Achievement goal contagion: mastery and performance goals spread among classmates

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Abstract

Past studies that explored the antecedents of achievement goals have mostly focused on the role of personal characteristics and parental/teacher influences. However, the role of one's classmates has not been given much attention. Drawing on the concept of goal contagion, the present study aimed to examine whether classmates' achievement goals influence one's achievement goals. We recruited 848 secondary school students nested within 30 classes and asked them to answer relevant questionnaires at Time 1 and Time 2. Multilevel analysis was used to examine whether classmates' achievement goals at Time 1 predicted one's achievement goals at Time 2 thereby demonstrating achievement goal contagion. To rule out alternative explanations, we controlled for baseline achievement goals at Time 1, social desirability bias, and other relevant demographic factors. Results indicated that mastery-approach, performance-approach, and performance-avoidance goals were contagious, but mastery-avoidance goals were not. Our study highlights the importance of understanding achievement goal contagion among classmates.

1 Introduction

Students pursue different types of achievement goals. Some students want to do well in school relative to their self-set standards (*mastery-approach*), while others are more concerned with outperforming their classmates (*performance-approach*). These achievement goals are important predictors of motivation (Elliot et al. 1999; Wolters 2004), engagement (King and McInerney 2019; McGregor and Elliot 2002),

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learning strategies (Michou et al. 2013), and achievement (Senko et al. 2013; Huang 2012; Mirzaei et al. 2012; King and McInerney 2019) among others.

Although the bulk of achievement goal research has focused on exploring the consequences of pursuing distinct achievement goals, there is a smaller body of literature that has looked at achievement goal antecedents. Most of these antecedents can be classified as personal characteristics (e.g., mindsets, personality traits, cognitive ability, needs; Ciani et al. 2011; Dweck et al. 1995; Elliot and Church 1997; Cury et al. 2006; Mirzaei et al. 2012; Payne et al. 2007) or socio-contextual factors (e.g., classroom goal structures; teacher pedagogical style). Among the socio-contextual factors, the roles of parents and teachers have received the most attention. Parents' and teacher's valuing of mastery and performance goals, as well as their provision of autonomy support, care, and feedback are critical predictors of students' achievement goals (e.g., Bernardo 2008; Friedel et al. 2007; Wang et al. 2019; Ciani et al. 2011; Wentzel et al. 2012).

There is limited information, however, on how classmates might shape one's achievement goal pursuit. This is surprising given that students spend much of their time with their classmates (Lam et al. 2014). Interactions with one's classmates play an important role in school motivation and achievement (see Wentzel and Muenks 2016; Burgess et al. 2018). One way that classmates can influence their peers' achievement goals is through goal contagion (Aarts et al. 2004), wherein students "catch" their classmates' achievement goals. Hence, this study aims to examine achievement goal contagion among classmates. We address this aim by surveying 848 high school students nested within 30 classes and test whether classmates' achievement goals at Time 1 predict one's achievement goals at Time 2.

This study advances the literature in three important ways. First, this study focuses on the role of classmates' achievement goals. Few studies have been conducted on how peers influence achievement goal pursuit because previous studies have mostly focused on the role of parents and teachers (Bernardo 2008; Friedel et al. 2007; Wang et al. 2019; Ciani et al. 2011; Wentzel et al. 2012).

Second, much of the goal contagion research has been conducted in laboratory settings (e.g., Aarts et al. 2004; Dik and Aarts 2007; Leander and Shah 2013; Loersch et al. 2008; Shteynberg and Galinsky 2011). Due to the artificiality and contrived nature of laboratory experiments, studies in actual classroom settings are needed.

Third, this study focuses specifically on achievement goal contagion. Although past studies have explored goal contagion, much of these have focused on more specific and lower-order "do" goals (e.g., helping others, competing in a task, etc.; Carver and Scheier 2000). Achievement goals differ from these lower-order proximal goals because they operate across a number of tasks and exist at a higher level in the goal hierarchy (Boekaerts et al. 2006; Carver and Scheier 2000). Hence, research is needed to examine whether goal contagion also applies to higher-order achievement goals to complement the previous studies on more specific proximal goals.

1.1 Achievement goals

Achievement goals are one of the most important types of goals that students pursue in the school setting. They refer to the purpose of engaging in a behavior in an achievement situation (Dweck and Leggett 1988). Though the achievement goal literature is complex with researchers using different achievement goal models and definitions (see Hulleman and Senko 2010, for review), a key distinction is posited between mastery and performance goals. Mastery goals focus on developing one's competence, while performance goals focus on demonstrating one's competence by outperforming others (Elliot 2005). Later, the approach-avoidance distinction was added by crossing valence with the mastery-performance distinction.

For this study, we draw on Elliot and McGregor's (2001) 2×2 achievement goal framework which posits four types of achievement goals: mastery-approach (the aim is to develop one's competence defined by one's personal standards), performance-approach (the aim is to outperform others), mastery-avoidance (the aim is to avoid the loss of one's competence), and performance-avoidance (the aim is to prevent demonstrating before others one's lack of competence; Elliot and Murayama 2008; Elliot and McGregor 2001).

Studies on achievement goals have primarily focused on two themes: antecedents and consequences (Hulleman and Senko 2010). As achievement goals are fundamentally considered predictors of motivation and behavior, the bulk of the achievement goal literature has focused on examining the consequences of different types of achievement goals (Senko et al. 2013; Elliot et al. 1999; Huang 2012; Mirzaei et al. 2012; King and McInerney 2019; Michou et al. 2013). Studies have shown that mastery-approach goals lead to the most optimal learning outcomes, while performance-avoidance goals are associated with maladaptive outcomes (Hulleman and Senko 2010). The consequences of performance-approach and mastery-avoidance goals are more mixed with some showing positive and others negative consequences (Hulleman et al. 2010).

There are relatively fewer studies that have investigated the antecedents of achievement goals themselves. For studies that did focus on achievement goal antecedents, these can be classified into studies that focus either on personal characteristics or social-contextual factors. For personal characteristics, need for achievement and fear of failure have been identified as key antecedents of approach and avoidance goals, respectively (Elliot and Church 1997; Michou et al. 2013). Studies have also posited that implicit theories about one's own ability or mindset (Chiu et al. 1997; Dweck et al. 1995; Dweck and Leggett 1988), metacognition (Mirzaei et al. 2012), perceived competence (Cury et al. 2006), and autonomous motivation (Ciani et al. 2011) predict achievement goals.

For social-contextual factors, the classroom learning environment has been the most common research focus (e.g., task, authority, and evaluation; Ames 1992; Murayama and Elliot 2009). Studies have found that classroom standards or norms that emphasize learning and personal development facilitate the pursuit of mastery-approach goals. On the other hand, classroom norms that emphasize interpersonal competition and social comparisons lead to the pursuit of performance goals (see Ames 1992; Urdan and Schoenfelder 2006; Wolters 2004).

Apart from classroom goal structures, other studies focused on the role of teachers and parents. For instance, teacher autonomy support positively predicted mastery-approach goals (Ciani et al. 2011). Perceived caring from teachers (Wentzel et al. 2012) and teacher feedback (Mueller and Dweck 1998) both influenced the adoption achievement goals. Learners' perceptions of their teachers' and parents' goal orientations also predicted achievement goals (Friedel et al. 2007; Bernardo 2008). Children whose parents and teachers emphasize mastery goals are more likely to adopt mastery goals themselves. Conversely, when children perceive their parents and teachers to value performance goals, they are more likely to become performance-oriented as well (Friedel et al. 2007). Students' perceptions of the achievement goals emphasized in their immediate social and learning environment influence the achievement goals they tend to pursue (see Kaplan et al. 2002).

Aside from parents and teachers, peers also play a significant role in achievement goal pursuit (see Wentzel et al. 2017). Research on peers, however, is scarce even if more time is spent by students in interacting with their classmates than their parents (Lam et al. 2014). Peers are also known to impact one's motivation and achievement goals in school (see Burgess et al. 2018; Shin and Ryan 2014). Past studies have found that peer social support and a sense of belonging foster the pursuit of mastery goals (Wentzel et al. 2010, 2012).

1.2 Goal contagion

Peers might shape their classmates' achievement goals through the process of goal contagion. Goal contagion means that a person can automatically adopt and pursue the goals inferred from others (Aarts et al. 2004). Contagion can be mediated by conscious processes but can also occur beyond one's conscious awareness (see Custers et al. 2012). Social situations, goals, and goal-directed actions are interconnected. When exposed to a specific situation that is perceived to be linked with a specific goal, one's goal-directed actions are automatically activated (Aarts and Dijksterhuis 2000). For instance, if a student is in a class where competition for class ranking is actively pursued, the student is likely to adopt such a competitive disposition. Merely being primed with performance-related words (e.g., *succeed*, *strive*, or *win*) can activate performance-oriented goals (Bargh et al. 2001).

The seminal study conducted by Aarts and colleagues (2004) used a vignette approach wherein participants read about the goals of others. Participants who read about a fictitious character who strove to earn money were more likely to pursue money-oriented goals themselves. In another study, Loersch and colleagues (2008) had participants observe other people's actual behaviors by watching a video of individuals engaged in either a competitive or non-competitive game. Participants exposed to the competitive video were more likely to infer competitive goals. These participants, in turn, experienced higher levels of negative affect after failure in a goal-relevant task, demonstrating that the competitive goal was both caught and pursued (Loersch et al. 2008). Experiments also showed that the goal of helping others is enhanced after participants viewed a film where the target character (i.e., an animated ball) put much effort in helping (Dik and Aarts 2007).

Despite studies on goal contagion, most of these have been conducted in experimental laboratory environments either through reading vignettes or watching videos. Hence, it is not known whether goal contagion would also occur in the real ecologies of the classroom. Goal contagion is amplified when goals are shared within a group to which one is affiliated with (Shteynberg and Galinsky 2011). As students in a classroom belong to the same social unit, achievement goal contagion might be especially salient within a classroom.

Although past studies have not explored achievement goal contagion in the classroom per se, educational psychology researchers have explored other types of social contagion in the school setting providing indirect support to our achievement goal contagion hypothesis. For example, Wild and Enzle (2002) examined whether motivational states are contagious among peers. They found that students who perceived their peers to be more intrinsically motivated were more likely to become intrinsically motivated themselves. Aside from motivation, studies have found that positive school behaviors (Burgess et al. 2018), ability beliefs (King 2019), socio-emotional states (King and Datu 2017; van Workum et al. 2013), and achievement (Fortuin et al. 2015) could be transmitted among peers. Indirect support for achievement goal contagion can also be found in Shin and Ryan's study (2014) which showed that students' selection of friends in the classroom over time is influenced by similarities in achievement goals. This highlights that achievement goals are salient social cues that students can detect in the classroom.

2 The present study

The aim of this study was to examine achievement goal contagion. We explored whether the achievement goals pursued by one's classmates at Time 1 (T1) would predict one's achievement goals at Time 2 (T2). Evidence of achievement goal contagion would be found when there is a statistically significant effect of classmates' achievement goals at T1 on one's own T2 achievement goal.

We used the 2×2 achievement goal model (Elliot and McGregor 2001) and focused on investigating contagion effects for mastery-approach, performance-approach, mastery-avoidance, and performance-avoidance goals. We tested the following hypotheses:

1. Classmates' achievement goals in T1 will predict student's goals in T2, (*achievement goal contagion effect*)
2. Time 1 student achievement goals will predict goals in T2 (*auto-regressor effect*)

The conceptual framework for the current study is presented in Fig. 1. To account for alternative explanations, we controlled for the auto-regressor effect and basic demographic factors. We also included other relevant covariates such as teacher support and peer support—defined as encouragement for learning activities and
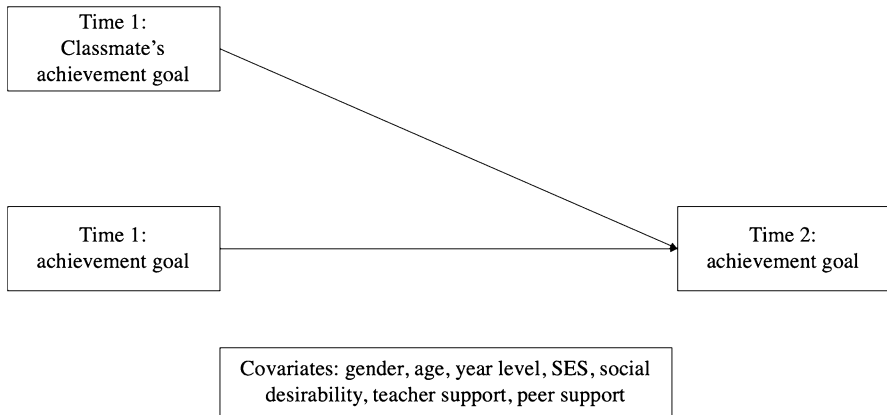
Fig. 1 Conceptual framework

school performance—as they were previously identified as predictors of achievement goals (Wentzel et al. 2010, 2012, 2017). Social desirability scores were also accounted in the models to ensure a more robust test of our achievement goal contagion hypothesis.

3 Methods

3.1 Participants and Procedures

We recruited 848 secondary school students nested within 30 classes who answered relevant questionnaires at Time 1 and Time 2, seven months apart. The average age of the participants was 14.64 years old ($SD = 1.52$). There were 485 (57.2%) females and 363 males. Most of the students (42.3%) were in their second year in high school. The data that we analyzed for this study are part of a larger study on student motivation; however, previous studies have not focused on testing the achievement goal contagion hypothesis (King 2015, 2016).

　　Data collection started two months after the beginning of the school year (August, T1). The questionnaires were personally administered in class through the pen-and-paper method and included items on demographic details, achievement goals, and other psycho-educational constructs (e.g., school engagement). The same set of questionnaires was administered after seven months (March, T2). The second wave of data collection was pragmatically set to seven months to collect data before the students complete the school year. This period also allows enough time for peer influence to operate within the classroom.

3.2 Instruments

3.2.1 Achievement goals

Achievement goals were measured using an adapted version of the Achievement Goal Questionnaire-Revised developed by (Elliot and Murayama 2008). Four types of achievement goals are included in this scale: mastery-approach ($\alpha = 0.76$; "I want to learn as much as possible this semester."), performance-approach ($\alpha = 0.76$; "My goal this semester is to get better grades than most other students."), mastery-avoidance ($\alpha = 0.78$; "I worry that I may not learn all that I possibly could this semester."), and performance-avoidance ($\alpha = 0.74$; "It's important to me that I don't look stupid in class."). Each goal was measured by three items. The questionnaire was rated on a 6-point Likert scale ranging from 1 (*false, not like me at all*) to 6 (*true, this statement describes me well*).

3.2.2 Socioeconomic status (SES)

SES was indexed using the mother's educational status which ranged from 1 (*no schooling*) to 5 (*finished university*). Maternal SES is known to be linked with student academic performance (Marks 2008) and research among adolescents have used maternal educational status as an indicator of socioeconomic status (e.g., Aaro et al. 2009).

3.2.3 Teacher support

Teacher support was measured using the 6-item Teacher Support subscale of the Facilitating Conditions Questionnaire (McInerney et al. 2005). A sample item is, "I get encouragement from some of my teachers to do well in school." It was measured using three items on a 5-point Likert scale from 1 (*strongly disagree*) to 5 (*strongly agree*). In the present study, the internal consistency of this measure is $\alpha = 0.68$.

3.2.4 Peer support

This construct was measured using the 5-item Peer Positive subscale of the Facilitating Conditions Questionnaire (McInerney et al. 2005). A sample item is "Most of my friends want to do well in school". It was measured on a 5-point Likert scale from 1 (*strongly disagree*) to 5 (*strongly agree*). Both the teacher and peer support scales were previously validated among students from the Philippines (Ganotice et al. 2013). The internal consistency of this measure for the present study is $\alpha = 0.90$.

3.2.5 Social desirability

Social desirability was measured using a short version of the Social Desirability Scale (Crowne and Marlowe 1960; Reynolds 1982). The scale ($\alpha = 0.60$) was comprised of six items and was answered on a dichotomous scale: (*Yes*) or (*No*). A sample item is, "Are you always willing to admit a mistake?".

3.3 Data analysis

We used hierarchical linear modeling (hlm) to test the key hypotheses. We included both student-level predictors (Level 1) and a class level predictor (Level 2). Prior to the analyses, we tested for normality of the dat. All skewness and kurtosis values were within the range of normality. Expectation maximization method (Gold and Bentler 2000) was used to impute item-level missing values.

   We ran four multilevel models for each of the four achievement goals (i.e., mastery-approach, mastery-avoidance, performance-approach, and performance-avoidance); yielding a total of 16 models. The first model was a baseline unconditional multilevel model that tested for between group-variance in achievement goals. This model yielded an intraclass correlation coefficient which denoted the variance between Level 1 and Level 2. We then specified the random coefficients in the second model and included the following Level 1 predictors: age, gender, year level, and the relevant achievement goal predictor (i.e., student's own achievement goal in T1). The third model is the full model which included all the Level 1 predictors in Model 2 as well as the Level 2 predictor (i.e., class-level achievement goal in T1). In the fourth model, we maintained the variables from the full model and extended it by including Level 1 covariates (i.e., socioeconomic status, social desirability, teacher support, and peer support) and Level 2 covariates (i.e., teacher support and peer support). Model 4 is designed to test the achievement goal contagion effect while controlling for Level 1 and Level 2 covariates.

4 Results

Descriptive statistics and bivariate correlations among the variables are shown in Table 1. Most variables from both Time 1 and Time 2 were significantly and positively correlated with coefficients ranging from $r = 0.079$ ($p < 0.05$) to $r = 0.527$ ($p < 0.01$), except for mastery-avoidance in Time 1 and Time 2 ($r = 0.058$, $p > 0.05$). Below, we report the multilevel models for the four achievement goals separately for the sake of clarity:

4.1 Contagion of mastery-approach achievement goals

The intra-class correlation coefficient (ICC) is 0.03 for Model 1 (see Table 2) indicating that 3% of the variance in T2 mastery-approach is between classes. Model

Table 1 Summary statistics and correlations among the variables

	Skewness	Kurtosis	Mean	SD	1	2	3	4	5	6	7
1. T1 Mastery-approach	−0.82	0.54	4.92	0.88	–						
2. T1 Performance-approach	−0.66	0.33	4.61	1.00	.527**	–					
3. T1 Mastery-avoidance	−0.44	−0.12	4.01	1.15	.248**	.255**	–				
4. T1 Performance-avoidance	−0.46	−0.06	4.23	1.09	.376**	.406**	.379**	–			
5. T2 Mastery-approach	−0.79	1.04	4.91	0.84	.231**	.169**	.79*	.123**	–		
6. T2 Performance-approach	−0.56	0.41	4.45	0.99	.284**	.353**	.108**	.180**	.479**	–	
7. T2 Mastery-avoidance	−0.57	0.23	4.24	1.09	.148**	.119**	.151**	.058	.276**	.275**	–
8. T2 Performance-avoidance	−0.93	1.13	4.86	0.92	.289**	.263**	.092**	.177**	.521**	.483**	.308**

** $p < 0.01$; * $p < 0.05$

Table 2 Hierarchical linear models predicting mastery-approach and mastery-avoidance goals

Dependent variables	T2 Mastery-approach goal				T2 Mastery-avoidance goal			
	Unconditional model	Random coefficients model	Full model	Final model	Unconditional model	Random coefficients model	Full model	Final model
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Intercept	4.89***	5.65***	5.39***	5.23***		4.95***	4.81***	4.65***
Level 1								
Gender	–	0.11	0.10	0.12*	–	0.13	0.13	0.15+
Age	–	–0.07*	–0.06*	–0.05*	–	–0.05	–0.04	–0.04
Year level	–	0.03	0.05	0.03	–	–0.06	–0.05	–0.07
T1 achievement goal	–	0.17***	0.17***	0.15***	–	0.13***	0.13***	0.13***
SES				–0.01				0.04
Social desirability				0.05**				0.00
Teacher support				0.10*				0.07
Peer support				0.02				–0.02
Level 2								
Class-level achievement goal	–	–	0.46***	0.46*	–	–	0.25+	0.22
Teacher support				0.45*				0.23
Peer support				–0.15				–0.07
Intercept variance ($\hat{\tau}_{00}$) between classes	0.02	0.02	0.00	0.00	0.01	0.00	0.00	0.00
Level 1 variance (σ^2) within classes	0.67	0.64	0.64	0.63	1.16	1.14	1.14	1.14
Intraclass correlation ($\hat{\rho}$)	0.03	–	–	–	0.01	–	–	–
Variance in achievement goal within classrooms explained Level 1 (%)	–	4.40%	–	5.69%	–	1.98%	–	1.98%

Table 2 (continued)

Dependent variables	T2 Mastery-approach goal				T2 Mastery-avoidance goal			
	Unconditional model	Random coefficients model	Full model	Final model	Unconditional model	Random coefficients model	Full model	Final model
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Variance in achievement goal between classrooms explained Level 2 (%)	–	–	89.24%	96.95%	–	–	95.32%	92.05%

Unstandardized parameters are shown. $+p < 0.10$. $*p < 0.05$. $**p < 0.01$. $***p < 0.001$

2 (see Table 2) showed that T1 mastery-approach positively predicted T2 mastery-approach ($B = 0.17$, $p < 0.001$) and accounted for 4.40% of the variance. In the full model (Model 3, Table 2), we included the Level 1 predictors from Model 2 and included the class-level mastery-approach as a Level 2 predictor. Regression estimates for Level 1 predictors are similarly reflected as in Model 2, whereas the Level 2 predictor (T1 class-level mastery-approach) positively predicted T2 mastery approach ($B = 0.46$, $p < 0.001$). Model 3 (Table 2) showed that class-level mastery-approach explained 89.24% of the variance at Level 2. Model 4 (see Table 2) indicated that T1 class-level mastery-approach still predicted T2 mastery-approach ($B = 0.46$, $p < 0.05$), while controlling for Level 1 and 2 covariates.

4.2 Contagion of mastery-avoidance achievement goals

The unconditional model (Model 5, Table 2) for T2 mastery-avoidance goals yielded an ICC of 0.01 which meant that 1% of the variance of T2 mastery-avoidance is between classes. Model 6 (Table 2) indicated that T1 mastery-avoidance positively predicted T2 mastery-avoidance ($B = 0.13$, $p < 0.001$). With Level 1 covariates (age and gender), the model accounted for 1.98% of the variance in T2 mastery-avoidance. Similar regression estimates for Level 1 predictors were found in Model 7 (see Table 2) but the Level 2 predictor (T1 class-level mastery-avoidance) did not predict T2 mastery-avoidance ($B = 0.25$, $p < 0.10$). Model 8 (see Table 2) indicated that only T1 mastery-avoidance was a consistent and significant predictor of T2 mastery avoidance ($B = 0.13$, $p < 0.001$).

4.3 Contagion of performance-approach goals

For performance-approach (Model 9, Table 3), the ICC is 0.03 indicating that 3% of the variance of T2 performance-approach is between classes. Model 10 (see Table 3) showed that T1 performance-approach positively predicted T2 performance-approach ($B = 0.33$, $p < 0.001$) while controlling for Level 1 covariates. This model accounted for 11.18% of the variance. In Model 11 (see Table 3), class-level performance-approach positively predicted T2 performance-approach ($B = 0.45$, $p < 0.001$). Finally, Model 12 (see Table 3) showed that the regression estimates of Level 2 class-level performance-approach remained statistically significant ($B = 0.45$, $p < 0.01$) even after including Level 1 and 2 covariates (Table 3).

4.4 Contagion of performance-avoidance goals

The ICC for the unconditional model (Model 13, see Table 3) is 0.03 indicating that 3% of the variability in T2 performance-avoidance is between classes. Model 14 showed that T1 performance-avoidance positively predicted T2 performance-avoidance ($B = 0.11$, $p < 0.01$). The Level 1 predictors along with age and gender as Level 1 covariates accounted for 50.72% of the variance in T2 performance-avoidance. In the full model (Model 15, see Table 3), regression estimates for Level 1 predictors were consistent as in the previous model. Class-level performance-avoidance

Table 3 Hierarchical linear models predicting performance-approach and performance-avoidance goals

Dependent variables	T2 Performance-approach goal				T2 Performance-avoidance goal			
	Unconditional model	Random coefficients model	Full model	Final model	Unconditional model	Random coefficients model	Full model	Final model
	Model 9	Model 10	Model 11	Model 12	Model 13	Model 14	Model 15	Model 16
Intercept	4.42***	6.00***	5.68***	5.38***	4.83***	5.93***	5.76***	5.29***
Level 1								
Gender	–	–.12	–.11	–.08	–	.16*	.16**	.18**
Age	–	–.11**	–.09**	–.08**	–	–.10**	–.09**	–.07*
Year level	–	.05	.09	.07	–	.04	.03	.01
T1 achievement goal	–	.33***	.33***	.31***	–	.11**	.11**	.09**
SES				.06*				.02
Social desirability				.01				.04*
Teacher support				.09+				.16**
Peer support				–.04				.08*
Class-level achievement goal	–		.45***	.45**	–		.37***	.21***
Teacher support				.46+				.25
Peer support				–.19				.30**
Intercept variance ($\hat{\tau}_{00}$) between classes	.03	.02	.00	.00	.03	.01	.00	.00
Level 1 variance (σ^2) within classes	.96	.85	.85	.84	.83	.80	.80	.77
Intraclass correlation ($\hat{\rho}$)	.03	–	–		.03	–	–	
Variance in achievement goal within classrooms explained Level 1 (%)	–	11.18%	–	12.12%		50.72%	–	6.43%

Table 3 (continued)

Dependent variables	T2 Performance-approach goal				T2 Performance-avoidance goal			
	Unconditional model	Random coefficients model	Full model	Final model	Unconditional model	Random coefficients model	Full model	Final model
	Model 9	Model 10	Model 11	Model 12	Model 13	Model 14	Model 15	Model 16
Variance in achievement goal between classrooms explained Level 2 (%)		–	90.36%	92.92%		99.54%	2.87%	

Unstandardized parameters are shown. $+p < 0.10$. $*p < 0.05$. $**p < 0.01$. $***p < 0.001$

positively predicted T2 performance-avoidance ($B = 0.37$, $p < 0.001$). Finally, after including all Level 1 and 2 controls, Level 2 class-level performance-avoidance was still a significant predictor of performance-avoidance (Model 16; $B = 0.21$, $p < 0.001$, see Table 3).

5 Discussion

The goal of this study was to examine achievement goal contagion in the real ecologies of classrooms. The results of our study found that mastery-approach, performance-approach, and performance-avoidance goals spread through one's classmates providing partial support to our achievement goal contagion hypothesis (H1); however, we did not find any evidence for contagion effects on mastery-avoidance goals. We also found significant auto-regressor effects for all the four achievement goals supporting H2. These findings held even after controlling for other relevant covariates such as demographic factors, teacher support, peer support, and social desirability scores. This points to the robust effects of classmates' goals in Time 1 in predicting one's goals in Time 2.

This study enriches the achievement goal literature. The bulk of achievement goal studies have focused on the consequences of achievement goals (Hulleman and Senko 2010). There is a smaller body of literature focusing on the antecedents of achievement goals but most of these have emphasized the importance of personal characteristics, parents, and teachers (e.g., Bernardo 2008; Friedel et al. 2007; Wang et al. 2019; Ciani et al. 2011; Wentzel et al. 2012). Less research has been conducted on the role of one's classmates. The results of our study suggest that classmates' goals can directly influence one's own goals extending previous studies on the role of peers in achievement goal research (Wentzel et al. 2010, 2012).

These findings also contribute to the broader motivational literature by highlighting the role of one's peers. While achievement goals are different across individuals, our findings suggest that they could also be influenced by peers. Fostering productive achievement goals, therefore, can be viewed not only from the individual perspective but also from the classroom and social perspective.

The findings also enrich the theorizing on goal contagion research as past studies have mostly relied on experimental paradigms (Aarts et al. 2004; Dik and Aarts 2007; Leander and Shah 2013; Loersch et al. 2008; Shteynberg and Galinsky 2011). The present longitudinal study extends previous findings and provides evidence that goal contagion operates beyond controlled settings and applies in real classroom settings. This is especially important given that a recent meta-analytic study has cast some doubt on the robustness of experimental studies on goal contagion (Brohmer et al. 2019).

It is important to reiterate that goal contagion can be activated automatically (e.g., Aarts and Dijksterhuis 2000). This study also provides support for the applicability of goal contagion theory to higher-order goals in the goal hierarchy (Carver and Scheier 2000). The results highlight that goal contagion is not limited to lower-level proximal goals (e.g., Aarts et al. 2004; Dik and Aarts 2007; Leander and Shah

2013; Loersch et al. 2008), but also applies to higher-level goals such as achievement goals.

In terms of specific achievement goals, we found evidence of achievement goal contagion for mastery-approach, performance-approach, and performance-avoidance goals. However, we did not find any evidence of mastery-avoidance contagion. The lack of contagion for mastery-avoidance seems to reflect the ambiguity in the literature with regard to the relevance of mastery-avoidance goals. Several qualitative studies failed to find evidence for the existence of mastery-avoidance goals (e.g., Bernardo et al. 2008; Lee and Bong 2016; King and McInerney 2019). This is probably because many of these studies were conducted among younger student populations while mastery-avoidance goals might be more relevant for older adult populations for whom the loss of skills is more salient (see Senko and Freund 2015). The lack of evidence for the contagion of mastery-avoidance might reflect the fact that this goal is not psychologically salient for adolescent populations. This finding seems to corroborate Aarts and colleagues' (2004) argument that only relevant goals are contagious, and non-salient goals are not "caught".

Overall, the findings of this study expand our knowledge of social contagion in the educational context. Previous research on contagion in the school context has focused on the contagion of motivation, socio-emotional states, beliefs, and behaviors among others (Burgess et al. 2018; Fortuin et al. 2015; King and Datu 2017; Wild and Enzle 2002; King 2019). However, achievement goal contagion has not been empirically explored. The understanding that achievement goals are partly shaped by the achievement goals of one's classmates highlights the need to focus on the social antecedents of achievement goal pursuit.

Despite the strengths of our study, we note key limitations. First, we only measured achievement goal contagion within one school year. It is not known how long goal contagion effects would last (e.g., Laurin 2016). Second, we only tested whether achievement goal contagion occurred or not but did not examine the potential moderators of the contagion effect. Individual differences and contextual factors could affect the strength of achievement goal contagion among classmates. Third, while our findings suggest that the classmates' achievement goals predict one's own, our study did not assess the quality of friendship or relationships among classmates. This is an important pathway for further investigation because students might be more strongly influenced by people they perceive to be closer to themselves. Future studies can consider the use of more sophisticated analysis (e.g., social network analysis; Burt et al. 2013) that would take into account the quality and strength of relationships among classmates. Lastly, our study was confined to the Philippine context which could limit the generalizability of our findings.

6 Conclusion

Students' achievement goals influence a wide range of school outcomes. Though past studies have found that social relationships predict achievement goal pursuits, rarely has the role of goal contagion among peers in real classroom ecologies been explored. The present study demonstrated evidence for achievement

goal contagion in the school context, extending the validity of goal contagion research beyond the laboratory setting. While students can determine and set their achievement goals, it is also important to acknowledge that these goals can be directly influenced by the goals of their classmates.

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