RUNNING HEAD: CYCLES, SPIRALS, EFFICACY BELIEFS, POSITIVE AFFECT,

ENGAGEMENT

About Gain Cycles and Spirals of Efficacy Beliefs, Positive Affect and Activity Engagement

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Abstract

Based on Bandura's *Social Cognitive Theory*, we tested how efficacy beliefs (self-efficacy and perceived collective efficacy) reciprocally influence activity engagement (work and task vigor, dedication and absorption) both directly and indirectly, through their impact on positive affect (enthusiasm, satisfaction, and comfort) over time. We conducted two longitudinal studies using independent samples. S*tudy 1* is a two-wave longitudinal field study which examines gain *cycles* regarding self-efficacy, positive affect and work engagement among 274 secondary school teachers. *Study 2* is a three-wave longitudinal laboratory study about gain *spirals* of collective efficacy beliefs, positive affect and task engagement among 100 university students working in groups. Our findings show that (1) both types of efficacy beliefs link directly and indirectly with activity engagement through positive affect; (2) enthusiasm has a stronger effect on activity engagement than the other positive affects with a lower level of activation; (3) a gain cycle exists whereby efficacy beliefs increase over time due to engagement and positive affect (most notably enthusiasm). Furthermore, *Study 2* also shows a tentative dynamic gain spiral with the collective constructs. Finally, we discuss the theoretical findings and the practical implications, mainly in terms of the *Social Cognitive Theory*.

Keywords: Cycles, Spirals, Efficacy Beliefs, Positive Affect, Engagement.

About Gain Cycles and Spirals of Efficacy Beliefs, Positive Affect and Activity Engagement

People differ in their beliefs about their competences and success in different areas of their life, and there is considerable evidence for the positive effects of self-efficacy on performance and behavior in different domains such as the workplace, school, and sports (Bandura, 1999, 2001). According to the *Social Cognitive Theory (SCT),* self-efficacy are "…beliefs in one's capabilities to organize and execute the courses of action required producing given attainments" (Bandura, 1997, p. 3). Whatever other factors serve as guides and motivators, their roots lie in the core belief that one has the power to produce desired effects by one's own actions; otherwise, one has little incentive to act or to persevere in the face of difficulties.

However, efficacy beliefs not only include personal self-efficacy but also perceived collective efficacy. Psychosocial research in organizations shows that when people work together, they may share beliefs and affective experiences, thus showing similar motivational and behavioral patterns (George, 1990, 1996) and experiencing a shared affective tone within the group (Barsade, 2002; Bartel & Saavedra, 2000). In that sense, the *SCT* extended the conception of individual human agency to collective agency; that is, people's shared beliefs in their collective power to produce desired results. Although collective efficacy beliefs include aspects which emerge from the group, they serve similar functions and operate through similar processes as personal efficacy beliefs do (Bandura, 1997). A growing body of research attests the impact of perceived collective efficacy on group processes. Some of these studies assess the affective, motivational and behavioral effects of perceived collective efficacy instilled experimentally at the collective level (Arthur, Bell, & Edwards, 2007; Gully, Incalcaterra, Joshi, & Beaubien, 2002; Llorens, Schaufeli, Bakker, & Salanova, 2007; Salanova, Llorens, Cifre, Martínez, & Schaufeli, 2003). Recently, a meta-analysis by Stajkovic, Lee and Nyberg (2009) that included 96 studies (6,125 groups and 31,019

individuals) revealed a significant positive correlation between collective efficacy and group performance. More specifically, Structural Equation Modeling showed that collective efficacy fully mediates the relationship between group potency and group performance. As a whole, the findings of these studies show that the higher the collective efficacy beliefs, the greater the group accomplishments in terms of affectivity, motivation, and performance.

To sum up, though cognitive, affective and motivational regulatory mechanisms, both types of efficacy beliefs (self-efficacy and perceived collective efficacy) influence how people feel, how much effort they apply to actions, how long they persevere in the face of obstacles and failures, and their resilience to adversity. Therefore, it appears that efficacy beliefs influence positive affect (how well people feel) and motivates behavior (how engaged they are in their activities in terms of effort, persistence, and dedication) amplifying loops of these positive states that reinforce each other over time.

In the present study, we investigate for the first time how efficacy beliefs (both self-efficacy and perceived collective efficacy), positive affect (enthusiasm, satisfaction, and comfort) and motivation (activity engagement) reciprocally relate, thus creating gain cycles and spirals over time. In other words, we attempt to uncover the affective and motivational mechanisms of efficacy beliefs over time.

The affective mechanism of efficacy beliefs: Positive affect

Efficacy beliefs influence how people feel. Basically, research has mainly shown that the more efficacy beliefs, the less negative affect such as anxiety and depression (Bandura, 1997). However, studies into the impact of efficacy beliefs on positive affect are scarce. One example is the meta-analysis of Judge and Bono (2001) that documents the positive implications of efficacy beliefs on levels of job satisfaction. Another example is the laboratory study of Baron (1990) which finds that males reported higher efficacy beliefs than women in the presence of pleasant artificial scents than in their absence.

Moreover, according to the *SCT*, affect and efficacy beliefs reciprocally come about over time, meaning that positive affect is not only an antecedent of efficacy beliefs, but also a consequence. More specifically, Bandura (1997, 2001) assumed that when people feel contented and satisfied, they are more likely to believe that they are efficacious; consequently, positive affect is also a source of efficacy beliefs. As Bandura concluded (1997, p. 113), "mood and efficacy beliefs are related both concurrently and predictively". Complementarily to the *SCT*, Fredrickson's (2002) *Broaden-and-Build Theory* (*B&BT*) also assumes these reciprocal relationships between positive affect and personal resources, such as efficacy beliefs. Specifically, it assumes that positive emotions appear to *broaden* people's momentary thought-action repertoires and to *build* their enduring personal resources, such as efficacy beliefs. Tellingly, research using the *B&BT* suggests a positive reciprocal impact of positive emotions and resources (efficacy beliefs) in such a way that momentary experiences of positive emotions may build enduring psychological resources and trigger gain spirals over time that may produce greater emotional well-being. In the present study however, we used positive affect instead of emotions as positive affect fluctuates less over time because it does not depend so much on momentary stimuli as emotions do.

The motivational mechanism of efficacy beliefs: Activity engagement

Efficacy beliefs not only regulate an affective but also a motivational mechanism, namely engagement in an activity (work engagement, task engagement). When people and groups feel efficacious, they feel good in the short term (positive affect), and this also increases their engagement in their activity (showing high effort, persistence, dedication) in the longer term. Generally speaking, one definition of work engagement is "a positive, fulfilling, work-related state of mind that is characterized by vigor, dedication, and absorption on the activity" (Schaufeli, Salanova, González-Romá, & Bakker, 2002, p. 72). If we define engagement as a work-related positive motivational construct and compare it to positive

affect, engagement is more stable over time (Gray & Watson, 2001). *Vigor* suggests the willingness to invest effort in one's work, persistence in the face of difficulties, and high levels of energy and mental resilience while working. *Dedication* refers to a particularly strong work involvement and identification with one's job. The final dimension of engagement, *absorption*, denotes being fully concentrated and engrossed in one's work, whereby time passes quickly and one has difficulties with detaching oneself from work.

Recent research on engagement suggests that it positively relates to efficacy beliefs (Llorens et al., 2007; Salanova et al., 2003; Xanthopoulou, Bakker, Demerouti, & Schaufeli, 2007). Quite interestingly, it seems that efficacy beliefs may not only precede, but also follow engagement (Carver & Scheier, 1990; Llorens et al., 2007; Salanova, Bresó, & Schaufeli, 2005). For example in a sample of Spanish and Belgian students, Salanova et al. (2005) showed that current academic efficacy beliefs influence high levels of academic engagement which, in turn, influence future students' efficacy beliefs over time. Using a two-way longitudinal design, Xanthopoulou et al. (2007) showed empirical support for a reciprocal relationship between efficacy beliefs and work engagement also over time. More specifically, efficacy beliefs at Time 1 (T1) relate to work engagement at Time 2 (T2), and vice versa, thus suggesting a positive reciprocal gain cycle. Llorens et al. (2007) also conducted a two-wave longitudinal study by examining the relationship between personal resources (i.e., efficacy beliefs) and task resources (i.e., time control and method control) on the one hand, and task engagement on the other. The results show that task resources have a positive impact on efficacy beliefs which, in turn, foster task engagement. In addition, engagement boosts future efficacy beliefs which, in turn, lead to the perception of more task resources. Together, these results seem to suggest the existence of a gain cycle: efficacy beliefs relate to engagement which, in turn, also relates to efficacy beliefs, and so on over time.

Positive affect and activity engagement

As shown above, reciprocal relationships have been reported between efficacy beliefs and activity engagement. However, we believe that a similar reciprocal relationship may exist between positive affect and activity engagement as well. Research on positive affect shows that it facilitates approach behavior, which prompts individuals to engage in particular activities (Cacioppo, Gardner, & Berntson, 1999; Carver & Scheier, 1990; Clore, 1994). In contrast to affect that reflects immediate adaptive responses to the (work) environment, engagement is defined as a relatively more stable work related motivational state. A recent study among Dutch managers showed that, indeed, positive affect partially mediates the relationship between job resources (i.e., job control, task variety, performance feedback, and opportunities for learning and development) at the one hand and work engagement and organizational outcomes (i.e., commitment and intention to stay) at the other hand. Hence, this study corroborates the theoretical claim, which is based on a structural model of affect, that positive affect mediates the relationship between the work environment and work related motivational states such as work engagement. In this way, we can expect that positive affect can also mediates the relationship between personal resource, such as self-efficacy, at one hand and activity engagement on the other hand.

This means that the self-efficacious employees feel good at work and they can show more likely an interest in what they do and, as a result, may end up feeling more motivated and engaged. And also, feeling engaged at work makes feel more efficacious as well, in a kind of reciprocal relationships over time. Furthermore, research (Sonnentag, Mojza, Binnewies, & Scholl, 2008) has also shown that work engagement and disengagement (psychological detachment from work during off-job times) relates to a person's affective states at the end of a working week. More particularly, high work engagement in combination with high levels of off-the-job detachment predicts the highest levels of positive affect. To date however, it is not clear as to what extent the activity level implied in particular affects has a differential effect

on engagement. Therefore in the present study, we include three positive affect states characterized by increasing activity levels (i.e., comfort, satisfaction, and enthusiasm).

About reciprocal gains and spirals of efficacy beliefs, positive affect and activity engagement

It is important to note that some of the aforementioned studies take into account reciprocal causation between efficacy beliefs and affective and motivational variables. In fact, reciprocal causation is rather plausible because we are dealing with dynamic processes that unfold over time rather than one-directional causal relationships (Bandura, 1997, 2001). In other words, we need to understand the *sequences* of the psychosocial experiences that explain these relationships rather than isolated episodes. For that reason, the *gain cycles* concept plays a key role. Moreover, the idea of reciprocal gain cycles is consistent with the cyclic relationship between psychological states that positively relate to each other over time. Hence in order to study the dynamic interplay of efficacy beliefs, positive affect, and engagement, longitudinal research designs are all necessary to disentangle cause and effect. Such studies, particularly those that combine causal and reversed causal effects into one reciprocal causation model, are relatively scarce. In the present study, we examine the reciprocal relationships among efficacy beliefs (self-efficacy and collective efficacy), positive affect and activity engagement over time using longitudinal designs.

As noted above, research suggests that the same reciprocal psychological mechanisms that operate at the individual level (self-efficacy, positive individual affect and engagement) also operate at the collective level (perceived collective efficacy, positive collective affect and collective engagement). Accordingly, we investigate a research model (see Figures 1) which assumes that efficacy beliefs (both personal and collective) lead to more activity engagement through three positive affects; enthusiasm, satisfaction and comfort. Moreover, a reciprocal gain process assumes that engagement (vigor, dedication and absorption) influences efficacy beliefs over time. Finally, it is important to emphasize that our

research uses both cycles and spirals for explaining these reciprocal relationships among psychological states. *Gain spirals* are defined as *amplifying loops* in which cyclic reciprocal relationships among constructs build on each other positively over time (Lindsley, Brass, & Thomas, 1995). More importantly, there is a need for three conditions for a gain spiral to exist: (1) normal and reversed causation (also known as a reciprocal relationship); (2) an increment in the levels of variables over time, and (3) the need to study spirals in longitudinal research with at least three waves to test the tendency (up-, down or stability) over time.

Put differently, empirical evidence on both reciprocal relationships and changes over time using, at least, three-way waves is essential to document the existence of gain *spirals*. There are two important issues to point out here. Firstly and statistically speaking, the aforementioned three conditions are independent. As we see below, most empirical studies on gain spirals comply with the first, but rarely with the second and third conditions. Consequently this means that, strictly speaking, we only see "cycles" of positive, bi-directional relationships rather than gain "spirals" because there is no evidence of increments or amplifying loops that result in increased levels. Secondly, we can only establish "real" causation when using experimental designs with a random assignment of subjects to conditions. Clearly, this is virtually never the case when studying psychological constructs in natural organizational contexts. Nevertheless, there is a need for theory-grounded longitudinal field studies that assess variables over time using proper sequences and intervals that enhance confidence in (reciprocal) causal relationships (Mathieu & Taylor, 2006).

The current study

Based on previous research, the objective of our study is to examine for the first time, a reciprocal structural model of gain cycles and spirals of efficacy beliefs, positive affect, and activity engagement. Specifically, and based on Bandura's *SCT*, we test how efficacy beliefs (both self-efficacy and collective efficacy) influence activity engagement

(vigor, dedication and absorption), both directly and indirectly, through their impact on positive affect (enthusiasm, satisfaction, and comfort) over time. To this end, we will conduct two independent longitudinal studies with two and three waves to test the gain cycles and spirals of the main constructs, respectively.

Study 1: Gain cycles of self-efficacy, positive affect and work engagement among teachers

The first study is a two-wave follow-up study with secondary school teachers. According to previous research on the affective and motivational mechanisms of self-efficacy, we expect (*Hypothesis 1*) that a positive *cycle* of self-efficacy and engagement exists over time (T1-T2), also via positive affect, in a way of reciprocal causality. More specifically, we expect feeling self-efficacious at T1 positively influences T2 positive affect and T2 engagement. Furthermore T1 engagement, in turn, positively influences T2 self-efficacy. Moreover, we sought to discover whether the positive affect characterized by high activation (enthusiasm) has stronger effects on engagement than positive affects characterized by a lower levels of activation (satisfaction and comfort) (*Hypothesis 2*). This goes one step beyond past research which did not take into account the activity level of affect. Figure 1, on the left, illustrates this research model.

INSERT FIGURE 1 ABOUT HERE

Method

Sample and Procedure

At the beginning of the academic year, we sent a letter to 50 Spanish secondary schools located in Spain explaining the goal of the research. We distributed self-report questionnaires among 600 secondary teachers from these schools. The sample at time 1 (T1) comprised 483 teachers (56% women) from 34 different secondary schools (81% response rate). Ages ranged from 23 to 60 years ($M = 40.2$; $SD = 8$ years and 2 months); 87% held a master's degree, and 83% worked in public schools. Researchers distributed

these questionnaires in envelopes. A cover letter explained the purpose of the study, and that participation was voluntary with guaranteed confidentiality. Respondents returned the completed questionnaires in a sealed envelope to either the person who had distributed them or directly to the research team. Eight months later, we distributed questionnaires again to the same 34 schools at time 2 (T2). After deleting missing cases, 274 secondary teachers (57% women) from 24 secondary schools participated in the longitudinal study (59% return rate of the questionnaires). Accordingly, 57% of the teachers who participated at T1 also participated at T2. Ages ranged from 23 to 60 years ($M = 40$; $SD = 7$ years and 1 month).

In order to test whether the drop-outs differed from the panel group, we compared the T1 background variables of both groups (age, gender, type of school— private vs. public—, teaching experience, and organizational tenure); and also to the main study variables at T1. The results of the Multiple Analyses of Variance showed no significant differences between groups regarding the background variables [$F(5,464) = 0.41$, $p = .83$] or the study variables [$F(7,454) = 0.91$, $p = .49$]. That is, the panel group differed from the drop-outs neither in terms of background nor in terms of the study variables.

Measures

Efficacy beliefs. We measured "self-efficacy" by adapting the general self-efficacy scale (10 items; 0 '*never*' to 6 '*always*') from Schwarzer (1999) to a more specific measure of teacher's self-efficacy. Instead of the specific version for teachers (Schwarzer & Hallum, 2008), we used the adapted general version to make it more comparable with that of Study 2. Namely, we rephrased the general versions in both studies to match them to the specific contexts of teaching (Study 1) and working in groups (Study 2), respectively. For Study 1, we changed "*I can solve most problems if I invest the necessary effort*" to "*I can solve most problems in my teaching job if I invest the necessary effort*".

Positive Affect. By asking the participants "How did you feel during the last four weeks *at your work?"*, we measured three specific job-related positive affects (Cifre & Salanova, 2002; Warr, 1990) that differ in terms of their level of activation (0 '*never*' to 6 '*always*'): (1) 'enthusiasm' (high level of activation) with the enthusiasm-depression scale (Warr, 1990) by indicating the extent to which teachers felt 'depressed', 'gloomy', 'miserable' (we reversed them all), 'cheerful', 'enthusiastic' and 'optimistic' at work; (2) 'satisfaction' (medium level of activation) with the 3-items 'faces scale'; an affect-based measure (Kunin, 1955) referring to satisfaction with the task, one's colleagues and supervisor, and one's school, respectively; (3) and 'comfort' (low level of activation) with the comfort-anxiety scale (Warr, 1990) by indicating the extent to which teachers felt 'tense', 'uneasy', 'worried' (we reversed them all), 'calm', 'contented' and 'relaxed' at work.

Activity Engagement. We measured work engagement with the Spanish version (Salanova, Schaufeli, Llorens, Peiró, & Grau, 2000) of the Utrecht Work Engagement Scale (UWES; Schaufeli et al., 2002) that includes three dimensions (0 '*never*' and 6 '*always*'): (1) vigor (6 items; e.g., "*I can continue working for very long periods at a time*"); dedication (5 items; e.g., "*For me, my job is challenging*") and absorption (6 items; e.g., "*When I'm working, I forget everything around me*").

Data analyses: Model fit

Firstly, we performed Confirmatory Factor Analyses (CFA) by AMOS 17.0 to test a measurement model that distinguishes among the constructs of enthusiasm, satisfaction, comfort, and engagement. Based on Caprara, Pastorelli, Regalia, Scabini and Bandura (2005), we tested three models: (1) A one-factor model where all constructs are the expression of a single latent (positive) factor; (2) a six-factor orthogonal model in which all the positive constructs are independent; and (3) a six-factor oblique model; the factors (and covariances) are freely estimated. Secondly, we used Structural Equation Modeling (SEM) to test

Hypotheses 1 and 2, and we tested different competitive models: (1) the Stability Model (M1) without cross-lagged structural paths, but with temporal stabilities and synchronous correlations, (2) the Causality Model (M2), which includes additional cross-lagged structural paths from T1 efficacy-beliefs to T2 positive affect and to T2 engagement, as well as from T1 positive affect to T2 engagement; (3) the Reversed Causation Model (M3) which includes additional cross-lagged structural paths from T1 engagement to T2 positive affect and to T2 efficacy beliefs, as well as from T1 positive affect to T2 efficacy beliefs; and (3) the Reciprocal Model (M4), which includes reciprocal relationships among efficacy beliefs, positive affect and engagement, thus including all the paths of M2 and M3. We allowed the measurement errors of the corresponding indicators of T1 and T2 to covary over time (Pitts, West, & Tein, 1996).

We used maximum likelihood estimation methods by computing the absolute and relative indices of goodness-of-fit (Marsh, Balla, & Hau, 1996): the χ^2 Goodness-of-Fit Statistic, Goodness-of-Fit Index (GFI), Adjusted Goodness-of-Fit Index (AGFI), and the Root Mean Square Error of Approximation (RMSEA), as well as the Comparative Fit Index (CFI), the Incremental Fit Index (IFI) and the Tucker-Lewis Index (TLI). Values smaller than .08 for RMSEA indicate an acceptable fit. For the remaining indices, values greater than .90 indicate a good fit (Hoyle, 1995). Finally, we computed the Akaike Information Criterion (AIC; Akaike, 1987) to compare non nested competing models. The lower the AIC index, the better the fit of the model to the data.

<div align="center">Results</div>

Descriptive Analyses

Table 1 displays the descriptive analyses, internal consistencies (Cronbach's α), stabilities, and intercorrelations of the scales. All the α- values meet the criterion of .70. As expected, the pattern of correlations shows that all the scales relate significantly and

positively. The common method variance test for the T1 variables, using the Harman's single

factor test with the CFA (e.g., Iverson & Maguire, 2000), reveals that one single factor could

not account for the variance in the data [Delta $\chi^2(2) = 112.3$, $p < .001$]. Consequently, our

dataset apparently presents no problems in terms of common method variance.

INSERT TABLE 1 ABOUT HERE

Confirmatory Factor Analyses

The CFA among T1 enthusiasm, satisfaction, comfort and engagement, based on

Caprara et al. (2005), show that the oblique model is the best fitting model to the data

compared to the one-factor model [Delta $\chi^2(6) = 259.67$, $p < .001$] and the orthogonal model

[Delta $\chi^2(6) = 1070.04$, $p < .001$] as all the fit indices, except RMSEA, meet their

corresponding criteria ($\chi^2 = 51.81$, df = 6, GFI = .97, RMSEA = .10, CFI = .97, IFI = .97,

AIC = 81.81). These results emphasize an interrelation of enthusiasm, satisfaction, comfort

and engagement, but with *distinct* constructs.

The Hypothesized Structural Model

Table 2 displays the overall fit indices of the competing models. The results show

that the fit of the *reciprocal model* (M4) proves superior to that of the their competitive

models. This means that M4, which includes the cross-lagged *reciprocal* relationships among

efficacy beliefs, positive affect and engagement over time, is the model that best fits the data.

INSERT TABLE 2 ABOUT HERE

The specific structural relationships of M4 reveal that all the indicators of

engagement have loadings on the intended latent factor that are higher than .61 at both T1 and

T2. It also reveals that the autocorrelations between the two waves are .60 for efficacy beliefs,

.18 for enthusiasm, .49 for satisfaction, .20 for comfort, and .65 for engagement.

Hence, the findings of Study 1 show that: (1) T1 efficacy beliefs lead to T2

engagement indirectly through T1 positive affect and (2) T1 engagement influences T2

positive affect and efficacy beliefs reciprocally (*Hypothesis 1*). That is, we corroborate the expected positive cycle of efficacy beliefs and engagement over time (T1-T2) via positive affect by way of reciprocal causality. Furthermore, the Analyses of Covariance (ANCOVA) using time (Wilks' Lambda) as intra-variance among the study variables show that the levels of efficacy beliefs [$F(1, 266) = 3.29$; $p < .05$] and satisfaction [$F(1, 264) = 11.28$, $p < .001$] increase significantly over time (T1-T2) We also expected the positive affect characterized by high activation (enthusiasm) to have stronger effects on engagement than on positive affects characterized by a lower level of activation (satisfaction and comfort) (*Hypothesis 2*). As expected, the results show that T1 enthusiasm exhibits unique effects on T2 engagement (see Figure 2).

INSERT FIGURE 2 ABOUT HERE

Study 2: Gain Spirals of collective efficacy beliefs, positive affect and task engagement in

working groups

Research increasingly supports the social nature of affect (Parkinson, 1996); that is, positive emotions and work engagement are not only individual level phenomena, but are also collective constructs, usually assessed at the group level (e.g., Barsade, 2002; Bartel & Saavedra, 2000; George, 1990, 1996; Kelly & Barsade, 2001; Salanova et al., 2003; Salanova, Agut, & Peiró, 2005). Like efficacy beliefs, groups of employees in the workplace can share positive affect and engagement which leads to important positive consequences (Bakker, Demerouti, & Schaufeli, 2005; Salanova et al., 2003, 2005). For example, Salanova et al. (2005) showed that the collective engagement experienced by employees of service units in hotels and restaurants had positive organizational consequences in terms of unit performance and customer loyalty. In a similar vein, Walter and Bruch (2008) presented a model that studied the emergence of collective moods and emotions on the work-group level. These authors argued in favor of the existence of a reciprocal linkage between positive group

affective similarity and group relationship quality that gives rise to a dynamic, self-reinforcing upward spiral which they called the positive group affect spiral. Tellingly, Walter and Bruch (2008) indicated the need for more longitudinal research to confirm this spiral.

In Study 2, participants worked on group tasks, and we collected measures of efficacy beliefs, positive affect and engagement. In this study, we used a three-wave longitudinal design to test our hypotheses that a positive *spiral* of collective efficacy beliefs and engagement exists over time (T1-T2-T3). We expected this spiral to operate via both positive affect and by a way of reciprocal causality. More specifically, we expected that feeling collective efficacious at T1 positively influences T2 positive affect and T2 and T3 engagement. Furthermore, T1 engagement, in turn, positively influences T2 and T3 collective efficacy (*Hypothesis 3*). Finally as in Study 1, we expected that collective positive affect characterized by high activation (collective enthusiasm) has stronger effects on collective engagement than other positive affects characterized by a lower level of activation (collective satisfaction and comfort) (*Hypothesis 4*). At the right of Figure 1 the hypotheses of study 2 are displayed.

Method

Samples and Procedure

Study 2 is a three-wave longitudinal laboratory study which includes 100 university students (77% women) who voluntarily participated in three laboratory tasks. Ages ranged from 20 to 38 years ($M = 25$; $SD = 3$ years and 4 months). We organized laboratory sessions in 19 groups of four to seven students each. All the groups met during three sessions to perform three tasks. We employed an idea generation task (at T1) as a training task. Participants had to come up with a slogan to promote house sales in a specific area. They did this task twice: individually (without interacting with any other group member) and in groups (by selecting the best five slogans after a group discussion). After three weeks (T2), the same

groups met again in the second session and followed the same procedure. This time, the groups performed another idea generation task in which they had to come up with three activities for a Cultural Program of Psychology. After three weeks, the students performed the final task (T3) and had to come up with three social projects which investigate a large amount of money. There was a small award of €120 for the best group performance. After finishing each task, the participants filled out a questionnaire with the study variables.

Measures

In Study 2, we used similar measures to those in Study 1, but we tailored them more specifically to the group tasks at hand. Thus, we reformulated the items in the questionnaire so that they referred to the *group* rather than to the individual. Furthermore, we also changed the time frame of the items so that they corresponded with the time intervals between the study waves.

Efficacy beliefs. We measured "collective efficacy" by averaging individuals' own perceptions of collective efficacy, as recommended by Earley (1993) and validated by Salanova et al. (2003). We used four items of the generalized self-efficacy assessment by Schwarzer (1999) on a scale of 0 ('never') to 6 ('always'), which we slightly adapted for use in work groups (e.g., *"I feel confident about the capability of my group to perform the tasks very well"*).

Positive Affect. We measured the three specific collective positive affects by asking the participants "How the group felt during the *group work*" (0 '*never*' to 6 '*always*'). We assessed: (1) 'collective enthusiasm' with the enthusiasm-depression scale (6 items) (Warr, 1990; e.g., *"During the task, my group felt enthusiastic"*), (2) 'collective satisfaction' with the task using a 4-item 'faces scale' (Kunin, 1955) (e.g., *"During the task, my group felt satisfied with the task itself"*) and (3) 'collective comfort' with the comfort-anxiety scale (6 items) developed by Warr (1990; e.g., "*During the task my group felt relaxed"*).

Activity Engagement. We measured *task collective engagement* (Salanova et al., 2003) by including three dimensions (0 '*never*' to 6 '*always*'): vigor (6 items; e.g., "*During the task, my group felt full of energy*"); dedication (4 items; e.g., "*My group felt proud of the task done*"), and absorption (6 items; e.g., "*Time flew when my group was working*").

Data analyses

Since the variables in Study 2 are collective, we firstly tested within-group agreements by computing r_{wg} at T1, T2 and T3 using the Agree program (see Arthur et al., 2007; Bliese, 2000; James, Demaree, & Wolf, 1993). The results show average r_{wg} values for the referent-shift consensus of the judgments of the variables in our study that ranges across the three waves from .84 to .89. Moreover, these judgments were also consistently high within each wave, ranging from .76 to .90. This suggests that it is not necessary to eliminate any of these groups because of poor agreement. Secondly, we used SEM methods to test the Hypotheses 3 and 4 longitudinally using three waves. As in Study 1, we tested the four different competitive models (see the *Data Analyses* section of Study 1).

<div align="center">Results</div>

Descriptive Analyses

Table 3 displays the descriptive analyses, internal consistencies (Cronbach's α), stabilities, and intercorrelations of the scales. All the α- values meet the criterion of .70. As expected, the pattern of correlations shows that all the scales significantly and positively relate. Once again, the results of the Harman's single factor test with CFA (Iverson & Maguire, 2000) on T1 variables reveal that the fit of the single factor model is significantly poorer than the model with three related latent factors [Delta $\chi^2(2) = 63.99$, $p < .001$]. Consequently, we do not consider the common method variance to be a problem in the Study 2 dataset.

<div align="center">INSERT TABLE 3 ABOUT HERE</div>

The Hypothesized Structural Model

Table 4 displays the overall fit indices of the competing models for Study 2. Again, the results reveal that the fit of the *reciprocal model* (M4) is superior to that of the stability model (M1), the causality model (M2), and the reversed causality model (M3) model. As in Study 1, this means that M4 that includes the cross-lagged *reciprocal* relationships among collective efficacy beliefs, collective positive affect and collective engagement over time (T1-T2-T3) and that this model best fits the data (see Table 4).

INSERT TABLE 4 ABOUT HERE

The structural relationships of M4 reveal that the loadings of all the indicators of collective engagement on the intended latent factor are higher than .89 at T1, T2 and T3. Furthermore, the autocorrelations among the three waves range from .36 to .47 for collective efficacy beliefs, from .33 to .38 for collective enthusiasm, from .22 to .42 for collective satisfaction, from .22 to .39 for collective comfort and from .41 to .68 for collective engagement. Once more, the findings from Study 2 show that, as far as *Hypothesis 3* is concerned, collective efficacy at T1 positively influences T2 and T3 positive affect (enthusiasm and comfort) which in turn influences T3 engagement. Furthermore, we observe some reversed causal effects. T1 engagement, in turn, positively influences T2 and T3 positive affect (satisfaction); T2 engagement also positively influences T3 positive affect (enthusiasm, satisfaction and comfort) and T3 collective efficacy. Furthermore, the ANCOVAs (Wilks' Lambda) show a significant increase over time for collective efficacy beliefs [$F(2, 92) = 8.01$; $p = .001$], collective satisfaction [$F(2, 92) = 4.06$, $p = .05$], and collective comfort [$F(2, 91) = 10.78$, $p = .001$], specifically from T1 to T2-T3, and also for collective absorption from T2 to T3 [$F(2, 92) = 3.17$, $p = .05$]. These results suggest that at least one tentative gain *spiral* of collective efficacy beliefs exists from T1 via T2 to T3, especially in terms of satisfaction, comfort and absorption (*Hypothesis 3*). Results also show

that, as expected (*Hypothesis 4*), only collective enthusiasm (the high activation affect) and collective satisfaction (the medium activation affect) have a significantly and positively cross-lagged effect on T2 and T3 collective engagement (see Figure 3).

INSERT FIGURE 3 ABOUT HERE

Discussion

In this study, we tested a structural model of gain cycles and spirals of efficacy beliefs. Specifically, we sought to discover whether different types of efficacy beliefs (self-efficacy and collective efficacy) have a similar influence on activity engagement, both directly and indirectly, through their impact on positive affect over time. In order to investigate this research question, we conducted two different longitudinal studies; a field-study among teachers and a laboratory study among students. In both studies, we assessed similar psychological constructs, and we tested gain *cycles* in Study 1 (reciprocal causation) and gain *spirals* in Study 2 (reciprocal causation plus increased levels over time). The results of both studies contribute to our understanding of the pivotal role of efficacy beliefs in their gain cycles and spirals that, in turn, increase both positive affect and activity engagement.

Our findings show that high levels of efficacy beliefs enhance both positive affect and engagement through a kind of gain cycle and a tentative spiral that operates over time. As expected, the two different longitudinal studies carried out confirm Hypotheses 2 and 4. More specifically, positive affect, characterized by high activation (enthusiasm), has a stronger effect on activity engagement than positive affects characterized by a lower level of activation (satisfaction and comfort). Interestingly, we also encountered unexpected findings and not all the positive affects have the same predictive power regarding activity engagement. For example, the results of Study 2 show that low arousal positive affect (comfort) may even relate negatively with engagement, but positively with efficacy beliefs. In addition, the more comfort students experience at T1 (and at T3), the lower the levels of engagement the groups

report at T1 (and at T3). Regarding efficacy beliefs, the results reveal that this positively relates with comfort, both concurrently and longitudinally. It appears that comfort relates differently with engagement and efficacy beliefs; high levels of efficacy beliefs increase levels of comfort, and vice versa, thus constituting a kind of gain cycle over time. However, feeling comfortable is negatively related with activity engagement. This is probably because comfort is a low-activation affect whereas, conversely, high activation characterizes engagement. However, the observed cross-lagged effects of engagement on comfort are the other way around, that is, the more engaged groups feel at T2, the more comfort they experience at T3. We also observe a similar cross-lagged effect in Study 1 among teachers.

If we take into account the three positive affect constructs considered in this research, then enthusiasm displays the most predictive power and relates more strongly to efficacy beliefs and engagement, both concurrently and longitudinally, in both studies. Among teachers (Study 1), self-efficacy predicts engagement directly and indirectly via enthusiasm; engagement also predicts self-efficacy over time. Moreover, we observe a significant increase of self-efficacy among teachers from T1 to T2, which may suggest the potential existence of a gain spiral. Feeling self-efficacious makes teachers feel good (experiencing positive affect like enthusiasm) and increases their work engagement (vigor, dedication and absorption) which, in turn, increases their levels of efficacy beliefs over time. However, according to Lindsley et al. (1995), at least three-wave longitudinal designs are necessary for testing spiraling hypotheses.

So far, the findings partially support our Hypotheses 1 and 3. We expected a positive gain cycle (Study 1) and spiral (Study 2) of efficacy beliefs and engagement would exist over time (also via positive affect). More specifically, we expected feeling efficacious at T1 would increase levels of positive affect at T2 which, in turn, would increase engagement levels at T2 and T3. Furthermore, we expected engagement, in turn, would increase efficacy levels over

time. But our findings show that a gain positive cycle and spiral of efficacy beliefs exists, but not with each one of the specific positive affects (enthusiasm, satisfaction and comfort), and activity engagement. For example, we observe significant increments in efficacy beliefs (self-efficacy and collective perceived efficacy), as well as increments in satisfaction.

Theoretical contribution

Our results extend the *SCT* because they further specify the *kinds* of affective and motivational states which play a major role as sources of efficacy beliefs (specifically as the fourth source of self-efficacy – affective states or experiences – is concerned). Apparently, the affect at the highest level of activation (enthusiasm) has the strongest consistent effect on efficacy beliefs. In the laboratory study (Study 2), we also find a tentative gain spiral for efficacy beliefs. As Lindsley et al. (1995) stressed, it is necessary to test spirals in longitudinal research with at least three waves, which is the case in Study 2. Moreover, we need to meet other conditions such as positive reciprocal relationships among variables and an increase of the levels of variables over time. The results of our laboratory study confirm a tentative dynamic gain spiral of collective efficacy beliefs because the changes from T1 – T2 – T3 are significant and show a steady increment of levels of efficacy beliefs over time. Moreover, efficacy beliefs have a short-term cross-lagged impact on enthusiasm and a longer term effect on enthusiasm and comfort. Enthusiasm also has a short-term effect on efficacy beliefs and also shows positive reciprocal causation dynamics. Finally, efficacy beliefs have a positive impact on engagement directly (only concurrently) and indirectly via enthusiasm (longitudinally). Collectively, the more efficacious groups feel the more enthusiasm they show and, in turn, the more they experience engagement over time.

Furthermore, the results suggest that a positive gain cycle and a spiral are also in line with former research on positive moods and emotions which showed that these positive constructs facilitate approach behavior which, in turn, prompts people to engage in particular

behaviors (Cacioppo et al., 1999; Carver & Scheier, 1990; Clore, 1994; Fredrickson, 2002). Our findings of reciprocal relationships between positive affect and engagement in our longitudinal study among teachers (Study 1) support the notion of positive gain cycles. In all these cycles, positive affect (especially enthusiasm, and satisfaction to a somewhat lesser extent) enhances engagement which, in turn, enhances efficacy beliefs over time, and so forth (see also Fredrickson, 2002).

In accordance with the reciprocal causal nature of efficacy beliefs, we also expected affective and motivational processes and efficacy beliefs to bi-directionally relate both synchronically and longitudinally. For example as Bandura (1997) argued, despondency may reduce efficacy beliefs; these low levels of beliefs, in turn, lower motivation and spawn poor performance to breed even deeper despondency, thus perpetuating a 'downward cycle'. For instance in both Study 1 and Study 2, efficacy beliefs have a positive impact on activity engagement (and positive affect) which, in turn, enhances efficacy beliefs over a longer time frame, thus triggering a positive gain cycle seems. In the present study, we tested this positive cycle successfully among teachers in Study 1 where efficacy beliefs increased significantly between two time points, and also to test a positive spiral among students working in groups in Study 2 for which we did a three-wave longitudinal design.

Implications for future research and for practice

It would be important that future research examines whether efficacy beliefs and activity engagement also relate to other positive affective states (joy, happiness), and to also investigate gain cycles and spirals with behaviors such as job and task performance because these topics are important from a practical point of view. Moreover, future studies may choose different time lags to examine these relationships, for example, to address longer-term associations in longitudinal studies with time lags of several months. It would also prove interesting to study these gain spirals with more than three waves using longitudinal designs

to test whether our findings also replicate in the form of virtuous spirals over time, as Lindsley et al. recommended (1995).

Our findings also indicate promising directions for interventions to increase efficacy beliefs among employees and working groups. These include practical exercises to provide successful experiences at work and in tasks (enactive mastery), models of performance or behavior modeling (vicarious experiences), coaching and encouragement (verbal persuasion), and reducing the emotional threats of rejection and promoting positive affect (managing affect). According to Bandura (1999), the most authentic and influential way to increase efficacy beliefs is by fostering 'mastery experiences'. To achieve this, it is necessary to tackle problems regarding work and group tasks in successive, attainable steps. While successes build a robust belief in one's activity efficacy beliefs, failures undermine it, especially in the earlier phases of starting new tasks or activities. Therefore in order to achieve resilient efficacy beliefs, it is necessary to study experiences in overcoming obstacles through persistent efforts. In a similar way, if people and groups see others like themselves succeed by sustained effort, they will believe that they also have the capability to succeed ('vicarious experiences'). 'Social persuasion' seeks to persuade workers and groups that they have what it takes to succeed. Therefore, they make more effort and are more likely to persevere if they have self-doubts when obstacles arise. Finally, people and groups also rely on their affect or emotional states to evaluate their own capabilities to do things. Negative emotions and moods, such as tension, anxiety and depression, are signs of personal and group deficiency. However, this study also shows that positive affect and engagement positively influence efficacy beliefs over time. In this case, it would be apt to enhance positive affects and engagement among individuals and groups, and to reduce people's negative affects by correcting misinterpretations of somatic sources of information and by also improving work and group environments that could also enhance positive affect.

Weaknesses and strengths of the study

One weakness of this study is the use of self-report measures. However, given the nature of this study, which includes covert psychological phenomena such as beliefs, affects and motivation, we cannot employ objective data. However, we checked the potential impact of common method variance in our data (see Podsakoff, Mackenzie, Lee, & Podsakoff,2003). Although we cannot completely rule out that method variance may play a role, the check done proved negative. Moreover, the collected samples were of convenience, from a specific country (Spain) and so results cannot be generalized. On the other hand, our study has the following strengths: (1) the use of longitudinal research designs that tests the cross-lagged effects between two or three waves; (2) the separate testing of the measurement and the structural models; (3) the use of different research designs: field and a laboratory studies; (4) the inclusion of two independent samples that allow for a cross-validation of the results; (4) testing of similar models that include individual- and group constructs. The fact that our results are quite similar across different samples, research designs, and individual- and groups illustrates the robustness of our findings. In addition, the similarity of the results across the fieldwork and laboratory studies also indicates of their ecological validity.

Final note

To summarize, the current study shows that efficacy beliefs have an indirect impact on engagement via positive affect, especially enthusiasm, in two different samples (teachers from secondary schools and university students working in groups). In addition, the results show the existence of a gain cycle of self-efficacy, job-enthusiasm and work engagement over time, as well as a tentative gain spiral of collective efficacy beliefs, collective enthusiasm and satisfaction, and collective engagement over time. Hence this study contributes the understanding of how the positive regulatory affective and motivational mechanisms of efficacy beliefs operate over time.

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Table 1

Means (M), standard deviations (SD), internal consistencies (Cronbach's α) stabilities (on the diagonal), and zero-order correlations, Study 1 (n=274).

Variables	*M*	**SD**	α	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Efficacy T1	3.93	.87	.93	-												
2. Efficacy T2	4.02	.81	.95	.64***	-											
3. Enthusiasm T1	4.19	.95	.87	.41***	.48***	-										
4. Enthusiasm T2	4.18	.95	.89	.53***	.41***	.72***	-									
5. Satisfaction T1	4.02	.93	.69	.32***	.37***	.44***	.43***	-								
6. Satisfaction T2	4.19	.89	.70	.47***	.32***	.42***	.51***	.64***	-							
7. Comfort T1	3.73	1.06	.88	.36***	.39***	.71***	.56***	.33***	.33***	-						
8. Comfort T2	3.70	1.04	.87	.45***	.35***	.59***	.76***	.38***	.46***	.64***	-					
9. Vigor T1	4.12	.93	.83	.38***	.42***	.56***	.43***	.24***	.27***	.42***	.41***	-				
10. Vigor T2	4.06	.92	.86	.46***	.34***	.45***	.48***	.25***	.37***	.29***	.41***	.64***	-			
11. Dedication T1	3.88	1.12	.90	.37***	.48***	.62***	.48***	.35***	.31***	.42***	.37***	.66***	.48***	-		
12. Dedication T2	3.86	1.09	.90	.51***	.42***	.52***	.57***	.34***	.44***	.35***	.44***	.57***	.74***	.67***	-	
13. Absorption T1	3.54	1.04	.80	.27***	.28***	.31***	.25***	.11*	.21**	.14*	.15*	.53***	.41***	.58***	.50***	-
14. Absorption T2	3.48	1.01	.82	.26***	.17***	.23***	.22***	.12*	.22***	.12*	.12*	.42***	.54***	.48***	.61***	

Note: * $p< .05$, ** $p< .01$, *** $p< .001$. T1 = Time 1, T2 = Time 2.

Table 2

Longitudinal model fit in secondary school teachers, Study 1 (n=274): SEM

Models	χ^2	df	GFI	AGFI	RMSEA	CFI	IFI	TLI	AIC	Difference test
M1. Stability	256.31	60	.90	.81	.10	.92	.92	.88	346.31	
M2. Causality	240.08	59	.90	.82	.10	.93	.93	.90	332.08	a = 16.23(1)***
M3. Reversed	214.42	57	.91	.83	.10	.94	.94	.90	310.42	a = 41.89(3)***
										a = 25.66(2)***
M4. Reciprocal	186.54	55	.91	.89	.08	.95	.95	.91	286.54	a = 69.77(5)***
										a = 53.54(4)***
										a = 27.88(2)***

Notes: $\chi 2$ = Chi-square; df = degrees of freedom; GFI = Goodness-of-Fit Index; AGFI = Adjusted Goodness-of-Fit Index; RMSEA = Root Mean Square Error of Approximation; CFI = Comparative Fit Index; IFI = Incremental Fit Index; TLI = Tucker-Lewis Index; AIC = Akaike Information Criterion; ***$p < .001$; a = Chi-square differences.

Table 3
Means (M), standard deviations (SD), internal consistencies (Cronbach's α) stabilities (on the diagonal), and zero-order correlations in students working in groups, Study 2 (n=100).

Variables	M	SD	α	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1. Col.Efficacy T1	4.19	.60	.88	-																			
2. Col.Efficacy T2	4.39	.54	.87	.47***	-																		
3. Col.Efficacy T3	4.44	.57	.84	.45***	.53***	-																	
4. Col.Enthusiasm T1	5.02	.60	.80	.65***	.37***	.46***	-																
5. Col.Enthusiasm T2	5.09	.61	.70	.38***	.51***	.48***	.58***	-														
6. Col.Enthusiasm T3	5.10	.62	.76	.45***	.39***	.52***	.65***	.68***	-													
7. Col,Satisfaction T1	4.87	1.0	.82	.27***	.23*	.20*	.21***	.13	.24*	-												
8. Col.Satisfaction T2	5.23	.94	.82	.20*	.42***	.37***	.38***	.45***	.49***	.31***	-											
9. Col,Satisfaction T3	5.17	.96	.85	.31**	.36***	.53***	.48***	.49***	.65***	.33***	.62***	-										
10. Col.Comfort T1	4.70	.73	.85	.51***	.30***	.37***	.68***	.32***	.41***	.05	.30**	.24***	-									
11. Col.Comfort T2	4.99	.72	.82	.22*	.46***	.32***	.44***	.63***	.35***	.08	.39***	.28**	.53***	-								
12. Col.Comfort T3	4.98	.70	.78	.43***	.38***	.44***	.56***	.50***	.62***	.14	.31***	.45***	.52***	.55***	-							
13. Col.Vigor T1	3.73	.65	.83	.49***	.30***	.41***	.61***	.35***	.53***	.20*	.30**	.41***	.32***	.15	.33***	-						
14. Col.Vigor T2	3.77	.67	.83	.38***	.48***	.51***	.50***	.51***	.66***	.10	.56***	.53***	.39***	.29***	.43***	.64***	-					
15. Col.Vigor T3	3.75	.75	.88	.31**	.37***	.61***	.49***	.52***	.73***	.12	.53***	.66***	.31**	.23*	.33**	.58***	.76***	-				
16. Col.Dedication T1	3.98	.70	.84	.55***	.36***	.41***	.57***	.40***	.55***	.34***	.34***	.42***	.31***	.13	.35***	.82***	.62***	.53***	-			
17. Col.Dedication T2	4.02	.76	.88	.33**	.49***	.49***	.51***	.47***	.65***	.15	.58***	.56***	.35***	.33**	.45***	.65***	.86***	72***	.62***	-		
18. Col.Dedication T3	3.93	.80	.86	.33**	.36***	.54***	.52***	.54***	.76***	.17*	.53**	.67***	.27**	.31**	.47***	.54***	.71***	.82***	.57***	.74***	-	
19. Col.Absorption T1	3.65	.71	.87	.47***	.23***	.37***	.56***	.37***	.55***	.23***	.28***	.42***	.29**	.11	.32**	.81***	.63***	.56***	.80***	.63***	.58***	-
20. Col.Absorption T2	3.73	.70	.86	.29**	.39***	.42***	.45***	.51***	.68***	.10	.46***	.53***	.25***	.28**	.40***	.56***	.81***	.71***	.56***	.81***	.75***	.69***
21.Col.Absorption T3	3.61	.75	.87	.21*	.26*	.53***	.42***	.49***	.69***	.16	.48***	.64***	.24*	.27**	.32***	.48***	.67***	.84***	.39***	.68***	.82***	.53***

Notes: * p< .05, **p< .01, ***p< .001. T1 = Time 1, T2 = Time 2, T3 = Time 3. Col. = collective

Table 4

Longitudinal model fit in groups, Study 2 (n=100): SEM

Model	χ^2	df	GFI	AGFI	RMSEA	CFI	IFI	TLI	AIC	Difference test
M1. Stability	260.82	157	.80	.71	.08	.94	.94	.92	408.82	
M2. Causality	226.97	152	.83	.74	.07	.96	.96	.94	384.97	a = 33.85(5)***
M3. Reversed	211.79	150	.84	.75	.06	.96	.96	.95	373.79	a = 49.03(7)***
										a = 15.18(2)***
M4. Reciprocal	181.07	145	.86	.77	.05	.98	.98	.97	353.07	a = 79.75(12)***
										a = 45.90(7)***
										a= 30.72(5)***

Notes: χ^2 = Chi-square; df = degrees of freedom; GFI = Goodness-of-Fit Index; AGFI = Adjusted Goodness-of-Fit Index; RMSEA = Root Mean Square Error of Approximation; CFI = Comparative Fit Index; IFI = Incremental Fit Index; TLI = Tucker-Lewis Index; AIC = Akaike Information Criterion; ***$p < .001$; a = Chi-square differences.

Figure Captions:

Figure 1. Conceptual Model for Study 1 (left) and Study 2 (right). Positive predictions for all the relationships.

Figure 2. Structural path coefficients of the reciprocal model for teachers (n = 274). *Notes:* Solid lines represent causality and reversed coefficients for Hypothesis 1, dotted lines are the effects for Hypothesis 2. We only display significant coefficients.

Figure 3. Structural path coefficients of the reciprocal model among students working in groups (n = 100). *Notes:* Solid lines represent direct and reversed causality for Hypothesis 3, dotted lines are the effects for Hypothesis 4. We only display significant coefficients.