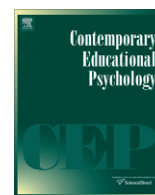




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## Affect and engagement during small group instruction

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## ABSTRACT

Two studies (Study 1:  $n = 137$ ; Study 2:  $n = 192$ ) were conducted to investigate how upper-elementary students' affect during small group instruction related to their social-behavioral engagement during group work. A circumplex model of affect consisting of valence (positive, negative) and activation (high, low) was used to examine the relation of affect to social loafing and quality of group interactions. Across both studies, negative affect (feeling tired or tense) was associated with higher rates of social loafing. Neutral to deactivated positive affect, such as feeling happy or calm, was positively related to positive group interactions, while deactivated negative affect (tired) was negatively associated with positive group interactions. Follow-up cross-lagged analyses to examine reciprocal relations suggested that positive group interactions altered affect on subsequent group tasks, but affect was not related to changes in positive group interactions. These quantitative findings were supplemented with a qualitative analysis of six small groups from Study 2. The qualitative analyses highlighted the reciprocal and cyclical relations between affect and social-behavioral engagement in small groups.

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## 1. Introduction

Both psychologists and educators have become increasingly interested in considering affect in academic contexts (c.f., Linnenbrink, 2006; Schutz & Lanehart, 2002; Schutz & Pekrun, 2007). Indeed, there is a growing body of evidence highlighting the importance of emotions and moods in supporting student engagement and achievement (Pekrun & Linnenbrink-Garcia, in press). The majority of this research has been conducted within more traditional classroom settings involving whole class instruction, individual seatwork, or homework. However, emotions may function differently when instruction requires high levels of social interaction such as during class discussions or small group work. Indeed, research on affect in discussion-based learning shows that intense, affective reactions can emerge in response to the social elements of instruction (Do & Schallert, 2004), suggesting that the social component of instruction may uniquely influence students' emotional responses and subsequent engagement. A small group context provides an interesting lens for the further examination of affect and engagement in relation to social interactions because group work requires significant social interaction, as students coordinate joint activity. Moreover, preliminary evidence suggests group processes may create unique emotional challenges that emerge during group disagreements or when resolving task challenges (Järvenoja & Jär-

velä, 2009; Wosnitza & Volet, 2005). Accordingly, the current work investigates the relation between affect and engagement during small group instruction.

In considering these relations, we contend that the conceptualization of engagement needs to be expanded beyond behavioral, cognitive, and emotional forms (c.f., Fredricks, Blumenfeld, & Paris, 2004) to account for the key role of social interactions in supporting learning within small groups. We call this form of engagement *social-behavioral engagement* and use this term to refer to social forms of engagement around academic tasks, including participation with classmates as well as the quality of social interactions. Social-behavioral engagement is critical within the group context, as group members' withdrawal of participation and effort from the group task and group discussion undermines opportunities for learning both for the non-participating student, but also in the lost opportunity for collaboration within the group (Crook, 2000; Van den Bossche, Gijssels, Segers, & Kirschner, 2006). Moreover, learning is hindered when students do not work cohesively or are disrespectful during small group work (Barron, 2003; O'Donnell, 2006; Van den Bossche et al., 2006; Webb & Palinscar, 1996). In this way, effective engagement in groups requires both a basic level of behavioral engagement, such as attending and responding to peer comments or contributing to the shared task, as well as high quality forms of social participation such as working cohesively, respectfully, and supporting other students' learning.

In the current studies, we operationalized social-behavioral engagement in terms of *social loafing* and *quality of group*

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*interactions*. Social loafing refers to the tendency for individuals to reduce effort when working collectively rather than alone, leading to disengagement from the group task (Karau & Williams, 1995). Quality of group interactions refers to the way in which group members support or undermine each other's participation; it can range from positive (e.g., actively working to support fellow group members' engagement, respecting other group members, working cohesively) to negative (e.g., discouraging other students from participating, disrespecting other group members, statements or actions that convey low cohesion).

Drawing from the field of experimental social psychology, there is some evidence that affect may influence social-behavioral engagement. Bramesfeld and Gasper (2008) experimentally manipulated undergraduates' mood and examined group functioning while participants solved a murder mystery. Undergraduates in a positive mood condition, relative to a negative mood condition, were more likely to listen to and discuss the various pieces of evidence provided by group members and thus successfully solve the case. In an experimental study examining how fatigue related to social loafing, Hoeksema-van Orden, Gaillard, and Buunk (1998) found that fatigue was associated with greater disengagement and social loafing among undergraduates working in four-person groups rather than alone on a series of laboratory tasks.

Research examining emotions and engagement during undergraduate discussion-based instruction highlights the ways in which affect shapes engagement during social interactions. Do and Schallert (2004) found that positive affect was associated with heightened engagement (moving from attending to listening), while negative affect was associated with disengagement (moving from attending to tuning out) during group discussions. However, the social nature of the discussion also introduced complexity in the interplay between affect and social interactions. Students responded with positive and negative affect to the social dynamics of the situation; and, negative affect during social interactions at times prompted students to engage, rather than disengage, in the discussion. Their results also suggest that affect is dynamic and reciprocal, as students reported shifts in affect throughout discussion. Taken together, the laboratory and discussion-based results suggest that affect may have a dynamic relation with engagement in small group settings and may uniquely predict certain types of social-behavioral engagement.

Prior research on affect and behavioral engagement (e.g., effort and persistence) in traditional classrooms may also inform our understanding of how affects relates to social-behavioral engagement in small groups. Theoretical models, drawn largely from social psychology, suggest several competing hypotheses. On one hand, a number of models suggest that negative affect increases

and positive affect decreases engagement. For instance, the control-process model proposes that affect emerges in reaction to the rate of progress towards or away from a goal (Carver, Lawrence, & Scheier, 1996). Positive affect emerges when one is progressing faster than expected, which may result in coasting leading to behavioral disengagement from the current goal. In contrast, negative affect signals an insufficient rate of progress, which may result in increased effort (to increase the rate) or disengagement. Similarly, the affect-as-information model states that negative affect signals a threat, resulting in vigilance and increased engagement, whereas positive affect signals that all is well, resulting in decreased engagement (Schwarz, 1990); however, Bless et al. (1996) clarified that positive mood may simply allow one to use heuristic processing and may not reduce overall effort levels. In contrast, Fredrickson's (2001) broaden-and-build theory suggests that positive affect increases engagement, as positive emotions (happiness, joy) help to broaden one's thought-action repertoire and build resources.

Within school contexts, there is greater support for Fredrickson's (2001) model. Overall, positive affect facilitates effort and persistence (Ainley, Corrigan, & Richardson, 2005; Efklides & Petkaki, 2005; Pekrun, Frenzel, Goetz, & Perry, 2007; Pekrun, Goetz, Titz, & Perry, 2002). For negative affect, the pattern appears more nuanced. In many studies, negative affect, including sadness, anxiety, frustration, and boredom, undermined behavioral engagement (Ainley et al., 2005; Assor, Kaplan, Kanat-Maymon, & Roth, 2005; Boekaerts, 2007; Pekrun et al., 2002). However, Pekrun et al. (2007) noted that negative emotions such as anxiety and anger can energize students thus increasing rather than decreasing engagement.

Overall, this prior research suggests that positive affect should support social-behavioral engagement during small group work. The relation of negative affect to social-behavioral engagement is not as clear, but generally suggests that both neutral (sad) to deactivating (boredom) negative affect should decrease social-behavioral engagement while activated negative affect (anxiety) may either increase or decrease it. Nonetheless, one must keep in mind that much of this prior research was conducted in traditional classrooms where peer-to-peer social interactions are not central; as such, these findings may not translate directly to small group contexts. Moreover, much of this prior research focuses on affect as a predictor of engagement, and does not examine reciprocal influences.

Accordingly, the current studies explored the relation of affect to social-behavioral engagement during small group learning, taking into account potential reciprocal relations. In this work, we conceptualized affect as a state consisting of both moods

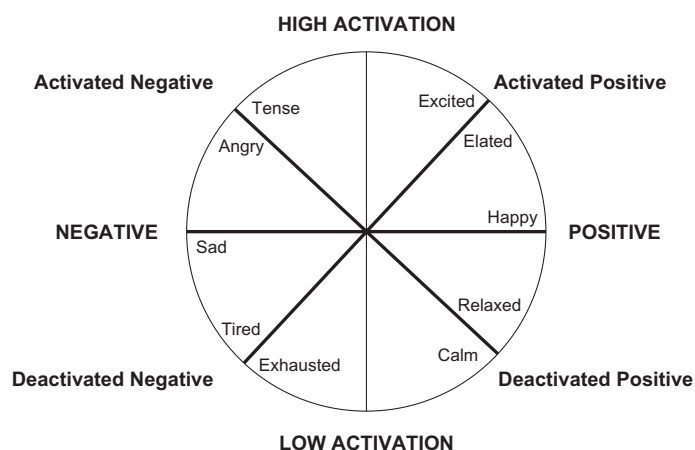


Fig. 1. Affective circumplex. Model adapted from Feldman Barrett and Russell (1998).

(relatively long-lasting and mild in intensity) and emotions (more intense, shorter in duration, which often emerge in response to a particular referent; Rosenberg, 1998). Given the transitory nature of affective states, we contend that affect is likely to emerge and shift during social interactions, but that it is still an individual experience since individuals may have unique emotional responses to the same shared event. Our conceptualization of affect includes two dimensions: valence (positive to negative) and activation (high to low). To capture these dimensions, we utilized Feldman Barrett and Russell's (1998) circumplex model that distinguishes among activated (excitement), neutral (happy), and deactivated (relaxation) forms of positive affect; activated (tense), neutral (sad), and deactivated (tired) negative affect; and neutrally-valenced activated and deactivated affect (see Fig. 1). The inclusion of valence and activation is important, as the consideration of both dimensions allows a more complex understanding of how affect shapes academic engagement, which has proven useful in prior work research (Pekrun & Linnenbrink-Garcia, in press).

## 2. Current studies

In two studies using two distinct samples of upper-elementary school students, we investigated how affect during small group instruction related to social loafing and quality of group interactions. Given the complexity of studying affect in educational settings (Pekrun & Schutz, 2007), we employed a multi-method approach. In Study 1, we focused on how the affect students experienced within their small groups related to social-behavioral engagement. The aim of Study 2 was to replicate the findings from Study 1 using a new sample, and to extend these findings to account for the dynamic nature of affect using cross-lagged analyses to examine reciprocal relations between affect and social-behavioral engagement. In Study 2, we also analyzed video observations from six small groups to provide a more in-depth understanding of how affect emerges in small groups and to explore the potentially dynamic relation between affect and social-behavioral engagement.

## 3. Study 1

To examine how affect that emerged during small group work related to social-behavioral engagement, we examined student-reported affect, social loafing, and quality of group interactions immediately after students worked on a 30-min small group mathematics task. Drawing from the extant research, we hypothesized that the relation of affect to engagement would vary as a function of valence and activation. Specifically, we expected that negative affect at all levels of activation would increase social loafing. While it is possible that activated negative affect might instigate heightened engagement (Pekrun et al., 2007), we expected that heightened anxiety or frustration would lead to disengagement from the group, perhaps in part as a way to regulate negative feelings. Positive affect, especially activated (excited) forms, was expected to enhance students' willingness to engage thereby decreasing social loafing. With respect to quality of group interactions, we hypothesized that deactivated positive affect would facilitate positive group interactions, as feeling calm may increase group members' willingness to listen to fellow group members, respect one another, and facilitate feelings of cohesion. Highly activated positive affect (excitement) may interfere with positive group interactions in that individuals may be so excited that they fail to listen to or seek out other group members' views or may interrupt fellow group members. Both activated and deactivated negative affect should undermine positive group functioning by interfering with students' capacity to respond respectively to fellow group members.

## 3.1. Method

### 3.1.1. Participants

Participants were 138 fourth and fifth grade students from a working class school district. Approximately equal numbers of females ( $n = 75$ ) and males ( $n = 63$ ) participated. The majority of the sample was Caucasian (84.4%), with a small percentage of students of African-American (11.1%), Asian (1.5%), or mixed (3%) descent. One student did not complete the post-test survey so was dropped from all analyses.

### 3.1.2. Procedures

Researchers assigned students to three-person groups that systematically varied in terms of gender ratio and teacher-rated ability level. Nineteen male majority (two males, one female) and 25 female majority (two females, one male) groups were created; two groups consisted of all female students. There were 87 homogenous ability groups and 51 heterogeneous ability groups. The ethnic make-up of the groups approximately mirrored that of the classroom.

Students worked on a 30-min group activity requiring a combination of problem solving and computational skills to plan a trip to an amusement park.<sup>1</sup> Groups were given a budget and 'coupons' so that they could plan how much to spend on meals and fun activities following specific guidelines (e.g., they had to allocate money for food). Group materials were distributed across the group to encourage students to work collaboratively. Pilot testing suggested that the task was challenging, but appropriate for fourth/fifth grade students. Immediately following the activity, students returned to their individual seats and completed a questionnaire assessing their affect and social-behavioral engagement. All items were rated on a five-point Likert scale ranging from 1 (not at all true) to 5 (very true). Exploratory and confirmatory factor analyses were employed to create the final scales.

### 3.1.3. Measures

Four multiple-item scales were used to assess affect: *activated positive* (e.g., excited;  $\alpha = .77$ ), *deactivated positive* (e.g., calm;  $\alpha = .75$ ), *activated negative* (e.g., tense;  $\alpha = .72$ ), and *deactivated negative* (e.g., tired;  $\alpha = .86$ ) (see Appendix A). This measure was developed based on Watson and Tellegen's (1985) and Thayer's (1986) assessments of affect.

Social loafing and positive group interaction were assessed with scales developed for this study (see Appendix A). The *social loafing* scale (four items,  $\alpha = .71$ ) assessed whether students disengaged from the group and allowed other group members to do the work. The *positive group interaction* scale (four items,  $\alpha = .83$ ) measured students' perceptions of positive group functioning including listening to each other, actively engaging in the group, and working well together.

## 3.2. Results

Correlations are provided in Table 1. Structural equation modeling (SEM) was employed to examine the four affective indicators as predictors of social loafing and positive group interaction using Mplus (version 4.2, Muthen & Muthen, 1998–2006). Since students were nested in groups, we first examined the design effect, which takes into account the intraclass correlation and cluster size and

<sup>1</sup> Study 1 was part of a larger experimental study examining how different achievement goal classroom structures related to students' learning and engagement. The goal manipulation was not successful and all measures used in the current study were taken at the end of the math unit. Therefore, the goal conditions were treated as the normal classroom variation that might occur and were not included as part of the study.

**Table 1**  
Study 1 and Study 2: Bi-variate correlations.

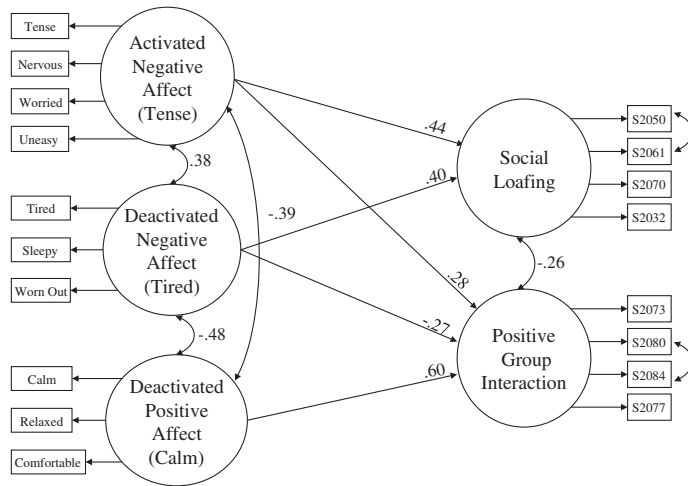
Study 1	Activated positive affect	Deactivated positive affect	Activated negative affect	Deactivated negative affect	Social loafing	Positive group interaction
Activated pos affect	–	.42	.09	–.42	–.09	.30
Deactivated pos affect	–	–	–.21	–.37	–.24	.47
Activated neg affect	–	–	–	.28	.38	–.04
Deactivated neg affect	–	–	–	–	.43	–.38
Social loafing	–	–	–	–	–	–.30
Positive group int.	–	–	–	–	–	–

Study 2	Sad–happy				Calm–tense				Tired–excited				SL	Positive group interaction			
	1	2	3	Avg.	1	2	3	Avg.	1	2	3	Avg.		1	2	3	Avg.
Sad–happy 1	–	.48	.35	.78	–.17	–.21	–.05	–.19	.45	.40	.30	.49	–.17	.36	.27	.25	.34
Sad–happy 2	–	–	.36	.79	–.05	–.17	–.03	–.11	.21	.67	.22	.46	–.04	.47	.54	.35	.51
Sad–happy 3	–	–	–	.75	.02	–.03	–.18	–.08	.31	.34	.48	.48	–.14	.32	.30	.47	.42
Sad–happy avg.	–	–	–	–	–.08	–.18	–.11	–.16	.41	.61	.43	.62	–.15	.49	.48	.46	.55
Calm–tense 1	–	–	–	–	–	.39	.31	.77	–.06	–.08	–.09	–.10	.23	–.04	–.02	.05	–.00
Calm–tense 2	–	–	–	–	–	–	.33	.78	–.01	–.18	–.06	–.10	.11	–.10	–.22	–.13	–.17
Calm–tense 3	–	–	–	–	–	–	–	.71	–.04	–.09	–.16	–.12	.09	–.06	–.11	–.06	–.09
Calm–tense avg.	–	–	–	–	–	–	–	–	–.05	–.16	–.13	–.14	.19	–.09	–.16	–.06	–.12
Tired–excited 1	–	–	–	–	–	–	–	–	–	.36	.48	.79	–.11	.28	.25	.23	.29
Tired–excited 2	–	–	–	–	–	–	–	–	–	–	.43	.78	–.22	.45	.56	.41	.54
Tired–excited 3	–	–	–	–	–	–	–	–	–	–	–	.81	–.14	.30	.30	.44	.40
Tired–excited avg.	–	–	–	–	–	–	–	–	–	–	–	–	–.20	.44	.47	.45	.52
Social loafing <sup>a</sup> (SL)	–	–	–	–	–	–	–	–	–	–	–	–	–	–.27	–.15	–.25	–.26
Pos group int. 1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.62	.63	.86
Pos group int. 2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.67	.87
Pos group int. 3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.89
Pos group int. avg.	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

Study 1:  $r \geq .22$  significant at  $p < .05$ ,  $r \geq .24$  significant at  $p < .01$ ,  $r \geq .30$  significant at  $p < .001$ . Study 2:  $r \geq .15$  significant at  $p < .05$ ,  $r \geq .19$  significant at  $p < .01$ ,  $r \geq .25$  significant at  $p < .001$ .

<sup>a</sup> Social loafing across all three group activities was reported following completion of the math unit.



**Fig. 2.** Affect to engagement for Study 1 ( $n = 137$ ). Errors among item indicators within a single scale were allowed to correlate, as needed to improve model fit. Non-significant paths were removed from the final model.

can be used to determine whether the nested nature of the data needs to be accounted for when calculating parameter estimates. When design effects are smaller than 2, standard errors are not typically underestimated making it less likely that spurious effects will emerge (Muthen & Satorra, 1995). In our data, design effects ranged from 1.23 to 1.74; this suggests that SEM analyses can be conducted at the individual rather than group level.

To examine whether social-behavioral engagement varied based on group composition (gender ratio, ability grouping), we included two dichotomous variables differentiating male/female majority groups and homogenous/heterogeneous ability groups. There were no statistically significant differences in social loafing

or positive group interactions as a function of either group composition variable nor did the relation of affect to engagement change when these variables were removed from the model. Therefore, neither group composition variable was included in the final model. Activated positive affect (excitement) was also removed from the final model because it was unrelated to both social loafing and positive group interactions.

The overall fit of the final model was good ( $\chi^2(123) = 173.01$ ,  $p < .01$ ; CFI = .94, TLI = .93, RMSEA = .05, SRMR = .06). As shown in Fig. 2, social loafing was more likely to occur when students reported either activated (tense,  $\beta = .44$ ) or deactivated (tired,  $\beta = .40$ ) negative affect. Positive group interaction was also signifi-

cantly predicted by activated and deactivated negative affect and deactivated positive affect. Students who felt calm reported more positive group interactions ( $\beta = .60$ ); tired students were less likely to report that their groups interacted positively ( $\beta = -.27$ ). The results for activated negative affect (tense) were somewhat surprising and seemed to be a function of statistical suppression. Activated negative affect was positively associated with positive group interaction ( $\beta = .28$ ); however, the correlation between these latent variables was small and negative ( $r = -.05$ ).

### 3.3. Discussion

Overall, the findings for Study 1 are generally aligned with our hypotheses and suggest that affect is related to students' social-behavioral engagement during small group instruction. Both deactivated and activated negative affect were associated with lower social-behavioral engagement in terms of social loafing and quality of group interactions, while deactivated positive affect was positively related to positive group interactions. These findings highlight the need to consider multiple dimensions of affect, as the results for social loafing and positive group interaction varied by valence and activation. Contrary to our hypotheses, feelings of excitement (activated positive affect) were not significantly related to lower social loafing.

While the multi-dimensional model of affect seems useful for understanding group functioning, there were several limitations to Study 1. First, the affect dimensions were highly correlated, which may have contributed to the aforementioned suppression effect. Our selection of scales also prohibited us from examining neutral levels of activation (sad, happy). Finally, caution should be taken when interpreting the findings because all measures of affect and engagement were collected after a single, 30-min group session. As such, we were not able to determine the directionality of the relations. A single group session may also not reflect small group instruction in elementary classrooms, where students typically work in groups over the course of several days on a single activity or work on multiple activities in the same group.

## 4. Study 2

Study 2 was designed to replicate and extend the findings from Study 1. Three important changes were made. First, we expanded the time frame of the study and incorporated the group task as part of daily classroom activities to increase the authenticity of the study. Specifically, we assessed students' affect during a 5-week mathematics unit so we could investigate how affect might relate to engagement in small group contexts over time. This change also enabled us to consider potential reciprocal relations among affect and engagement, which have been proposed by a number of researchers (c.f., Schutz & Pekrun, 2007). Second, affect was assessed using three bi-polar indicators so that we could include a measure of neutral activation. This type of assessment may also yield more distinct indicators of affect that are not as highly correlated, thus reducing suppression. Third, we videotaped a sub-set of students to further explore the way in which affect supported or undermined engagement and group functioning.

### 4.1. Method

#### 4.1.1. Participants

Participants were 192 fifth and sixth grade upper-elementary students from a working class school district. An equal number of females ( $n = 96$ ) and males ( $n = 96$ ) participated. Most of the sample was either African-American (54.2%) or Caucasian (43.8%), with a small percentage of students of Native American

(1.6%) or Hispanic (0.5%) descent. This sample represents a subset of students who participated in a larger study (Linnenbrink, 2005).<sup>2</sup>

#### 4.1.2. Procedures

Following the instructions provided by the first author, classroom teachers assigned students to four-person groups. Teachers were asked to create groups that were heterogeneous in teacher-rated math ability (one low, two medium, and one high), whose gender and ethnic make-up approximately mirrored the distribution within the class as a whole. When this was not possible, groups closely approximating this design were created. Before the mathematics unit began, students completed three group-training activities (broken circles, jigsaw puzzle, conflict resolution) designed by Cohen (1994) to facilitate productive group interactions. As part of a larger 5-week mathematics unit on statistics and graphing, all students completed three small group assignments, each lasting approximately two 50-min class sessions. Group tasks included lower-order (calculate the mean, median, mode) and higher-order (e.g., students explained which statistic best represented the data) questions. Teachers provided the groups with one set of materials to share and assigned group roles (facilitator, recorder, materials manager, presenter),<sup>3</sup> which rotated for each group activity. Group interdependence was fostered by awarding points based on the group's score on the group activity and their individual quiz scores. After each group activity, students were queried about their current affect and positive group interactions. At the end of the math unit, participants completed additional questionnaires assessing their social loafing during the three group activities.

From the five participating 6th grade classrooms, the first author randomly selected two groups per classroom for videotaping; only four-person groups where all group members had video consent were eligible. Groups were videotaped for 1 day during each of the small group activities. The first two authors qualitatively analyzed the videotapes of six out of the 10 groups. Four groups were dropped to ensure group membership was similar to the full sample. This sub-sample of six groups consisted of 24 students (10 female, 14 male; 11 Caucasian, 12 African-American, one Latino). Approximately 130 min of video were collected per group.

#### 4.1.3. Measures

With the exception of the affect scales, all items were similar to those used in Study 1, were rated on a five-point Likert scale ranging from 1 (not at all true) to 5 (very true), and were created based on exploratory and confirmatory factor analyses (see Appendix A for list of items). As noted above, positive group interaction was assessed following each of the three group activities ( $\alpha = .86, .86, .89$  for time 1, 2, and 3). Social loafing ( $\alpha = .81$ ), which was assessed at the end of the unit, measured students' overall tendency to loaf across the three group activities.

Student affect was assessed with three bi-polar indicators after each group activity. Students reported feeling sad (1) to happy (9), calm (1) to tense (9), and tired (1) to excited (9) by circling a num-

<sup>2</sup> The purpose of the larger study was to examine how classroom goal conditions (mastery, performance, combined mastery-performance) shaped students' motivation, affect, behavior, and achievement. The current manuscript focuses on the relation between affect and engagement using data collected during the small group interactions as the primary data source (these data were not reported in the larger study). The current study does not focus on the classroom goal conditions. Any differences that may have emerged as a function of the condition are reflected in the assessment of both affect and engagement, as students completed all measures reported in the current manuscript after the goal condition manipulation. Further, the relation between affect and engagement was not expected to vary as a function of the goal condition.

<sup>3</sup> In some classrooms, teachers allowed groups to select group roles.

ber from 1 to 9 for each bi-polar dimension. These dimensions were chosen to represent valence (sad to happy) and the corresponding orthogonal dimensions representing the cross between valence and activation (e.g., deactivated positive (calm) to activated negative (tense) and deactivated negative (tired) to activated positive (excited), see Fig. 1). Cronbach's alpha was not calculated for these items, as they are all single item indicators.

#### 4.1.4. Video observation and analyses

The analysis of the videotape observations was based on the guidelines described by Miles and Huberman (1994). First, the first two authors viewed the videotapes and created elaborated running records for each tape. Elaborated running records focused on capturing dialog, behavior, and student interactions related to our a priori areas of interest and student interactions regarding the task (e.g., what students said and did as it pertained to mathematics). These running records were subsequently jointly coded by the first two authors using Nvivo for affective tone, off-task behavior, and quality of group interactions.<sup>4</sup> Codes were not mutually exclusive; portions of the video narrative could be coded using multiple codes. After coding the running records for the larger coding categories, reports for each code were printed and the first two authors independently coded the segments using sub-codes (e.g., the different types of affect, different forms of quality of group interaction); any disagreements were resolved to 100% consensus. Descriptions of the relevant codes used in this paper are provided below; more detailed examples of each code are available upon request from the authors.

**4.1.4.1. Affect.** We began by coding all evidence of affect as related to either on-task or off-task behavior. Based on the affective circumplex, we then coded each instance as representing activated positive (excited, joking), neutral positive (happy, content), deactivated positive (relaxed, calm), activated negative (anxious, frustrated, angry, annoyed), neutral negative (upset, sad), or deactivated negative (bored, tired, exhausted) based on the affect circumplex presented in Fig. 1. Indicators of affect including the use of facial expressions (e.g., large grin; furrowed brow; glaring), body language (e.g., arms crossed on one's chest; backing away from the group), tone (e.g., anger), specific statements expressing affect (e.g., "I'm bored"), and the vocalization of affect through specific comments (e.g., David told his group "Jupiter has 16 satellites... Wow, that is way up there" and then exclaimed, "wheeee" as he drew the line graph up to 16.)

**4.1.4.2. Social loafing.** Running records were coded for student behavioral disengagement, or off-task behavior. Off-task behavior was differentiated between whole group disengagement and partial-group disengagement (e.g., when one or more group members were observed still working on the task). The latter instances were considered evidence of social loafing. This coding scheme assumes that social loafing occurs when at least one other group member is working, as the non-participating student(s) is (are) not assisting the group. Behaviors coded as social loafing included engaging in task irrelevant behaviors such as drawing, talking to a peer from a neighboring group, singing, simply not participating, and so forth.

**4.1.4.3. Quality of group interactions.** Two forms of group interactions were coded. *Positive group interactions* were coded when students engaged in active listening and respect (e.g., made eye contact, paid attention to other group members, responded to group member's efforts and contributions), worked to include a

group member (e.g., provided positive feedback, actively attempted to involve the whole group), or worked cohesively (e.g., worked together as a team, referred to the group as "we"). *Negative group interactions* were identified when students explicitly discouraged a group member's participation on the task (e.g., criticized her work, refused to give him a portion of the task), disrespected another group member (e.g., ignored a group member, put-down a group member), or were not cohesive (e.g., the group decided not to work together or made statements suggesting they did not think of each other as part of a team).

**4.1.4.4. Qualitative analysis.** After coding was complete, we developed summaries for each videotape that included a count of the coded instances and an in-depth description of each code. Next, we created a group summary that described the commonalities for each code across the three observations for each group and highlighted any salient instances from a single observation. In both the single videotape and whole group summaries, we noted overlap among codes (e.g., affect and social loafing). For the final phase of analysis, we used these summaries to draw conclusions regarding the relation between affect and engagement across the groups, remaining open to the directionality of the relation and the possibility of reciprocal relations.

## 4.2. Results

Results are presented in three sections. First, we present the quantitative analyses examining affect as a predictor of social loafing and positive group interactions, testing a similar model to that tested in Study 1. Second, we examine reciprocal relations between affect and positive group interactions using cross-lagged analyses. Third, we report on our qualitative analysis of the small groups based on the video observations.

### 4.2.1. Affect to engagement

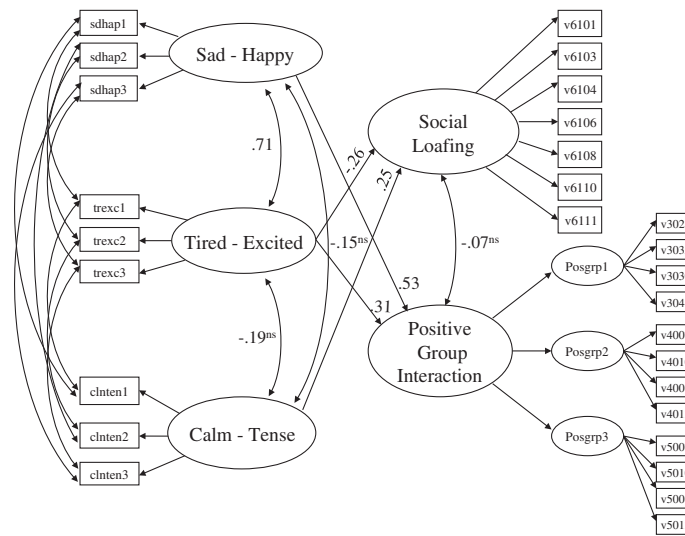
Correlations for Study 2 are provided in Table 1. As in Study 1, we used Mplus (version 4.2, Muthen & Muthen, 1998–2006) to examine the relation of affect during the three small group activities to engagement. Because affect and positive group interactions were measured at three time points, a latent variable was created for each affect variable (sad–happy, tired–excited, calm–tense) and positive group interactions to represent the average level of affect or group interaction across the three group assignments (see Fig. 3). To determine whether it was necessary to take into account the nesting of students in groups, we again calculated the design effect. For all observed variables except one (design effect = 2.015), the design effects were below 2, ranging from 1.21 to 1.84; thus we analyzed the data at the individual level.

The overall fit of the final model was good ( $\chi^2(340) = 500.53$ ,  $p < .001$ ; CFI = .93, TLI = .93, RMSEA = .05, SRMR = .06). Similar to Study 1, feeling more tense than calm ( $\beta = .25$ ) was positively related to social loafing, while feeling more excited than tired was negatively related social loafing ( $\beta = -.26$ ). Feeling more happy than sad ( $\beta = .53$ ) and more excited than tired ( $\beta = .31$ ) were both associated with higher positive group interactions (see Fig. 3).

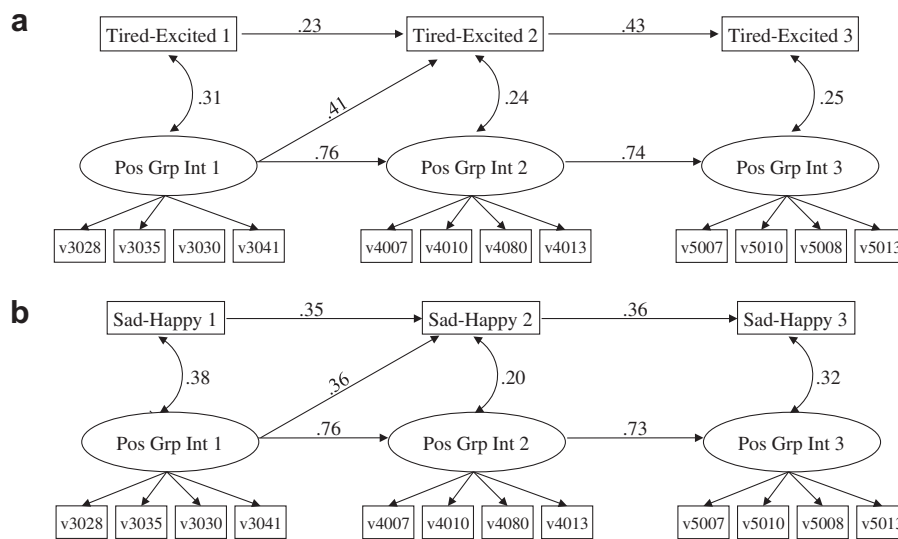
### 4.2.2. Reciprocal relations between affect and positive group interactions

We conducted cross-lagged analyses examining reciprocal relations between affect and positive group interactions across the three group activities; we were not able to conduct a parallel analysis for social loafing as it was only assessed at one time point during the post-test. Two sets of cross-lagged analyses were conducted, one for tired–excited and the other for sad–happy (see Fig. 4). Calm–tense was not examined since it was not a significant predictor of positive group interactions in the prior analyses.

<sup>4</sup> The creation of narratives and coding of these videotapes is part of a larger study examining motivation in relation to small group interaction. As such, the narratives and codes focused on a broad array of constructs not discussed in the current manuscript.



**Fig. 3.** Affect to engagement for Study 2 ( $n = 192$ ). Items from times 1, 2, and 3 were constrained to contribute equally to the average latent variables for affect and were allowed to correlate within each time point. For positive group interactions, the first-order latent variables for times 1, 2, and 3 were constrained to contribute equally to the second-order latent variable. Based on initial analyses, we utilized a model with measurement invariance for positive group interaction across time. Non-significant paths were removed from the final model.



**Fig. 4.** Cross-lagged model examining tired–excited (a) and sad–happy (b) with positive group interaction ( $n = 192$ ). Based on initial analyses, we utilized models with measurement invariance for positive group interaction across time. Comparison of nested models indicated that the stability paths between time 1 and 2 could be constrained to be equal the paths between time 2 and 3 for positive group interactions in both models and sad–happy (Model 4b). Affect and positive group interactions were allowed to freely correlate at time 1 and the errors (disturbances) for affect and positive group interactions were allowed to freely correlate at times 2 and 3. Non-significant paths were removed from the final model.

The overall fit of the final models for tired–excited and positive group interaction ( $\chi^2(92) = 194.52, p < .001$ ; CFI = .93, TLI = .92, RMSEA = .08 SRMR = .07) and sad–happy and positive group interaction ( $\chi^2(93) = 180.79, p < .001$ ; CFI = .94, TLI = .94, RMSEA = .07, SRMR = .07) was acceptable (see Fig. 4). For both models, the paths from positive group interaction for the first activity to tired–excited and sad–happy for the second activity were statistically significant. Students who perceived that their group got along well together during the first group activity reported that they were more excited than tired ( $\beta = .41$ ) and more happy than sad ( $\beta = .36$ ) during the second activity; the relations were in a similar direction for time 2 to time 3, but the strength was reduced and was not statistically significant. As shown in Fig. 4a and b, per-

ceived positive group interaction remained more stable across the three activities in both models (Model 4a:  $\beta = .76_{T1-T2}, .74_{T2-T3}$ ; Model 4b:  $.76_{T1-T2}, .73_{T2-T3}$ ) than did student reports of feeling tired–excited ( $\beta = .23_{T1-T2}, .43_{T2-T3}$ ) or sad–happy ( $\beta = .35_{T1-T2}, .36_{T2-T3}$ ).

#### 4.2.3. Qualitative analysis based on videotape observations

Qualitative analyses were conducted to provide a more in-depth understanding of the relation between affect and social-behavioral engagement in small groups. We were especially interested in exploring how affect emerged in relation to social interactions and unpacking the dynamic relation between affect and social-behavioral engagement.

4.2.3.1. *Social loafing.* Overall, our qualitative analyses suggested that negative affect was associated with the tendency to loaf. For example, about 30 min into the second observation, Denise<sup>5</sup> put her head down on the desk, saying that her head hurt (*deactivated negative affect, tired*).<sup>6</sup> For the remainder of the task, she only engaged in off-task conversations but did not engage in any group work, instead letting Pam and Ray complete and edit the remainder of the group's work on the task.

Students also appeared to socially loaf when they experienced negative affect regarding the task or their assigned group role (e.g., reporter, facilitator, materials manager, presenter). For instance, when Sam learned that he was assigned the role of reporter, he crouched over and put his head down on the desk (*deactivated negative affect, tired*) and later appeared frustrated with having to record the group's work (*activated negative affect*). Later, when students discussed the directions and began recording their response to the math task, Sam conveyed to the group that he would rather let everyone else in the group do the work. "I'm just reporter. I don't listen to anything . . . I'm recorder. What am I supposed to do? . . . I just don't understand." Throughout the task, Sam did not fully engage unless his group encouraged him to record and remain involved.

However, it is important to note that, in addition to negative affect, many other group processes (e.g., discouraging participation, collaborative versus cooperative forms of engagement) also seemed to co-occur with social loafing. For example, groups that decided to assign different parts of the task and rotate task work around the group so that each group member completed it alone seemed to encourage social loafing.

In addition, our qualitative analyses suggested that social loafing was related to both positive and negative feelings. For instance, when students were disengaged from the task while the rest of the group was working, they at times appeared bored or tired (*deactivated negative affect*). However, there were also a number of instances in which those group members who were loafing from the task together displayed positive affect, joking with one another and laughing about topics unrelated to the task (*activated positive affect*). These displays of positive affect were often prolonged and appeared enjoyable for the students; in this way positive affect experienced during loafing episodes may have prolonged these periods of off-task behavior in which several group members failed to contribute to the group task.

Overall our qualitative analyses on social loafing were consistent with but also extended the quantitative findings. In line with the quantitative findings, our observations suggested that negative affect (both activated and deactivated) initiated social loafing. However, there were also instances in which affect emerged after students had already disengaged from the task. These observations suggest that the relation between social loafing and affect is likely reciprocal.

4.2.3.2. *Group interaction.* We also used the qualitative data to examine the relation between quality of group interaction (both positive and negative) and affect. Overall, our qualitative analyses were aligned with the cross-lagged analyses, suggesting that quality of group interactions typically initiated affect and that the relations between quality of group interactions and affect were cyclical. Below, we provide more detail to justify these claims.

One cyclical pattern occurred when harsh negative group interactions (*discouraging participation, disrespect*) seemed to provoke

activated negative affect (upset, frustrated). Subsequently, the group member who was the target of the negative interaction retaliated by communicating disrespect to the first offending group member. This cyclical pattern was observed in a number of groups and often recurred throughout their group work. For example, David's work on the task was frequently criticized or ignored within his group, which conveyed both disrespect and discouraged his participation as illustrated in the example below in which David drew a bar graph and Angela looked over at his work, harshly criticizing it:

Angela: See, David. The line in the bar graph is supposed to be up here by the moon. Did you ever guess that? Did you figure? (*disrespect*)

David [in response]: Did you ever figure to shut your mouth? [*heightened tone*] (*activated negative affect, disrespect*).

David appeared upset and angered by this exchange. Subsequently, David and Angela continued to exchange disrespectful dialog using hurtful language and exhibiting negative affect as they continued their work on the task.

David: Stop acting like you got an IQ smaller than a rock. (*disrespect*)

Angela: I am not the one acting. You ain't got to act. (*disrespect*)

This cycle of disrespectful interactions and activated negative affect was maintained as Angela criticized David's work on the bar graph as they re-engaged with the group task.

Angela: David, don't you know how to make a bar graph? (*discouraging participation*) See the name [planet label on the x-axis]. You should have put that [label] right under that [accompanying bar], but instead you put it [bar] off to the side.

David: Do you know how to leave me alone? (*disrespect*)

The disrespectful interactions not only translated into a sustained cyclical pattern of sadness and frustration, but also meant Angela's feedback likely lost its informational benefit.

A second cyclical pattern began in a similar way to the first, starting with negative group interactions. However, in this pattern, positive affect and/or positive group interactions seemed to disrupt the ensuing cycle of negative group interactions and negative affect. This pattern is illustrated in the example below in which Pam's task contribution was initially interrupted by Ray, which appeared to lead to Pam's negative affect.

Pam [to Ray and Denise]: Ok, we have to make a bar graph, a line plot, and . . .

Ray [interrupting Pam] (*disrespect*): What are we doing? [then to Denise] Give me my pencil.

Pam [with a scowl on her face]: Hiss. (*activated negative affect*)

Ray responded by making fun of Pam for hissing at the group, which prompted the group to joke about Pam's hissing. Ray's joking seemed to effectively diffuse this potentially negative cycle of affect and interactions. In other instances, the group member who initiated the negative group interaction laughed or joked as the criticism or disrespect was delivered, which seemed to ease the impact of the negative comment.

Negative group interactions did not always initiate cycles of negative affect and disrespect. Often, these involved more mild forms of disrespect or discouraging participation, which may not have elicited the same heightened emotional response. At times, negative group interactions also led to deactivated rather than activated negative affect, such as boredom when a group member's contributions were ignored.

There was also some evidence that affect shaped the quality of group interactions. However, the pattern was somewhat different

<sup>5</sup> Pseudonyms are used throughout the article.

<sup>6</sup> Qualitative codes are indicated in parentheses and italics. Subjective interpretations, such as tone of voice, are indicated using brackets and italics. Clarifications regarding observed student behaviors or aspects of the task are included in brackets without italics.

than that suggested by the quantitative analyses. Feeling tired or frustrated with the task had the potential to evoke positive, rather than negative, group interactions in the form of responsiveness and active listening. For example, Sam experienced both activated (frustration) and deactivated (tired) affect while working the task. His group members responded by offering to help clarify what needed to be done.

Sam: Do I write first or do I draw ...? [*appearing frustrated*] (*activated negative affect*)

Briana: No, no, no, you don't write. You just say ... [pause]. See, do you think it's [the graph] going up or down? It's going up right? (*active listening, inclusion*)

Sam: Yea.

Briana: So you ...

Julie [adding to Briana's description]: describe ... then you choose the one that's misleading, tell why it's misleading, redraw the one that's misleading.

Briana and Julie's responsiveness to Sam's distress seemed to alleviate his negative affect and facilitate his subsequent engagement with the task.

Finally, we observed that positive affect and positive group interactions were mutually sustaining. This co-occurrence was particularly clear within the context of one group that displayed positive to neutral affect throughout the majority of their work on the three group activities. Their affect was generally more moderate in activation (calm, happy) and seemed to permeate the group interactions. Specifically, the group's tendency to actively listen, include one another, and their deliberate attempts to create a sense of team sustained a general positive tone. In addition, the calm and happy undertone allowed for sustained positive interactions. In this way, the co-occurrence of positive affect and positive group interactions seemed to support each other. Of note, this group also had relatively little negative affect, which further allowed for the general positive tone and positive group interactions. However, our observations suggested that it was not simply the absence of negative affect that seemed to support positive feelings and positive interactions for this group.

In summary, our observations were in line with the cross-lagged findings suggesting that quality of group interaction led to affect, although we also observed instances in which affect seemed to initiate quality of group interactions. These findings help to extend the quantitative results, suggesting a cyclical relation between affect and quality of group interactions.

#### 4.3. Discussion

The three sets of analyses examining how affect related to social-behavioral engagement in Study 2 show similar patterns. In the first set of analyses (see Fig. 3), feeling more excited than tired was negatively associated social loafing, while feeling more tense than calm was positively related to a tendency to loaf; sad-happy was not related to social loafing. For positive group interactions, feeling more happy than sad and more excited than tired was beneficial. This pattern of results is similar to those reported in Study 1. The main difference was that in Study 1 we found that deactivated positive affect (calm) was positively related to positive group interactions, whereas in Study 2, reports of feeling more calm than tense were not associated with positive group interaction. However, this may have occurred because calm-tense was measured as a bipolar variable in Study 2. Interestingly, in Study 1, we did not include the neutral activation dimension of sad to happy. Our findings from Study 2 suggest that feeling happy may also support positive group interactions. Across both studies, these findings

suggest that both neutral and deactivated positive affect relate to positive group interactions.

We further investigated the initial quantitative findings using both cross-lagged and qualitative analyses to examine reciprocal effects. These analyses suggest a more complex pattern and provide additional information regarding the directionality of the relation. Specifically, both the cross-lagged and qualitative analyses suggest that the models tested in Studies 1 and 2, in which affect predicts group interaction, are not entirely accurate. Rather, group interactions may lead to affect rather than vice versa. For social loafing, the qualitative findings are supportive of the idea that affect predicts loafing, but we could not examine this relation using cross-lagged analyses because social loafing was not measured at each time point.

Moreover, the qualitative analyses highlight the cyclical nature of the relation between quality of group interaction and affect. The findings suggest that negative group interactions and negative affect may feed upon each other over time, but that these cycles can also be interrupted by positive affect or positive group interactions. In a similar manner, positive group interactions seemed to emerge in response to a group member's negative affect. For instance, feeling tired or frustrated with the task appeared to evoke active listening. This somewhat counterintuitive pattern highlights the unique ways in which affect relates to social interactions within group contexts.

Finally, the cross-lagged analyses indicate that positive group interactions are more stable than emotions across the group activities. This evident stability suggests that patterns of group interactions are established early among group members and are then maintained across tasks. Additionally, these stable interactions seem to shape students' affective reactions, at least initially. The potential for the social context of the group to shape future emotions is similar to what has been observed during group discussions, in which certain patterns of social interactions and affective reactions are established early in the semester and appear to automatically shape future affect and engagement during subsequent interactions (Do & Schallert, 2004).

## 5. General discussion

Our results build upon and extend prior research on affect in collaborative groups (Järvenoja & Järvelä, 2005, 2009; Vass, 2007; Wosnitzer & Volet, 2005) by considering how the affect that emerges in small group settings relates to social-behavioral engagement (e.g., social loafing and quality of group interactions). Overall, the quantitative findings in Studies 1 and 2 suggest that negative affect (feeling tired or tense) is associated with higher levels of social loafing. This finding is consistent with prior research on social loafing conducted in lab settings (Hoeksma-van Orden et al., 1998), disengagement during discussions (Do & Schallert, 2004), as well as research conducted in more traditional academic settings on individual students' behavioral engagement (Assor et al., 2005; Boekaerts, 2007; Pekrun et al., 2002). The current work also helps to extend prior research on affect by considering the way in which affect relates to social interactions in a group setting. Specifically, our initial models suggest that neutral to deactivated positive affect, such as feeling happy or calm, seem to support positive group interactions, while feeling tired seems to undermine it. However, both our qualitative and cross-lagged analyses suggest that quality of group interactions influence affective responses rather than affect predicting quality of group interactions, as was originally hypothesized.

The notion that social elements of the learning environment influence students' affect has been proposed by others as well.

For example, Pekrun (2000) theorized that social factors shape the emotions that emerge in classroom settings via perceived value and control. And, there is evidence that teachers and peers can influence students' affect through instructional practices and social interactions (Assor et al., 2005; Do & Schallert, 2004; Frenzel, Pekrun, & Goetz, 2007; Goetz, Pekrun, Hall, & Haag, 2006; Meyer & Turner, 2007; Turner, Meyer, Midgley, & Patrick, 2003). However, much of the research on peer influences has focused on contagion effects, in which peers' positive regard for a domain is associated with a student's positive affect in that domain (Frenzel et al., 2007; Goetz et al., 2006). We extend this prior work by considering how the social interactions within a small group support students' positive affect (and reduce negative affect) during subsequent group activities. Students in groups that work well together may approach future group tasks with greater feelings of happiness and excitement, while students in groups with negative group interactions may approach future tasks feeling tired or sad.

Taken together, these results highlight the importance of considering both affect and social-behavioral engagement when using small groups as an instructional technique. For example, supporting positive group interactions seems critical, as negative group interactions may spark ongoing cycles of negative affect and reduce social-behavioral engagement. As such, training students to work effectively with peers prior to starting group work (c.f., Cohen, 1994) and helping them develop strategies for alleviating disagreements, disrespectful interactions, and negative affect may be especially important. Additionally, it is important to keep in mind that students' emotions can shape their social-behavioral engagement. When students are tired, tense, or frustrated, they may be more likely to disengage from the group task and allow other students to do their work. This disengagement has the potential to undermine both their own learning and the collaborative efforts of the group. As such, it is critical that teachers are sensitive to students' affective state, and consider the possibility that group work may be especially challenging for students who begin the group task with activated or deactivated negative affect.

### 5.1. Limitations and suggestions for future research

Our findings also highlight several potential avenues for future research. First, future research should further explore the reciprocal and dynamic relations between affect and engagement, both within traditional learning contexts as well as small group settings. While many theoretical models highlight the importance of considering reciprocal relations (c.f., Schutz & Pekrun, 2007), much of the extant empirical research examines unidirectional relations. Both our qualitative and cross-lagged quantitative findings highlight the need to expand our methodology to better understand the dynamic processes shaping socialization processes, affect, and engagement and learning in the classroom.

Additionally, future research should focus on understanding why some groups have cycles of negative interactions that are sustained, while other groups experience truncated cycles or quickly diffuse them with positive affect or positive group interactions. This difference between groups may occur because some groups are more effective at regulating group members' emergent emotional responses (Järvenoja & Järvelä, 2009) or are adept at regulating social interactions. However, it is not clear whether these actions are intentionally aimed to disrupt the negative cycle. Connections between emotion regulation in individual and group contexts may inform these processes. For example, our observations revealed that students use humor to diffuse negative group interactions, which is similar to regulatory strategies that

appear during individual learning (Op 't Eynde, De Corte, & Verschaffel, 2007). In addition, some group members may be friendly socially, which may enable them to more readily dismiss the negative undertones that emerge from disrespect or discouraging participation.

While we have focused on the lost opportunities for learning when social-behavioral disengagement occurs, there may also be a positive function of disengagement (Do & Schallert, 2004). Group members who opt to disengage may be restoring resources or diffusing a negative situation, ultimately enhancing group productivity. This possibility should be explored in future research. These results should also be replicated in older samples. Preadolescents may not be equipped with social skills to effectively function in group contexts. For example, they may make overly harsh or negative comments. Less developed emotion regulation strategies may also make it more difficult for preadolescents to cope with negative group interactions. Thus, it is possible that a different pattern may emerge among older students.

Finally, it is important to highlight that the way in which emotions are measured may shape the interpretation of the findings. For example, our qualitative findings suggest that frustration is quite apparent in small group contexts, yet we did not measure frustration quantitatively in either study. And, more activated forms of affect were easier to observe in the qualitative analyses, which may have skewed our qualitative results towards a focus on activated emotions such as frustration rather than sadness. Our selection of self-report measures may have also shaped our findings. While we found similarities in the quantitative findings across the two studies, the use of bi-polar versus single dimensional indicators altered our interpretation somewhat. As many have noted before (c.f., Linnenbrink, 2006; Schutz & Pekrun, 2007), the study of affect is especially challenging and may require the use of multiple methodologies.

### 5.2. Conclusion

In summary, the current studies highlight the need to investigate the relations among affect and social-behavioral engagement. Our findings largely parallel results observed using more traditional instructional techniques, but also extend these results by helping to unpack the way in which affect emerges when social interactions are more central. We found evidence that students' affect is associated with disengagement from the group task, thus limiting the opportunities for learning. Moreover, there was a clear interplay between affect and quality of group interactions, which were often cyclical in nature and suggest that quality of group interactions help to shape the affect that emerges while working in group contexts.

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## Appendix A

Measures (Study 1)	
<i>Affect</i>	
Activated positive	Deactivated positive
I felt like I had a lot of energy	I felt calm
I felt excited	I felt relaxed
I felt enthusiastic	I felt comfortable
I felt thrilled	
Activated negative	Deactivated negative
I felt tense	I felt tired
I felt nervous	I felt sleepy
I felt worried	I felt worn out
I felt uneasy	
<i>Social loafing</i>	
I tried to get the other kids in my group to do the hard parts (s2050)	
I let the other kids in my group do most of the work (s2061)	
I stopped listening to what others in my group were saying (s2070)	
I did not take part in my group (s2032)	
<i>Positive group interaction</i>	
The students in my group helped each other solve the activity (s2073)	
My group enjoyed working together (s2080)	
We all worked well together (s2084)	
The students in my group listened to each other (s2077)	
Measures (Study 2)	
<i>Affect</i>	
While I was working on assignment 1 (2, 3) in math with my group	
I felt sad (1) ... happy (9)	
I felt calm (1) ... tense (9)	
I felt tired (1) ... excited (9)	
<i>Social loafing</i>	
I let the other students in my group do most of the work (v6101)	
I stopped listening to what others in my group were saying (v6103)	
I let the other students in my group figure out how to solve the problems (v6104)	
I was not involved in helping my group solve the activities (v6106)	
I didn't help my group solve the activities (v6108)	
I tried to get the other students in my group to do the hard parts (v6110)	
I did not take part in my group (v6111)	
<i>Positive group interaction</i>	
My group enjoyed working together (v3028, v4007, v5007)	
We all worked well together (v3035, v4010, v5010)	
My group cared about what each person thought (v3030, v4008, v5008)	
The students in my group listened to each other (v3041, v4013, v5013)	

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