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Situational Interest within the Reciprocal Teaching Style: Roles of Dyad Composition and Students' Personal Variables

Vanessa Lentillon-Kaestner  and Cédric Roure 

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ABSTRACT

Purpose: Based on person-context interaction, situational interest (SI) has been used to interpret students' motivation in task engagement. Through two consecutive studies, the purpose of this research was to investigate the roles of forms of dyads (self-selected vs. ability), feelings of relatedness and perceived competence in eliciting students' SI within the reciprocal teaching style. **Method:** The first study examined the role of dyad composition to determine how to group students to elicit high SI (self-selected vs. ability dyads) and compared self-selected and ability dyads using repeated-measures of students' SI, perceived competence and feelings of relatedness, with 99 students in a PE unit. Based on the results of this first study, demonstrating the benefits of the self-selected dyads, the second study aimed to investigate the role of feelings of relatedness and perceived competence in eliciting students' SI within football (99 students) and gymnastics units (109 students) using MANOVAs and a cluster approach. **Results:** The first study's results showed higher scores for SI, perceived competence and feelings of relatedness in favor of self-selected dyads compared to ability dyads. In the second study within self-selected dyads, the results showed a small effect of perceived competence and a stronger effect of feelings of relatedness on SI. **Conclusion:** To elicit students' SI within the reciprocal teaching style, teachers should favor self-selected dyads. This paper highlights the importance of designing contexts where students can develop good peer relationships to increase SI. The implementation of self-selected grouping in PE is interesting since it is less time-consuming than other grouping strategies.

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Motivation in physical education (PE) is influenced by both contextual and personal factors (Bourgeois, 2006). Based on a person-context interaction, situational interest (SI) has been used to interpret students' motivation in task engagement (Renninger & Hidi, 2016). During the interaction between a student and a specific context (e.g., a teaching style or a learning task), SI can emerge as a psychological state and is characterized by increased attention, concentration and affect experienced (Ding et al., 2013; Renninger & Hidi, 2016). Previous studies on SI in PE have identified various teaching factors that elicit students' SI, such as learning task design (e.g., Roure & Pasco, 2018), the use of video feedback augmented by teachers' feedback (Roure et al., 2019) and specific characteristics of PE contexts such as coeducational classes (compared to single-sex classes) (e.g., Lentillon-Kaestner & Roure, 2019). Even if interesting results have been reported in relation to eliciting students' SI in PE, to date, no study has examined SI in the reciprocal teaching style, which is an interesting teaching style to implement in PE (e.g., Hennings et al., 2010). In this style, students work in pairs and take turns acting as the teacher, giving feedback based on performance criteria (Iserbyt et al., 2010). Since students' SI can emerge from their

interaction with this teaching style, researchers might take into account contextual and personal variables that are primarily related to this teaching style. The composition of the dyad in terms of ability and affinity is considered a critical contextual variable within the reciprocal teaching style, and to date, the role of dyad composition on students' motivation is not well documented in PE (Jenkinson et al., 2014; Ward et al., 2005). Furthermore, personal variables such as perceived competence and feelings of relatedness should also be examined considering their demonstrated influence on students' motivation in PE (e.g., Domville et al., 2019; Estevan et al., 2021; Garn et al., 2011; Wallhead et al., 2013) and relationships with dyad composition (i.e., self-selected vs. ability dyads). Grouping with friends (self-selected) or according to students' ability levels (ability dyads) within reciprocal teaching style might not have the same effects on students' SI or on students' perceived competence and feelings of relatedness (Byra & Marks, 1993; Ward et al., 2005). Herein, two consecutive studies were conducted to analyze how to better elicit students' SI within the reciprocal teaching style, taking into account dyad composition, students' perceived competence and feelings of relatedness.

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Peer-assisted learning: Reciprocal teaching style

Teaching strategies that use the active support of peers to help students acquire knowledge or skills are generically labeled peer-assisted learning (PAL) (Jenkinson et al., 2014; Ward et al., 2005). Although it included limited studies, comprehensive literature reviews supported the use of PAL in PE (Jenkinson et al., 2014; Ward et al., 2005). The reciprocal teaching style (also called reciprocal peer tutoring [e.g., Topping & Ehly, 1998] or Teaching Style C [e.g., Mosston & Ashworth, 2002]) is a subcategory of peer tutoring in which students work together to support one another's learning (Iserbyt et al., 2010). In this teaching style, students work in partnership relationships: one student performs the task (doer), while the other observes and provides feedback to him (observer). The teacher provides specific criteria that the observer uses to give accurate feedback to the doer. Then, the doer and the observer switch roles (i.e., structured groups; Iserbyt et al., 2010; Mosston & Ashworth, 2002). Within structured groups, role definition and switching are thought to create a positive interdependence between partners (Iserbyt, 2015; Iserbyt et al., 2010).

Teachers commonly use the reciprocal teaching style in PE (Hennings et al., 2010; Kulinna & Cothran, 2003); it is the third most frequently used style after the command and practice styles (Kulinna & Cothran, 2003). Despite many results showing the effectiveness of the reciprocal teaching style to develop motor skills (for a review, see Jenkinson et al., 2014), little is known about student perceptions within this teaching style (d'Arripe-Longueville, Gernigon, Huet, Winnykamen, et al., 2002; Ensergueix & Lafont, 2010), especially about student motivation (Chatzipanteli et al., 2015; Morgan et al., 2005; Pitsi et al., 2015). For example, Chatzipanteli et al. (2015) proposed student-activated teaching styles, including the reciprocal style, and showed higher lesson satisfaction and students' motivation compared to the command and/or the practice styles. In the same vein, Morgan et al. (2005) underlined that the reciprocal teaching style had positive effects on students' enjoyment, interest, and effort during PE lessons. Pitsi et al. (2015) compared three teaching styles (i.e., the reciprocal, the self-check, and the command styles) and showed that the implementation of the reciprocal and self-check styles in teaching Greek dance created a positive motivational atmosphere (with higher positive results for the self-check style). Even if previous results showed promising positive effects of the reciprocal teaching style on students' motivation, there is a need to better understand the motivational mechanisms of this style. Based on a person-context interaction, students' SI can be elicited during their interaction with the reciprocal teaching style through dyad composition, students' feeling of relatedness and perceived competence.

The role of dyad composition within the reciprocal teaching style, students' feelings of relatedness, and perceived competence

Influencing the learning context (Fernandez-Rio et al., 2017; Wallhead et al., 2013), the dyad composition in PAL may have an effect on students' motivation in PE; nevertheless, to date,

few previous studies have focused on this contextual variable (Jenkinson et al., 2014; Ward et al., 2005). Some studies on PAL or observational learning have focused on the effect of student ability level in dyad composition on students' learning outcomes and perceptions, but with contradictory results (Penny McCullagh & Weiss, 2001). Some studies have underlined the beneficial effect of asymmetrical dyads on learners' skills or self-efficacy in improvement (e.g., d'Arripe-Longueville, Gernigon, Huet, Cadopi, et al., 2002; d'Arripe-Longueville, Gernigon, Huet, Winnykamen, et al., 2002; Lirgg & Feltz, 1991). On the other hand, for example, McCullagh and Caird (1990) showed that learning models (i.e., demonstrations of a skill with some errors) led to higher motor performance than correct models (i.e., correct demonstrations of a skill), and McCullagh and Meyer's (1997) indicated that viewing either a correct or a learning model was equally effective in learning the correct form in the squat lift. Previous studies focused mostly on the influence of students' ability level in dyad composition and on learning outcomes (Jenkinson et al., 2014). However, considering the potential effects of the dyad composition on students' SI, within the reciprocal teaching style, another dyad composition (i.e., the self-selected dyads) might be compared to the ability dyads. "At this stage in the research, there is little to say about how best to group students" (Ward et al., 2005, p. 216). However, the self-selected dyads seem to be an interesting way to group students to improve the quality of relationships within dyads, notably feelings of relatedness (Byra & Marks, 1993; Ward et al., 2005). Grouping dyads by student self-selection allows students to work with their friends, and it is more comfortable to give feedback to and receive it from a person one likes and trusts (Byra & Marks, 1993; Ernst & Byra, 1998; Mosston & Ashworth, 2002). More precisely, by grouping students according to their degree of friendship and ability, Byra and Marks (1993) showed that observers gave specific feedback more frequently to friends than to nonacquaintances and that doers felt more comfortable receiving feedback from friends than from nonacquaintances.

In addition to dyad composition, as a critical contextual variable that can elicit students' SI within the reciprocal teaching style, researchers might take into account personal variables such as students' perceived competence and feelings of relatedness, two variables highly related to student motivation and to dyad composition within this teaching style. In other contexts, such as cooperative learning (Fernandez-Rio et al., 2017) or SE (Wallhead et al., 2013), previous research has shown the influence of social factors in PE on feelings of relatedness and student motivation. Feelings of relatedness imply both feelings of acceptance (i.e., feelings of being accepted, understood, respected, confident) and feelings of intimacy (i.e., an emotional and authentic attachment, secure relationships, human warmth) (Richer & Vallerand, 1998). Previous studies have shown the positive effects of peer acceptance, friendship quality, and learner likability on learner process and student motivation (e.g., Cox & Ullrich-French, 2010; Domville et al., 2019; Duncan, 1993; Fernandez-Rio et al., 2017; Smith, 2003; Wallhead et al., 2013). For example, Duncan (1993) showed positive relationships between higher perceptions of friendship and positive performance-related

affect in PE. Smith (2003) found that students who perceived lower peer acceptance reported higher social physique anxiety. Finally, SI studies in school subjects other than PE (i.e., biology, mathematics; Dohn, 2013; Nolen, 2007) showed the importance of social involvement and group interactions in SI development.

For example, in feelings of relatedness, students' perceived competence (more than actual ability level) is recognized as an important variable related to students' motivation (Estevan et al., 2021; Fairclough, 2003, 2006; Garn et al., 2011; Harter, 1978; Marsh et al., 2006; Weiss & Amorose, 2005). "Perceived competence refers to one's beliefs about his or her ability in an achievement domain. These beliefs are formed by information gathered from the environment and significant others. Such information could take the form of peer comparisons or teacher feedback" (Fairclough, 2006, pp. 5–6). As students develop their interest in an activity, they may become more confident of their skills, thereby increasing their perceived competence in the activity. Investigating the relationships between interest and perceived competence, researchers have reported that the development of students' interest was associated with the development of their perceived competence (Hidi & Renninger, 2006; Linnenbrink-Garcia et al., 2013; Roure & Lentillon-Kaestner, 2022). Furthermore, it has been demonstrated that students' perceived competence might be a key variable when explaining the transition from SI to individual interest (Lipstein & Renninger, 2007; Renninger & Hidi, 2002). Finally, Weiss and Duncan (1992) showed that perceived physical competence was related to social acceptance and affiliation. According to the aforementioned studies, it seemed interesting to examine the role of both personal variables, i.e., students' feelings of relatedness and perceived competence, in eliciting SI within the reciprocal teaching style.

Purpose and relevance of the study

The purpose of this research was to investigate the roles of forms of dyads (self-selected vs. ability), feelings of relatedness and perceived competence in eliciting students' SI within the reciprocal teaching style. According to the research design, two consecutive studies were conducted. The first study aimed to compare self-selected and ability dyads by evaluating their effects on students' perceived competence, feelings of relatedness, and SI in a six-lesson badminton unit. Based on the results of this first study, demonstrating the benefits of the self-selected dyads, the second study aimed to investigate the role of feelings of relatedness and perceived competence in eliciting students' SI in two four-lesson reciprocal teaching style units with self-selected dyads (i.e., gymnastics and football units).

This study is relevant for three main reasons. First, in their reviews, Ward et al. (2005) and Jenkinson et al. (2014) underlined the limited number of PAL studies, the lack of outcome evidence and the several methodological limitations of previous studies (e.g., lack of external validity, lack of control groups, mostly small sample size). Second, previous studies on the effect of dyad composition in PAL principally estimated the effects of ability dyads on students' learning outcomes (Jenkinson et al., 2014; Ward et al., 2005); however, no previous study has compared two forms of dyad (i.e., self-selected

based on affinity vs. ability level assessed by teacher) and their effects on students' feelings of relatedness, perceived competence and SI. Third, it seems important to investigate the specific roles of students' perceived competence and feeling of relatedness in eliciting students' SI when they are grouped in self-selected dyads within the reciprocal teaching style in different activities with opposite characteristics (i.e., football and gymnastics). Football is a team sport with opposition, topokinetic activity in an unstable environment, while gymnastics is an individual and morphokinetic activity in a stable environment (seen and judged). The choices of the physical activities units in the two studies, i.e., badminton in study 1 and football and gymnastics in study 2, were justified by the fact that these physical activities are the most taught in the state of Vaud (Switzerland), as in the French PE context (Marsault, 2005). In addition, with respect to the diversity of physical activities taught in PE, it was important to implement studies in various contexts of physical activities to test its generalizability across the contexts of different physical activities.

Method

Participants

The two studies were carried out in three secondary schools in the state of Vaud, Switzerland. Participants in the first study consisted of 99 students ($M = 13.8$, $SD = 1.1$, 54% girls, aged 12–17) from six PE classes, and participants in the second study consisted of 208 students ($M = 13.6$, $SD = 1.3$, 51.4% girls, aged 12–18) from 12 PE classes. The students from the two studies came from families with an upper-middle-class socioeconomic status. Class sizes ranged from 12 to 20 students. Permission to conduct the study was granted by the ethical board of the host university, and consent was obtained from the principals of the participating schools. The students' parents were informed about the scope of the study, and consent was requested from all of them. All the parents allowed their children to participate in the study.

In the state of Vaud, students have three PE periods (3×45 min) per week. In the selected schools, the reciprocal teaching style was not particularly promoted in PE, which means that the students were not used to this pedagogical approach. In the first study, students ($N = 99$) participated in a six-lesson unit in badminton. In the second study, students ($N = 208$) were divided into two subsamples: 99 students from six classes ($M = 13.6$, $SD = 1.1$, 52.5% girls, aged 12–17) participated in a four-lesson unit in football, and 109 students from the other six classes ($M = 13.6$, $SD = 1.5$, 50.5% girls, aged 12–18) participated in a four-lesson unit in gymnastics.

Measures

Situational interest

The French 15-item SI scale (Roure et al., 2016) was used to measure students' SI during the learning tasks. The scale includes five SI dimensions with three items for each dimension (Roure et al., 2016): novelty (e.g., "What we did today was new to me"), instant enjoyment (e.g., "What we did was enjoyable for me"), exploration

intention (e.g., “I wanted to analyse and have a better handle on what we were learning today”), attention demand (e.g., “What we were learning demanded my high attention”), and challenge (e.g., “What we were learning was hard for me to do”). The items were randomly arranged, and the students rated each item on a 5-point Likert scale ranging from 1 = *strongly disagree* to 5 = *strongly agree*. Roure et al. (2016) established the construct validity of the French SI scale using exploratory and confirmatory factor analyses (CFAs), with the goodness-of-fit index (GFI) = 0.93, normed fit index (NFI) = 0.93, comparative fit index (CFI) = 0.96, and root mean squared error of approximation (RMSEA) = 0.06. They also reported an internal consistency (Cronbach’s alpha) greater than .76 for all SI dimensions among middle and high school students.

Perceived competence

In the present study, perceived competence, i.e., students’ beliefs about their ability in the specific physical activity taught in the PE unit, was assessed with a 3-item questionnaire used in previous research (e.g., Marsh et al., 2006; Sarrazin et al., 2002). For example, one item was “Compared to my classmates, my level in football is”. The students responded on a 7-point Likert scale ranging from 1 = *very bad* to 7 = *very good*. In previous studies (Marsh et al., 2006; Sarrazin et al., 2002), this scale had good internal consistency, with a Cronbach’s alpha greater than .81.

Feelings of relatedness

The French 10-item scale of Richer and Vallerand (1998) was used to measure the students’ feelings of relatedness. The scale includes two dimensions: feeling intimate with peers (e.g., “I feel close to my peers”) and feeling accepted by peers (e.g., “I feel confident with my peers”). Each dimension consists of five items. The items were randomly arranged, and the students rated each item on a 7-point Likert scale ranging from 1 = *strongly disagree* to 7 = *strongly agree*. Richer and Vallerand (1998) established the construct validity of the scale using exploratory and confirmatory factor analyses, with the non-normed fit index (NNFI) = 0.93 and CFI = 0.94. They also reported an internal consistency (Cronbach’s alpha) of .89 for feeling intimate with peers and of .91 for feeling accepted by peers (Richer & Vallerand, 1998).

Procedure

The two studies took place during the students’ regularly scheduled PE classes, once a week during the double PE period (2 × 45 min); during the remaining weekly PE period of 45 minutes, teachers taught other sport units as usually. Two male teachers were involved in the first study; they had 15 years of teaching experience, and each teacher taught a badminton unit. The teachers involved in the second study were six males and four females with teaching experience ranging from two to nine years. Four males and one female taught the four-lesson unit in gymnastics, whereas two males and three females taught the four-lesson unit in football. The authors of the study designed all the units (badminton, football and gymnastics) in collaboration with the PE teachers. Three team meetings, with an average length of three hours, were organized for each unit for a total of nine hours. These meetings consisted of designing the learning tasks under the reciprocal teaching style and training the teachers to teach them in the gymnasium.

In all units, the students had to perform correctly and seek an understanding of basic technical skills (e.g., serve, smash, clear shot and drop shot in badminton, pass accuracy and various shots in football and forward rolls and handstands in gymnastics). The skills were chosen by the PE teachers to ensure that the learning tasks’ difficulty was compatible with the students’ ability levels.

Structured dyads were computed in reciprocal teaching style for the two studies: more precisely, students received guidance on role switching and role definition (Iserbyt et al., 2010). In the first study, the six-lesson unit in badminton was split into two parts of three lessons. During the first three lessons, half of the students were grouped into self-selected dyads, while the others were grouped into ability dyads (based on the teacher’s initial observation). In the last three lessons, the students switched to the other form of dyads, which meant that the students who began in the self-selected dyad moved to the ability dyad and vice versa. In the second study, it was decided that the students would group themselves into dyads (i.e., self-selected dyads) (Figure 1). Finally, for both studies, the teachers provided the students with coding sheets related to the observation of the specific technical skills retained.

Fidelity of implementation

The content fidelity of all units (developed in collaboration between the researchers and the PE teachers) was ensured since the teachers shared the same benchmarks, including the

Study 1			Study 2	
Six-lesson badminton unit (N=99)			Four-lesson football unit (N = 99)	Four-lesson gymnastics unit (N = 109)
	Half of students	Half of students	All students	
First three lessons	Self-selected dyads	Ability dyads	Self-selected dyads	
Last three lessons	Ability dyads	Self-selected dyads		

Figure 1. Dyad compositions in the Studies 1 and 2.

following elements for the learning tasks: task goals, task presentation, a coding sheet to observe the skills, and a list of feedback for observers. Three training sessions were organized for the teachers before conducting the study, consisting of teaching selected learning tasks in a microteaching process with researcher feedback on the reciprocal teaching style. Additionally, researchers observed the teachers using the aforementioned benchmarks and a coding system that evaluated the fidelity of each element of the benchmarks (goal, task presentation, coding sheet, etc.). This coding system was composed of three letters indicating the fidelity of the intervention (A = high fidelity, B = good fidelity or C = low fidelity). The three training sessions allowed the teachers to reach A ratings on the benchmarks. Following the training sessions, the researchers were present at two PE lessons for each unit to assess the teachers' fidelity to the benchmarks (using the same coding system as in the training sessions).

Data collection

In the first study, the students received six badminton lessons of 90 minutes each. Since the students experienced two forms of dyads (self-selected vs. ability) during three lessons each, they completed the three questionnaires at the end of the third and sixth lessons. For the second study, the students received four lessons of 90 minutes each, either in football or in gymnastics. At the end of the fourth lesson, they completed the three questionnaires. To minimize the students' tendency to give socially desirable responses, the students were encouraged to answer honestly; they were assured that their responses would remain anonymous and confidential, and they were informed that their answers were not tied to their evaluation in the PE unit.

Data analysis

The students' responses were aggregated according to the SI dimensions. Preliminary analyses were conducted on the study variables to examine the normality, multicollinearity, internal reliability of the subscales, and construct validity.

For the first study, a repeated-measures MANOVA was performed to compare the effects of dyad composition (self-selected vs. ability) on the study variables. The two dimensions related to students' feelings of relatedness, the five dimensions of students' SI and students' perceived competence were used to examine whether the self-selected dyads would result in higher scores than the ability dyads.

For the second study, scores for perceived competence were recoded as nominal data into three groups: low perceived competence ($n = 36$ in football and $n = 39$ in gymnastics; $M - 0.5 SD$), medium perceived competence ($n = 28$ in football and $n = 30$ in gymnastics; M), and high perceived competence ($n = 35$ in football and $n = 40$ in gymnastics; $M + 0.5 SD$). This nominal coding is interesting since it allows us to compare groups and identify differences between students from these three perceived competence groups, as in previous studies on perceived competence (e.g., Estevan et al., 2021). In addition, a preliminary MANOVA was performed to test the differences between the two physical activities on SI dimensions, perceived competence, and feelings of relatedness to determine

whether the two subsamples could be merged or considered distinct samples for the main analyses.

Then, the main analyses for this second study were conducted in the following two stages. First, MANOVA was used to investigate the effects of students' perceived competence on the five SI dimensions. Pillai's F statistic was used to determine the statistical significance of the multivariate model because it controlled for the type I error rate with unequal sample sizes (Ntoumanis & Myers, 2016). Follow-up univariate ANOVAs were then conducted based on the statistical significance of the MANOVA. Then, a cluster analysis was used to generate students' profiles according to their scores on the two dimensions of feelings of relatedness. Since the feelings of relatedness were a personal variable including two factors (Richer & Vallerand, 1998), a person-centered analysis (i.e., cluster analysis) was retained to take into account the students' interpersonal differences. The clustering variables in this study were the two factors related to the students' feelings of relatedness. The SI dimensions were not used as clustering variables but were entered as output variables for the cluster analysis. The analysis required two steps, involving a combination of hierarchical and nonhierarchical clustering methods (Gore, 2000). In the first step, a hierarchical cluster analysis was employed using Ward's method based on squared Euclidean distances. The hierarchical method was used as a preliminary step in identifying the cluster solutions, which then provided the input for the nonhierarchical procedure. In the second step, the number of clusters, determined previously, was used for the nonhierarchical clustering procedure. A log-likelihood to measure the distance between the clusters and the Bayesian information criterion (BIC) for the classification criterion were used (Gore, 2000). After establishing the different groups through cluster analysis, MANOVA was performed to analyze the statistical significance of the group differences. SPSS version 25.0 (SPSS Inc., Chicago, IL) was used for all statistical analyses.

Results

Preliminary analyses

Analyses of skewness ($-.88$ to $.91$) and kurtosis ($-.74$ to $.34$) revealed that the data were normally distributed. No problem of multicollinearity between variables was found. The internal consistencies of the scales were good, with Cronbach's alpha values ranging from $.78$ to $.92$. The amount of variance explained at the school and class levels was analyzed for both studies, considering the nature of the data (i.e., the students' data nested in classes and schools). The results indicated that the intraclass correlation coefficients (ICCs) for all the variables at the school and class levels ranged between $.015$ and $.049$, indicating low between-schools and between-class variances. Therefore, we proceeded with student-level analysis for both studies, since a multilevel analysis would have been less efficient (ICCs were below $.10$; Preacher et al., 2011).

To test the construct validity of SI and students' perceived competence and feelings of relatedness in both studies, we performed a series of CFAs. The results of all the measurement models yielded a good fit to the data in both physical activities.

The factor loadings of the indicators ranged between .72 and .91, indicating good construct validity.

The results of the coding system, used to ensure fidelity to the benchmarks, revealed a high fidelity of intervention with A ratings for all the elements for all the PE teachers.

Study 1

Self-selected vs. ability dyads: Differences in students' SI, feelings of relatedness, and perceived competence

The results of the repeated-measures MANOVA showed significant differences between the two forms of dyads (self-selected vs. ability) on feeling of relatedness, SI dimensions and perceived competence, *Pillai Trace* = 0.71, $F(8,91) = 28.38$, $p < .01$, $\eta^2 = .71$. Follow-up ANOVAs revealed better results for self-selected dyads, students feeling better related (two dimensions), being more situationally interested (five dimensions) and perceiving themselves as better in badminton (Table 1).

Study 2

Differences between the football and gymnastic units

The results of the preliminary MANOVA showed significant differences between the two physical activities (football and gymnastics) on SI dimensions and perceived competence, *Pillai Trace* = 0.29, $F(8,199) = 10.15$, $p < .01$, $\eta^2 = .29$. However, no difference was found between the two physical activities for students' feelings of relatedness (4.12 vs. 4.04, $p = .32$ for feeling intimate and 4.08 vs. 3.92, $p = .18$ for feeling accepted). Therefore, it was appropriate to use the two subsamples as distinct samples for the first stage of the main analyses (MANOVA centered on SI dimensions and perceived competence) and to merge the subsamples for the second stage related to the cluster analysis (centered on feelings of relatedness).

Effects of perceived competence on students' situational interest in football and gymnastics

The MANOVA results revealed a significant effect for perceived competence on students' SI in football, *Pillai Trace* = 0.23, $F(10,186) = 2.45$, $p < .01$, $\eta^2 = .12$, and in gymnastics, *Pillai Trace* = 0.29, $F(10,206) = 3.47$, $p < .01$, $\eta^2 = .14$. In football, follow-up univariate ANOVAs showed significant differences between perceived competence groups for instant enjoyment, $F(2,99) = 8.61$, $p < .01$, $\eta^2 = .15$, and exploration intention, $F(2,99) = 3.15$,

$p < .05$, $\eta^2 = .06$. The high-perceived competence group reported higher scores for instant enjoyment than the medium- and low-perceived competence groups (11.09 vs. 8.93 and 8.37, $p < .01$). Similarly, the high-perceived competence group reported more exploration intention than the low-perceived competence group (9.30 vs. 7.57, $p < .05$). A similar trend was observed in gymnastics, as follow-up univariate ANOVAs showed significant differences between perceived competence groups for instant enjoyment, $F(2,109) = 7.40$, $p < .01$, $\eta^2 = .12$, and exploration intention, $F(2,109) = 7.15$, $p < .01$, $\eta^2 = .12$. The high-perceived competence group reported higher scores for instant enjoyment (11.80 vs. 9.23, $p < .01$) and exploration intention (10.06 vs. 7.49, $p < .01$) than the low-perceived competence group.

Students' feelings of relatedness profiles

Prior to conducting cluster analyses, we checked for univariate and multivariate outliers. No values of more than three standard deviations above or below the mean and no individuals with high Mahalanobis values were found (Gore, 2000). Three clusters were retained using Ward's cluster analyses. The high increase in the agglomeration schedule (35%) suggested that a three-cluster solution was suitable and preferable in comparison to a two-cluster solution. The three clusters reflected high, medium and low scores on the feeling-accepted and feeling-intimate dimensions. The means of the feelings of relatedness and the five SI dimensions by cluster are presented in Table 2. The results of the MANOVA revealed a significant main effect for feelings of relatedness and SI for the cluster profiles, *Pillai Trace* = 1.13, $F(7,199) = 37.02$, $p < .01$, $\eta^2 = .56$. These results indicated that students perceived the reciprocal teaching style differently according to their scores on feelings of relatedness.

Follow-up ANOVAs revealed that students in the high relatedness profile ($n = 45$) reported significantly higher scores for the five SI dimensions than students in the medium relatedness profile ($n = 102$), who also reported higher scores for these five dimensions than those in the low relatedness profile ($n = 61$). Two exceptions were noted concerning the challenge and novelty dimensions. For challenge, no difference was found between the medium and low relatedness profiles. For novelty, the medium relatedness profile received lower scores than the low relatedness profile.

Table 1. Self-selected vs. Ability dyads: Differences in students' feeling relatedness, situational interest, and perceived competence.

	Range	Self-selected dyad <i>N</i> = 99		Ability dyad <i>N</i> = 99		<i>F</i> (1, 98)	η^2
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Feeling accepted	1–7	5.28	1.30	3.41	1.56	97.47**	.50
Feeling intimate	1–7	4.98	1.59	2.54	1.71	129.11**	.57
Instant enjoyment	1–15	11.54	1.51	7.26	1.47	134.42**	.58
Exploration intention	1–15	10.72	1.36	6.59	1.23	150.36**	.60
Attention demand	1–15	10.89	1.27	7.10	1.82	151.14**	.61
Novelty	1–15	7.15	2.53	5.69	2.57	14.33**	.13
Challenge	1–15	8.37	2.13	6.40	2.43	45.19**	.32
Perceived competence	1–7	5.03	1.21	4.39	1.36	22.52**	.19

Note. ** $p < .001$.

Table 2. Differences between students' feelings of relatedness profiles.

	Range	High relatedness profile N = 45		Medium relatedness profile N = 102		Low relatedness profile N = 61		F(1, 207)	η^2
		M	SD	M	SD	M	SD		
Feeling accepted	1–7	5.51	0.93	4.03	0.97	2.89	0.92	99.23**	.49
Feeling intimate	1–7	5.55	1.15	4.12	0.99	2.97	1.06	78.15**	.43
Instant enjoyment	1–15	12.13	2.39	10.89	2.48	7.18	2.69	60.31**	.37
Exploration intention	1–15	11.09	2.90	9.18	2.33	6.00	2.55	56.67**	.36
Attention demand	1–15	12.53	1.77	9.11	1.92	7.11	2.64	84.63**	.45
Novelty	1–15	11.27	2.53	5.23	2.47	6.56	3.50	71.90**	.41
Challenge	1–15	11.76	2.13	7.10	2.28	7.49	2.66	64.54**	.39

Note. ** $p < .001$.

Discussion

Through two consecutive studies, the purpose of this study was to investigate the roles of forms of dyads (self-selected vs. ability), feelings of relatedness and perceived competence in eliciting students' SI within the reciprocal teaching style. While the first study was designed to compare self-selected and ability dyads, the second one aimed to investigate the role of feelings of relatedness and perceived competence in eliciting students' SI within two physical activities with opposite characteristics, i.e., football and gymnastics.

The first study showed that students in self-selected dyads had higher perceived competence, feelings of relatedness and SI than students in ability dyads during a reciprocal teaching style in a badminton unit. Comparing two dyad compositions (ability groups vs. self-selected groups), these results fill a gap in the literature and can be related to previous studies on self-selected dyads (Byra & Marks, 1993; Ernst & Byra, 1998). The better peer relationships and feelings of both acceptance and intimacy in self-selected dyads allow students to better accept peers' feedback and increase the quality of peers' observations and feedback, which could also explain the higher perceived competence among students. Indeed, the amount and quality of feedback is essential for helping students in PE learning (Chan et al., 2014; Lee et al., 1993). In the same vein, regarding assessment, James et al. (2009) noted that students perceived that working with their friends resulted in more effort "because students wanted to work and socialize with their friends, as well as perform the skills correctly in front of their friends" (p. 323). In addition, Weiss and Duncan (1992) showed positive relationships between perceived competence, social acceptance and affiliation.

Study 2 focused on self-selected dyads in the reciprocal teaching style in two activities with opposing characteristics, i.e., football and gymnastics. The results showed that feelings of relatedness were the most relevant factor influencing students' SI. The highest SI scores were obtained for the students from the highest feelings of relatedness profile in both activity units. These results are consistent with studies finding that students are more successful in peer-teaching situations when they are able to select a partner whom they like and with whom they like to work (Byra & Marks, 1993; Ernst & Byra, 1998; Jenkinson et al., 2014; Mosston & Ashworth, 2002; Ward et al., 2005). More precisely, we observed in our study a dramatic difference between the highest feelings of relatedness in the student profile and the two other profiles on different SI dimensions. Students immerse themselves in a task when they feel

accepted by and intimate with their peers. Feelings of relatedness seem to be a determinant factor in SI, regardless of the characteristics of physical activity. The present result corroborates the positive role of feelings of relatedness on student motivation in PE (e.g., Cox & Ullrich-French, 2010; Domville et al., 2019; Fernandez-Rio et al., 2017; Smith, 2003; Wallhead et al., 2013). As demonstrated by Fernandez-Rio et al. (2017) in cooperative learning and Wallhead et al. (2013) in sport education, self-selected dyads in reciprocal teaching style allow an increase in student motivation in PE through higher feelings of relatedness.

Finally, a similar but small effect of perceived competence on students' SI was observed in the two physical activity units, i.e., football and gymnastics units. With self-selected dyads in reciprocal teaching style, only the high-perceived competence group reported higher scores for instant enjoyment and exploration intention. The results obtained in two different physical activities were similar, and the effects on these two specific dimensions could be explained by the primary role that instant enjoyment and exploration intention dimensions played in the SI construct (Roure et al., 2019). No difference emerged between different students' perceived competence groups and the three other SI dimensions of attention demand, novelty, and challenge. Since there is no previous study on reciprocal teaching style and the effect of dyad composition on SI, it is difficult to compare our results to previous results. Nevertheless, in line with previous studies on the effect of perceived competence on student motivation (Estevan et al., 2021; Fairclough, 2003, 2006; Garn et al., 2011; Harter, 1978; Marsh et al., 2006; Weiss & Amorose, 2005), this study underlined that perceived competence plays a role in student SI but a lower role than feelings of relatedness in self-selected groups within a reciprocal teaching style.

Overall, based on a person-context interaction perspective, this study confirmed that students' SI can be elicited within the reciprocal teaching style, according to one contextual variable (i.e., self-selected dyads) and two personal variables (i.e., students' feeling of relatedness and students' perceived competence). It extends the current literature by identifying factors that can trigger students' SI in PE and by showing the underlying mechanisms associated with the reciprocal teaching style.

Limitations and perspectives

This study presents various limitations, and the results suggest new directions for research on reciprocal teaching style and SI. First, this research was implemented in three different physical

activities frequently taught in the state of Vaud, Switzerland, i.e., study 1 in badminton and study 2 in two activities with opposite characteristics, i.e., football and gymnastics. Even if it is necessary to be vigilant on the generalization of these results for PE, it is interesting to note that a small effect of perceived competence and a stronger effect of feelings of relatedness were obtained in two physical activities with opposite characteristics in study 2. In addition, it would be interesting to replicate this study in other physical activities (e.g., rugby, dance, volleyball, athletics units) to better understand the role of the type of physical activities on students' SI when implementing a reciprocal teaching style in PE. Second, study 1 showed the beneficial effect of self-selected groups in reciprocal teaching style compared to ability groups, but this study did not compare the effects of reciprocal teaching style with other more traditional approaches (e.g., command and practice styles) (Chatzipanteli et al., 2015; Morgan et al., 2005; Pitsi et al., 2015). The reciprocal teaching style based on self-selected groups is a promising learning paradigm to develop students' SI, but further research is needed to demonstrate its beneficial effects compared to more traditional teaching styles in various physical activities (Mosston & Ashworth, 2002). In addition, the implementation of the reciprocal teaching style in PE is a relatively new pedagogical approach with strong support (Johnson & Ward, 2001); nevertheless, further studies are needed to test and find the best ways to implement the reciprocal teaching style to increase students' SI. More precisely, the use of stable groups in longer units (Johnson & Johnson, 2000) and of video feedback (Goodyear et al., 2014) could be additional methods to increase good peer relationships and feelings of both acceptance and intimacy, perceived competence and SI and could be tested in future research. Finally, it could be interesting for future research to estimate the effect of the degree of friendship between two students in dyads (Byra & Marks, 1993). In fact, some students may not have real friends in class, and some difference would be observed in the degree of friendship between and within dyads even if self-selected grouping was used. The effects of the dyad composition could be mediated or moderated by this variable.

Conclusion

Even if there is strong support for the reciprocal teaching style (e.g., Byra & Marks, 1993; Morgan et al., 2005), "PAL is not a magic solution. Merely placing students in groups is insufficient to ensure that learning will occur. [...] There is also evidence that PAL works differentially relative to the type of task, student grouping, grade level, and ability and giftedness of the students" (Ward et al., 2005, p. 206). This research showed that a reciprocal teaching style with self-selected groups favors higher students' feelings of relatedness, perceived competence and SI compared to ability dyads. In addition, this paper showed a small effect of perceived competence and a stronger effect of feelings of relatedness on students' SI in reciprocal teaching styles with self-selected dyads. The implementation of this grouping in PE is interesting since it is less time-consuming than other grouping strategies (e.g., based on students' ability level). In line with other studies (Fernandez-Rio et al., 2017; Wallhead et al., 2013), this study

highlights the importance of designing contexts where students can develop good peer relationships and feelings of both acceptance and intimacy to increase student motivation.

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