

The Teacher Benefits From Giving Autonomy Support During Physical Education Instruction

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Recognizing that students benefit when they receive autonomy-supportive teaching, the current study tested the parallel hypothesis that teachers themselves would benefit from giving autonomy support. Twenty-seven elementary, middle, and high school physical education teachers (20 males, 7 females) were randomly assigned either to participate in an autonomy-supportive intervention program (experimental group) or to teach their physical education course with their existing style (control group) within a three-wave longitudinal research design. Manipulation checks showed that the intervention was successful, as students perceived and raters scored teachers in the experimental group as displaying a more autonomy-supportive and less controlling motivating style. In the main analyses, ANCOVA-based repeated-measures analyses showed large and consistent benefits for teachers in the experimental group, including greater teaching motivation (psychological need satisfaction, autonomous motivation, and intrinsic goals), teaching skill (teaching efficacy), and teaching well-being (vitality, job satisfaction, and lesser emotional and physical exhaustion). These findings show that giving autonomy support benefits teachers in much the same way that receiving it benefits their students.

Keywords: autonomy support, intervention; motivation, physical education, teacher training

When physical education (PE) teachers and exercise instructors participate in carefully designed training programs to help them learn how to develop and enact a more autonomy-supportive motivating style, their students and clients show large and wide-ranging gains in motivation, engagement, achievement, and future intentions for a physically active and healthy lifestyle (Chatzisarantis & Hagger, 2009; Cheon & Reeve, 2013; Cheon, Reeve, & Moon, 2012; Edmunds, Ntoumanis, & Duda, 2008; Fenner, Straker, Davis, & Hagger, 2013; Moustaka, Vlachopoulous, Kabitsis, & Theodorakis, 2012; Tessier, Sarrazin, & Ntoumanis, 2010). What these intervention studies show is that, first, instructors who participate in an autonomy-supportive intervention program (ASIP) generally do learn how to become more autonomy supportive and, second, their students benefit in many important ways.

The theory we use to explain why students and clients benefit from autonomy-supportive teaching is self-determination theory (SDT; Ryan & Deci, 2000). According to SDT, students possess the three psychological needs of autonomy, competence, and relatedness,

and when these needs are supported by environmental conditions and by interpersonal relationships, they collectively provide students with the psychological nutrients necessary for their positive classroom functioning and well-being. Hence, when teachers learn how to provide instruction in an autonomy-supportive way, their students experience a proportional level of psychological need satisfaction that yields numerous downstream benefits such as greater learning, engagement, achievement, and well-being (Jang, Reeve, Ryan, & Kim, 2009; Vansteenkiste, Simons, Lens, Sheldon, & Deci, 2004). The present study focused on supporting the three needs through the provision of autonomy support, though we do recognize the additional value of competence support (structure) and relatedness support (involvement) in supporting the needs (e.g., Tessier et al., 2010).

Teacher Benefits From Giving Autonomy Support

In the current study, we provided teachers with a training program to help them become more autonomy supportive, and we expected that these trained teachers would become more able to provide their students with psychologically need satisfying classroom experiences. That said, our focus in the current study was not on the students but, rather, was on the teachers themselves. Our question was whether these trained teachers would experience their own psychological need satisfaction and related teaching benefits. Recognizing that students benefit from

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receiving autonomy-supportive teaching, the purpose of the current study was to test the parallel hypothesis that teachers would benefit from *giving* autonomy support.

Three reasons led us to expect that teachers who participated in an intervention designed to help them become more autonomy supportive would experience greater teaching motivation, teaching skill, and teaching well-being. First, ASIPs are designed explicitly to provide PE teachers with empirically validated instructional strategies to support students' high-quality motivation and engagement. In these programs, teachers receive the expert modeling (e.g., videotapes of autonomy-supportive teaching), direct mastery experiences, responsive mentoring, and vicarious experiences (e.g., group discussion) they need to learn how to (a) take their students' perspective during instruction, (b) offer learning activities in ways that nurture rather than neglect or thwart students' psychological needs, (c) communicate with noncontrolling and informational language, (d) provide explanatory rationales for their requests and requirements, (e) display patience, and (f) acknowledge and accept students' expressions of negative feelings. ASIPs therefore provide teachers with new opportunities for professional development (Allen & Shaw, 2009). It is therefore likely that teacher-participants in ASIPs use more effective posttraining classroom instruction than they used pretraining and also that they experience a meaningful boost in their posttraining teaching efficacy (Rimm-Kaufman & Sawyer, 2004).

Second, ASIPs are designed explicitly to help teachers fundamentally change the classroom dynamics for the better. As mentioned earlier, students of ASIP-trained teachers report greater engagement and higher achievement, and they do so because ASIP training allows teachers to offer instruction in psychologically need satisfying ways. As a case in point, Cheon and his colleagues showed that need satisfaction fully mediated and explained the positive effect that participation in ASIP teacher-training had on students' educational outcomes (for this longitudinal mediation analysis, see Figure 8, p. 387, in Cheon et al., 2012). This analysis did not, however, assess students' extent of psychological need frustration and it did not test whether ASIPs allow teachers to offer their instruction in ways that lessened students' need frustration. This is an important point because teacher-provided autonomy support should produce the dual student benefit of greater need satisfaction (because teachers are more autonomy supportive) and lesser need frustration (because teachers are less controlling). So, in the current study, we sought to provide the first empirical test as to whether ASIP trained teachers lessen students' need frustration. If teachers are able to increase students' need satisfaction and decrease their need frustration, then teachers themselves should benefit because a reciprocal relation between students' and teachers' classroom functioning and outcomes has been suggested (Pelletier, Séguin-Levesque, & Legault 2002) and indeed empirically confirmed (Jang, Kim, & Reeve, 2012; Reeve, 2013). That is, as students display ASIP-induced gains in need satisfaction and declines in

need frustration, their teachers should show gains in their own teaching motivation, efficacy, and well-being (e.g., greater job satisfaction).

Third, correlational studies show that the more autonomy supportive teachers and coaches are, the more psychological need satisfaction, autonomous motivation, and well-being they report from their teaching (Roth, Assor, Kaplan, & Kanat-Maymon, 2007; Stebbings, Taylor, & Spray, 2011; Stebbings, Taylor, Spray, & Ntoumanis, 2012; Taylor, Ntoumanis, & Standage, 2008). These are only cross-sectional correlations, but research outside the teaching literature shows a directional effect that giving autonomy support tends to facilitate the giver's own psychological need satisfaction and well-being as much as does receiving it from others (Deci et al., 2006). This finding opens up the interesting possibility that giving autonomy support may yield benefits similar to receiving autonomy support. In the current study, we offer the experimental research design necessary to test the hypothesis that teachers causally benefit from giving students autonomy support.

Hypotheses

We proposed three sets of hypotheses. Hypothesis 1 was that the ASIP manipulation would be effective. We predicted that teachers in the experimental group would display a classroom motivating style that was both more autonomy supportive and less controlling than would teachers in the control group. In the test of hypothesis 1, we used dependent measures from both raters' objective scoring of teachers' motivating style and students' self-reported perceptions of their teacher's motivating style.

Hypothesis 2 was that the ASIP manipulation would produce student benefits. We predicted that students of teachers in the experimental group, compared with students of teachers in the control group, would report greater psychological need satisfaction and lesser psychological need frustration.

Hypothesis 3 was that the ASIP manipulation would produce teacher benefits. We predicted that teachers in the experimental group, compared with the teachers in the control group, would show benefits in terms of greater teaching motivation, skill, and well-being. In terms of greater teaching motivation, we hypothesized that teachers in the experimental group would report greater psychological need satisfaction during teaching, greater autonomous motivation to teach, and greater pursuit of intrinsic teaching goals. In terms of greater teaching skill, the current study focused explicitly on teachers' sense of teaching efficacy. We hypothesized that teachers in the experimental group would report greater gains in both teaching efficacy to use effective instructional strategies and teaching efficacy to produce high student engagement. In terms of greater teaching well-being, we hypothesized that teachers in the experimental group would report greater vitality during teaching, greater job satisfaction from teaching, and lesser emotional-physical exhaustion from teaching.

Method

Participants

Teacher Participants. Teacher-participants were 27 full-time PE teachers (20 males, 7 females) who taught in one of 27 different schools (2 elementary, 17 middle schools, 8 high schools) in Seoul, South Korea. Teacher-participants were ethnic Korean, and all were certified teachers who taught between five and seven PE classes with class sizes that ranged from 33 to 40 students. The teachers averaged 6.5 years of teaching experience (range = 2–10 years) and were, on average, 33.7 years of age (range = 28–38). The content of the courses they taught was designated by the Korean National and Educational Curriculum and included weekly activities devoted to sport-based physical activities such as softball, soccer, badminton, basketball, loop jumping, table tennis, and track and field. All 27 teacher-participants completed all aspects of the study, including participating in all three waves of data collection and, for teachers in the experimental group, all three parts of ASIP. Thus, the teacher retention rate for the study was 100%. In appreciation for their participation, all 27 teacher-participants received the equivalent of \$40. This monetary award was not announced during the recruitment process but, instead, was given at the conclusion of the study as an expression of gratitude.

Student Participants. Student-participants initially were 1,312 students who completed the student questionnaire during the first week of class (T1). All of these students were ethnic Korean. During the second wave of data collection (T2), 1,276 of the original 1,312 student-participants completed the same questionnaire. The student retention rate at T2 was 97.3% (1,276/1,312). The 1,276 T2 persisting students reported significantly higher T1 perceived teacher autonomy support ($t =$

2.37, $p < .05$) than did the 36 T2 dropout participants, though these two groups did not differ on any of the other 3 T1 dependent measures. During the third wave of data collection, 1,229 of the 1,276 students from the first two waves completed the questionnaire. The 1,229 T3 persisting students did not differ significantly from the 47 T3 dropouts on any of the T1 or T2 dependent measures, all $ts < 1$. The final sample of 1,229 student-participants represented an overall retention rate of 93.7% (1229/1312) and consisted of the following: 541 (44.0%) females and 688 (56.0%) males; 52 (4.2%) late elementary school, 902 (73.4%) middle school, and 275 (22.4%) high school students; and 619 (50.4%) in the experimental group and 610 (49.6%) in the control group.

Procedure

Potential K–12 PE teacher participants were contacted by the research team during an annual professional development experience conducted by the Korean Ministry of Education during the summer break. We told all PE teachers about a semester-long study on teachers’ classroom instructional strategies that involved, first, random assignment into either an experimental or control condition and, second, three waves of data collection. Thirty-eight teachers (out of a possible 60) expressed an interest in the study. Three interested teachers could not participate because of the geographical distance between their schools and Korea University in Seoul, which was the site of the teacher-training intervention program. Twenty-seven of the remaining 35 teachers (77.1%) were able to gain the consent of their school principal and therefore agreed to participate.

The timeline for the experimental procedures appears in Figure 1. Teachers were first randomly assigned into either the experimental or the control group. Because teachers varied in their grade level taught (2 elementary,

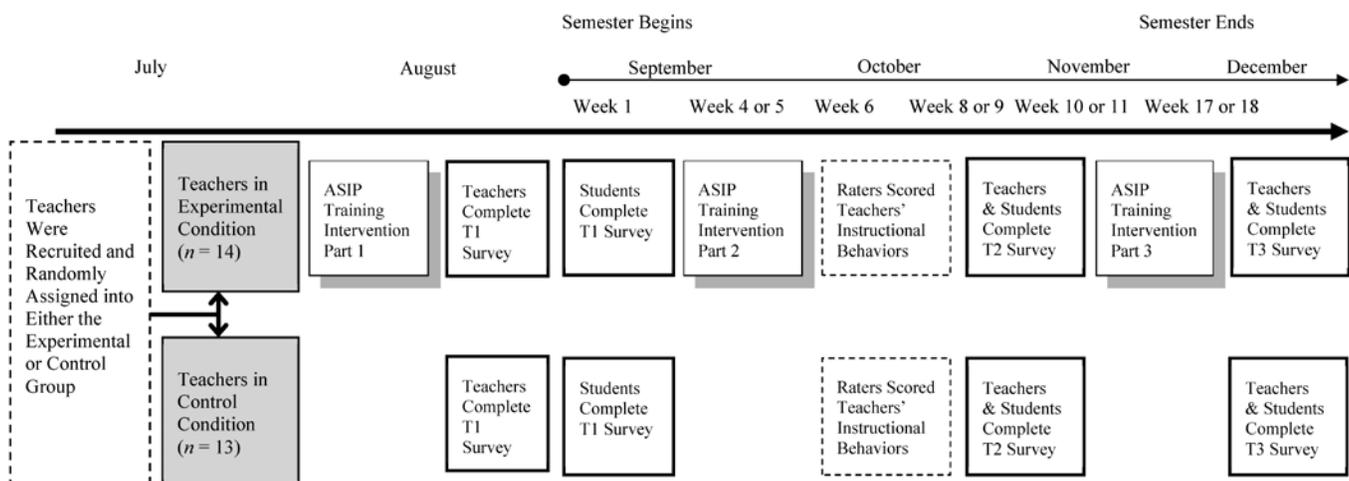


Figure 1 — Procedural timeline for the 3-part autonomy-supportive teacher training intervention and 3 waves of data collection.

17 middle, and 8 high school teachers) and because we knew in advance that grade level taught might affect students' PE motivation and engagement (following Cheon et al., 2012), we imposed a constraint on the random assignment so that no condition would have more than one elementary, nine middle, or four high school teachers (e.g., after the first elementary school teacher was randomly assigned to one condition, the other was automatically placed into the second condition). The teachers in the experimental group participated in the three-part intervention during the fall semester (late August through December), while teachers in the control group received the same intervention training experience after the study ended. Teachers participated in the ASIP 2 weeks before the start of the semester (Part 1), during either Week 4 or 5 (Part 2), and during either Week 10 or 11 (Part 3). All teachers completed the same teacher questionnaire in the month before the semester (T1), during Week 8 or 9 of the semester (T2), and during Week 17 or 18 of the semester (T3). Students completed the same student questionnaire during Week 1 (T1), during Week 8 or 9 (T2), and during Week 16 or 17 (T3). All teachers and students completed an informed consent form before the T1 questionnaires. Before the data collection, the study was approved by the principal at each teacher's school and by the Human Subjects Committee of the second author's host university.

Autonomy-Supportive Intervention Program (ASIP)

Participation in the ASIP constituted the study's independent variable. ASIP was provided in three waves/parts. Part 1 was a three-hour workshop experience. It began with a warm-up activity in which teachers read two teaching scenarios (for the scenarios, see Reeve et al., 2014, Table 1, page 96), one that described highly autonomy-supportive teaching and another that described highly controlling teaching, and answered questions about how well these scenarios described their own teaching. A media-rich PowerPoint presentation followed to discuss the nature of student motivation (what it is, where it comes from), teachers' motivating styles toward students, classroom examples of autonomy-supportive and controlling instruction, and empirical evidence on the student benefits of teacher-provided autonomy support. For the examples of autonomy-supportive and controlling teaching, teachers viewed brief video clips of previously recorded Korean PE teachers' classroom instruction. Part 1 concluded with a group discussion about the feasibility of, potential obstacles to, personal doubts about, and specific "how to" autonomy-supportive instructional behaviors in the context of the Korean PE classroom.

Because of teachers' demanding schedules and the need to keep teacher attrition to a minimum, teachers in the experimental group were divided into three logistical groups. The first group ($n = 6$) attended Part 1 of ASIP on July 26th, a second group ($n = 4$) attended (a repeat

of) Part 1 on August 16th, while a third group ($n = 4$) attended Part 1 on August 24th.

Part 2 of ASIP lasted for two hours, and it took place during either the Week 4 or 5 of the semester. Teachers in the first two scheduling groups participated together in Part 2 during Week 4 ($n = 10$), while teachers in the third scheduling group ($n = 4$) participated in a repeat of Part 2 during Week 5. Part 2 began with a brief PowerPoint presentation of autonomy-supportive teaching that reinforced the presentation from Part 1. The central activity, however, was a teacher-centered group discussion about the teachers' actual September classroom experiences as they tried to enact autonomy-supportive instructional behaviors. During this discussion, teachers shared and exchanged their teaching experiences, ideas, strategies, opinions, concerns, frustrations, and suggestions.

Part 3 of ASIP lasted for two hours, and it took place during either the Week 10 or 11 of the semester, again at a time that was possible for teachers' individual schedules. During Week 10, one group ($n = 4$) participated in Part 3 during the early part of the week while a second group ($n = 4$) participated during the latter part of the week. The third group ($n = 6$) participated in Part 3 during Week 11. Part 3 began with each individual teacher presenting an actual case study in which a specific autonomy-supportive strategy was enacted followed by a telling of how students reacted in terms of their motivation and engagement. A teacher-centered group discussion followed in which teachers shared and exchanged autonomy-supportive instructional behaviors, reported their students' reactions to autonomy-supportive teaching, and considered how their instructional strategies might be refined and made more effective.

Objective Raters and Their Rating Sheet

Before the study, four raters who were familiar with both PE instruction and the SDT framework on teachers' motivating styles were trained in how to score teachers' classroom instruction in terms of autonomy-supportive and controlling instructional behaviors. For their training, they receive conceptual definitions of autonomy-supportive and controlling teaching, became familiar with a previously validated rating sheet that operationally defined autonomy-supportive and controlling teaching, received modeling and guidance in how to use the rating sheet, practiced using the rating sheet first by scoring videotapes of PE teachers and second by scoring live PE classroom instruction, and engaged in recurring in-rating and post-rating discussions with the authors to (a) explain, defend, and refine their ratings and (b) generate a single rating for each of the five instructional behaviors based on 50 min of classroom observation.

As illustrated in Figure 1, these raters visited the PE classes of teachers in both the experimental and control groups during Week 6. In doing so, they worked in pairs, came to the class unannounced 5 min before its start, did not know into which group (experimental or control) the observed teacher had been assigned, and made indepen-

dent ratings. The rating sheet was the same as that used in Cheon and Reeve (2013) that listed the following five instructional behaviors: relies on extrinsic sources of motivation vs. nurtures inner motivational resources; relies on controlling language vs. relies on informational language; neglects explanatory rationales vs. provides explanatory rationales; displays impatience for students to produce a right answer/correct behavior vs. displays patience to allow for student-paced learning; and counters and tries to change negative affect vs. acknowledges and accepts negative affect. Each instructional behavior was scored using a bipolar format in which the controlling behavior (scored as 1) with illustrative descriptors appeared on the left side of the rating sheet while the autonomy-supportive behavior (scored as 7) with illustrative descriptors appeared on the right side. The ratings from the two observers visiting the same classroom were positively correlated on each of the five instructional behaviors [average of the five $r(27)$ s = .76; range of r s = .61 to .93]. Given these acceptable reliabilities, we averaged the raters' two scores into a single score. In addition, these five objectively rated instructional behaviors were all highly intercorrelated (five-item α = .90), so we averaged the five separate scores into one single grand mean rating of "teachers' autonomy-supportive versus controlling instructional behaviors."

Measures

Student Measures. Student participants completed the same questionnaire at the beginning (T1), middle (T2), and end (T3) of the semester. The questionnaire assessed two manipulation checks (perceptions of autonomy-supportive teaching, perceptions of controlling teaching), two student outcomes (psychological need satisfaction, psychological need frustration), and a few additional measures that are not reported in the present analyses due to space limitations. While each measure was originally developed in English, we had successfully used a Korean-translated version of these measures in previous research that used Brislin's (1980) back-translation guidelines. The Korean-translated version can be found in Cheon et al. (2012), and each scale from this questionnaire has been shown to produce acceptable reliability (internal consistency) and validity evidence. The student questionnaire used the same 7-point Likert scale for each measure that ranged from 1 (*strongly disagree*) to 7 (*strongly agree*).

To assess perceptions of autonomy-supportive teaching, we used the six-item short version of Learning Climate Questionnaire (Williams & Deci, 1996). This measure has been used successfully in previous studies to assess autonomy-supportive teaching (Black & Deci, 2000; Jang et al., 2009). A sample item is, "My PE teacher provides us with choices and options." Scores on the Learning Climate Questionnaire were internally consistent throughout each assessment period (α = .88 at T1; α = .93 at T2; α = .95 at T3). To assess perceptions of controlling teaching, we used the four-item Control-

ling Teacher Scale (Jang et al., 2009). This measure has also been used successfully in previous studies (Cheon & Reeve, 2013; Jang et al., 2009). A sample example item is, "My PE teacher puts a lot of pressure on me." Scores on the Controlling Teacher Scale were internally consistent throughout each assessment period (α = .81 at T1; α = .86 at T2; α = .90 at T3).

To assess psychological need satisfaction, students completed the Korean translated versions of the five-item Perceived Autonomy Scale to assess autonomy need satisfaction (Standage, Duda, & Ntoumanis, 2006), the four-item Perceived Competence subscale from the Intrinsic Motivation Inventory to assess competence need satisfaction (McAuley, Duncan, & Tammen, 1989), and the four-item Relatedness to Teachers Scale to assess relatedness need satisfaction (Furrer & Skinner, 2003). Each of these measures has been used successfully in previously published research to assess need satisfaction within the PE secondary school context (Cheon et al., 2012; Ntoumanis, 2001). Scores on the Perceived Autonomy Scale (e.g., "In this PE class, I feel that I do PE activities because I want to.") showed acceptable internal consistency (α = .89 at T1; α = .93 at T2; α = .95 at T3); scores on the Perceived Competence Scale (e.g., "I think I am pretty good at physical education.") showed acceptable internal consistency (α = .92 at T1; α = .93 at T2; α = .93 at T3); and scores on the Relatedness to Teachers Scale (e.g., "When I am with my PE teacher, I feel accepted.") showed acceptable internal consistency (α = .78 at T1; α = .82 at T2; α = .84 at T3). Scores from the three need satisfaction scales were positively intercorrelated across each of the three assessment periods, so we followed the tradition in this literature (Deci et al., 2001; Standage, Duda, & Ntoumanis, 2005) to create a single need satisfaction composite score by averaging participants' scores for autonomy, competence, and relatedness need satisfaction at each wave of assessment (three-item α s were .74 at T1, .81 at T2, and .84 at T3). To justify treating the three measures as a single score, we calculated a series of three exploratory factor analyses by entering students' mean scores on autonomy, competence, and relatedness as the three individual data points. A one-factor solution emerged from a three-item principal components analysis at T1 (eigenvalue = 2.00; 66.7% of the total variance; factor loadings of .87 for autonomy, .81 for competence, and .76 for relatedness), at T2 (eigenvalue = 2.19; 73.1% of the total variance; factor loadings of .90, .84, and .82, respectively), and at T3 (eigenvalue = 2.29; 76.5% of the total variance; factor loadings of .92, .86, and .84, respectively).

To assess psychological need frustration, students completed the 12-item Psychological Need Thwarting Scale (Bartholomew, Ntoumanis, Ryan, & Thøgersen-Ntoumani, 2011), a scale has been used successfully in published research (Gunnell et al., 2013). The Psychological Need Thwarting Scale includes a four-item subscale to assess autonomy need frustration ("In PE class, I feel pushed to behave in certain ways.") that showed acceptable internal consistency (α = .88 at T1; α = .93 at T2; α

= .95 at T3), a four-item subscale to assess competence need frustration (“In PE class, there are situations where I am made to feel inadequate.”) that showed acceptable internal consistency ($\alpha = .83$ at T1; $\alpha = .88$ at T2; $\alpha = .91$ at T3), and a four-item subscale to assess relatedness need frustration (“I feel rejected by my PE teacher.”) that showed acceptable internal consistency ($\alpha = .86$ at T1; $\alpha = .91$ at T2; $\alpha = .94$ at T3). Scores from the three need frustration scales were positively intercorrelated across each of the three assessment periods, so we again created a single need frustration composite score by averaging participants’ scores for autonomy, competence, and relatedness at each wave of assessment (three-item α s were .90 at T1, .94 at T2, and .96 at T3). To justify treating the three measures as a single score, we again calculated a series of exploratory factor analyses by entering students’ mean scores on autonomy, competence, and relatedness as the three individual data points. A one-factor solution emerged from a three-item principal components analysis at T1 (eigenvalue = 2.52; 84.1% of the total variance; factor loadings of .92 for autonomy, .93 for competence, and .90 for relatedness), at T2 (eigenvalue = 2.67; 89.0% of the total variance; factor loadings of .95, .95, and .93, respectively), and at T3 (eigenvalue = 2.77; 92.5% of the total variance; factor loadings of .96, .96, and .95, respectively).

Teacher Measures. Teacher participants completed the same questionnaire before the start of the semester (T1), during the semester (T2), and at the end of the semester (T3). The questionnaire assessed three possible benefits related to teaching motivation (psychological need satisfaction, autonomous motivation to teach, and adoption of an intrinsic goal during teaching), two possible benefits related to teaching skill (teaching efficacy for instructional strategies, teaching efficacy for student engagement), and three possible benefits related to teaching well-being (vitality during teaching, job satisfaction, and emotional and physical exhaustion from teaching). Most of the scales used to assess these dependent measures have been widely used and previously validated within sport, coaching, and exercise research (i.e., Basic Psychological Needs Scale at Work, Taylor, Ntoumanis, & Standage, 2008; Perceived Locus of Causality, Standage, Gillison, Ntoumanis, & Treasure, 2012; Teachers’ Sense of Efficacy Scale, Wolters & Daugherty, 2007; Subjective Vitality Scale, Stebbings, Taylor, & Spray, 2011; Job Satisfaction, Caprara et al., 2003; and Athlete Burnout Questionnaire, Stebbings et al., 2012). We had a successfully used Korean-translated version for most of these measures (e.g., Cheon & Moon, 2010; Klassen et al., 2009), but the Goal Content Questionnaire needed to be professionally translated and back-translated from its original English to Korean. With one exception, each measure used the same 7-point Likert scale that ranged from 1 (*strongly disagree*) to 7 (*strongly agree*). The one exception was the Teachers’ Sense of Efficacy Scale. Following the recommendations for the use of this scale (Tschannen-Moran & Woolfolk

Hoy, 2001), teachers completed a 9-point Likert scale that ranged from 1 (*not at all true*) to 9 (*very true*).

To assess psychological need satisfaction during teaching, teachers completed the widely used 21-item Basic Psychological Needs Scale at Work (Gagne, 2003) scale. The Basic Psychological Needs Scale at Work includes a seven-item Autonomy Need Satisfaction Scale (e.g., “I feel like am I free to decide for myself how to teach my PE class.”) that showed acceptable internal consistency ($\alpha = .75$ at T1; $\alpha = .73$ at T2; $\alpha = .79$ at T3), a six-item Competence Need Satisfaction Scale (e.g., “Most days I feel a sense of accomplishment from my PE teaching.”) that showed acceptable internal consistency ($\alpha = .68$ at T1; $\alpha = .80$ at T2; $\alpha = .82$ at T3); and an eight-item Relatedness Need Satisfaction Scale (e.g., “I consider the people I regularly interact with at school to be my friends.”) that showed acceptable internal consistency ($\alpha = .81$ at T1; $\alpha = .82$ at T2; $\alpha = .78$ at T3). Scores from the three need satisfaction scales were positively intercorrelated across each of the three assessment periods, so we again followed the tradition in this literature to create a single need satisfaction composite by averaging participants’ scores for autonomy, competence, and relatedness at each wave of assessment (three-item α s were .89 at T1, .87 at T2, and .91 at T3). Results from a series of exploratory factor analyses showed that a one-factor solution again emerged from a three-item principal components analysis at T1 (eigenvalue = 2.47; 82.2% of the total variance; factor loadings of .89 for autonomy, .91 for competence, and .91 for relatedness), at T2 (eigenvalue = 2.41; 80.3% of the total variance; factor loadings of .92, .91, and .86, respectively), and at T3 (eigenvalue = 2.56; 85.4% of the total variance; factor loadings of .95, .92, and .89, respectively).

To assess autonomous motivation to teach, teachers completed the widely used 16-item Perceived Locus of Causality (Goudas, Biddle, & Fox, 1994) Scale. The Perceived Locus of Causality Scale features 4 four-item scales to assess intrinsic motivation, identified regulation, introjected regulation, and extrinsic regulation. Two scales are conceptualized as autonomous types of motivation, including intrinsic motivation (e.g., “The reason I teach my PE classes is because I enjoy it.”) and identified regulation (e.g., “The reason I teach my PE classes is because it is important.”). To create a single index of the autonomous motivation to teach, we followed the tradition established within this area of research (e.g., Williams, Grow, Freedman, Ryan, & Deci, 1996) and combined these eight items into a single autonomous motivation score (α s were .71 at T1, .83 at T2, and .93 at T3).

To assess intrinsic and extrinsic goals to teach, teachers completed the Goal Content Questionnaire (Sebire, Standage, & Vansteenkiste, 2008). The Goal Content Questionnaire assesses five exercise goals (skill development, health management, social affiliation, image, and social recognition), the first of which we regarded a priori as a central intrinsic goal to pursue during teaching and the last of which we regarded as a central extrinsic teach-

ing goal. Scores on the five-item intrinsic goal to develop teaching skill scale (e.g., “My goal is to acquire new teaching skills in motivating students in PE.”) showed acceptable internal consistency ($\alpha = .81$ at T1; $\alpha = .91$ at T2; $\alpha = .94$ at T3), and scores on the four-item extrinsic goal for social status/public recognition scale (e.g., “My goal is to gain social recognition from others from my teaching.”) also showed acceptable internal consistency ($\alpha = .92$ at T1; $\alpha = .93$ at T2; $\alpha = .94$ at T3).

To assess teaching efficacy, teachers completed the widely used Teachers’ Sense of Efficacy Scale short form (Tschannen-Moran, M., & Woolfolk Hoy, 2001); which assess three aspects of teaching efficacy (for instructional strategies, student engagement, and classroom management), though we included items only to assess the first two aspects. Scores on the four-item teaching efficacy for instructional strategies scale (e.g., “How well can you implement alternative teaching strategies in your classroom?”) showed acceptable internal consistency ($\alpha = .89$ at T1; $\alpha = .91$ at T2; $\alpha = .92$ at T3), as did the scores on the four-item teaching efficacy for student engagement scale (e.g., “How much can you do to motivate students who show low interest in school work?”; $\alpha = .86$ at T1; $\alpha = .93$ at T2; $\alpha = .92$ at T3).

To assess vitality during teaching, teachers completed the widely used Subjective Vitality Scale (Ryan & Frederick-Recascino, 1997). This is a seven-item measure of the extent to which teachers feel vital, energized, and alive during teaching (e.g., “When I am teaching PE, I have energy and spirit.”). Scores showed acceptable internal consistency ($\alpha = .74$ at T1; $\alpha = .94$ at T2; $\alpha = .94$ at T3).

To assess job satisfaction, we used the single item “In general, I am satisfied with my job” (Caprara et al., 2003; Klassen et al., 2009). Research in the workplace literature shows that single-item measures of job satisfaction correlate very highly with multiple-item measures and are an acceptable and reasonable alternative to multiple-item scales (Dolbier, Webster, McCalister, Mallon, & Steinhardt, 2005).

To assess emotional and physical exhaustion from teaching, teachers completed the Athlete Burnout Questionnaire (ABQ; Raedeke & Smith, 2001). The ABQ is a five-item measure of the extent to which athletes feel burned out—or emotionally and physically exhausted. In the current study, we adapted each athlete-centered item (e.g., “I feel overly tired from my <sport> participation.”) to the teaching situation (e.g., “I feel overly tired from teaching my PE class.”). Scores on our teacher-adapted ABQ showed acceptable internal consistency ($\alpha = .89$ at T1; $\alpha = .94$ at T2; $\alpha = .97$ at T3).

Data Analyses and Power Analysis

To test each hypothesis, we used ANCOVA-based repeated-measures analyses with experimental condition serving as the between-groups independent variable and time or wave serving as the within-groups repeated measure (a second independent variable). The critical

test for each hypothesis was for a significant Condition \times Time interaction to test the extent to which the predicted changes in the T2 and T3 scores did or did not depend on experimental condition. In conducting four planned pairwise mean comparisons within each analysis, we used the Bonferroni-corrected t test procedure (family-wise $\alpha = .05/4 = .012$) to provide the alpha level ($\alpha = .01$) used in each mean comparison. Before our hypothesis tests, we computed a power analysis (G*Power 3; Faul et al., 2007). Using $p = .05$ and an expected effect size of $d = 0.70$, we calculated what sample size was needed to obtain power = 0.90. The needed sample size was 28. Because the sample size of the current study was 27, we determined that we had sufficient statistical power underlying each Condition \times Time interaction effect tests.

Results

Preliminary Analyses

Before the main analyses, we tested for possible associations among the demographic characteristics and the student and teacher measures. Among the student measures, point biserial correlations showed that gender was associated with three of the four baseline scores, with males scoring higher than females on perceived autonomy support and psychological need satisfaction but lower on perceived teacher control. One-way ANOVAs with Student-Newman-Keuls post hoc tests showed that grade level was associated with two of the four baseline scores, with high school students scoring higher than either middle school or elementary school students on perceived autonomy support and psychological need satisfaction. Given these associations, we included gender (0 = *females*; 1 = *males*) and grade level (0 = *elementary or middle school*; 1 = *high school*) as covariates (i.e., as statistical controls) in the analyses of the four student measures. Among the teacher measures, neither gender, age, nor teaching experience was associated with any of the nine measures. Grade level taught, however, was associated with two dependent measures, with elementary school teachers scoring higher than either middle or high school teachers on vitality and job satisfaction. Given these associations, we included grade level taught (0 = *middle or high school*; 1 = *elementary school*) as a covariate in the teacher outcome analyses.

Manipulation Checks

We assessed the effectiveness of the ASIP in two ways. First, trained raters scored teachers’ objective classroom instructional behaviors at Week 6. Second, students reported their perceptions of their teachers’ autonomy-supportive teaching and controlling teaching at three times (T1, T2, and T3).

Raters’ Objective Scoring of Motivating Style. Raters scored teachers in the experimental group as enacting significantly more autonomy-supportive instructional

behaviors than teachers in the control group, M_s , 5.58 versus 4.50; $t(25) = 4.94, p < .01, d = 1.98$.

Students' Perceptions of Motivating Style. For *perceived autonomy-supportive teaching*, the condition main effect was significant, $F(1, 1,225) = 30.20, p < .01$, the time main effect was significant, $F(2, 2,450) = 54.91, p < .01$, and, most importantly, the Condition \times Time interaction was significant, $F(2, 2,450) = 62.45, p < .01$. As illustrated in the upper left panel of Figure 2, perceived autonomy support increased significantly for students of the teachers in the experimental group from T1 to T3 ($\Delta = +0.76, p < .01, d = 0.70$), while it rose significantly but more modestly for students of the

teachers in the control group from T1 to T3 ($\Delta = +0.15, p < .01, d = 0.15$). While the two conditions did not differ at T1 baseline ($\Delta = -0.08, ns$), perceived autonomy support was greater for students of teachers in the experimental group than it was for students of teachers in the control group at both T2 ($\Delta = +0.44, p < .01, d = 0.39$) and T3 ($\Delta = +0.53, p < .01, d = 0.45$).

For *perceived controlling teaching*, the condition main effect was significant, $F(1, 1,225) = 25.03, p < .01$, the time main effect was significant, $F(2, 2,450) = 4.01, p < .05$, and, most importantly, the Condition \times Time interaction was significant, $F(2, 2,450) = 55.27, p < .01$. As illustrated in the upper right panel of Figure 2,

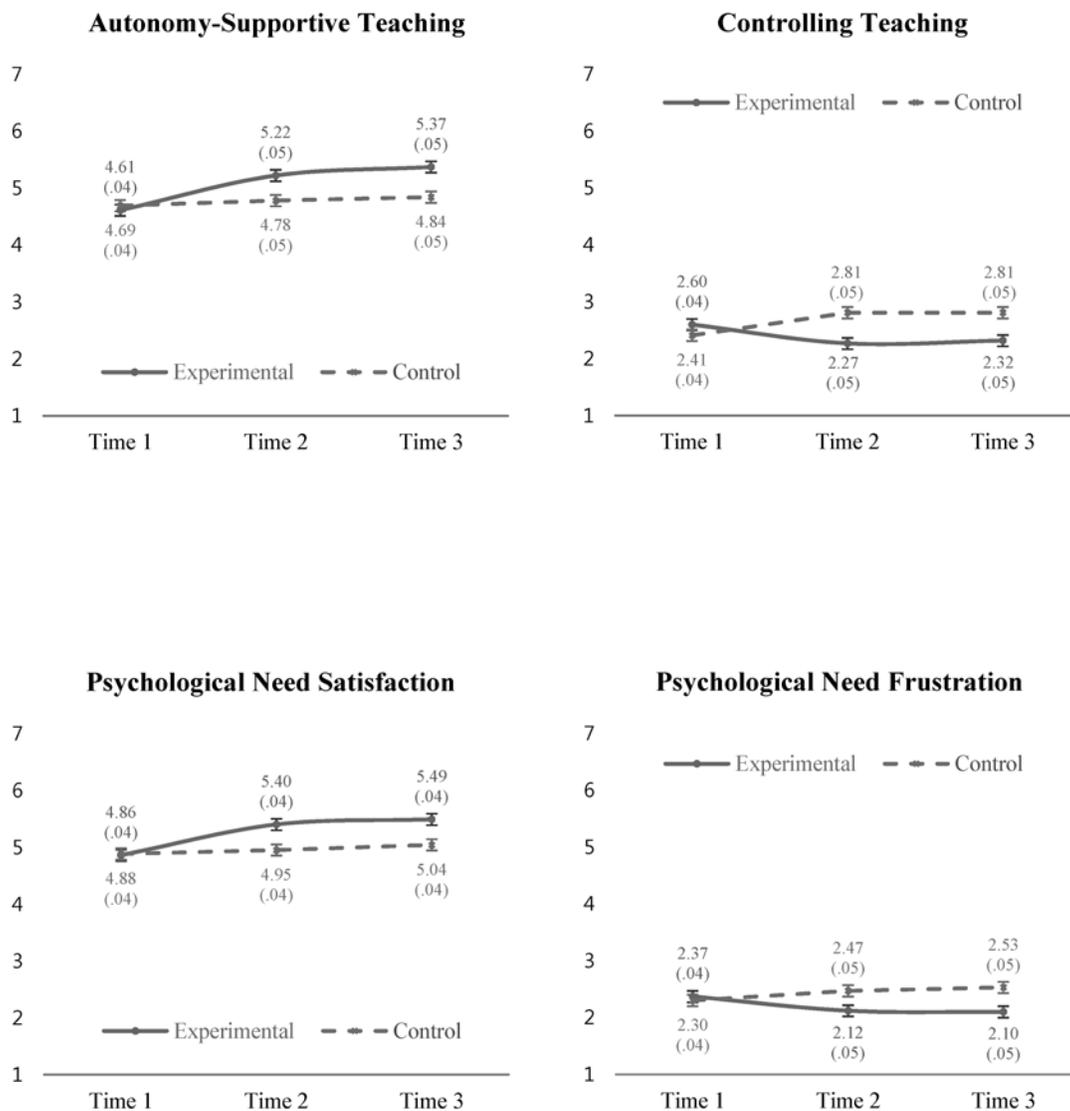


Figure 2 — Student-reported autonomy-supportive and controlling teaching (upper panels) and psychological need satisfaction and frustration (lower panels) broken down by experimental condition and time of assessment. Numbers represent mean scores at each time point assessment, while bars represent the standard error of those means.

perceived controlling teaching decreased significantly for students of the teachers in the experimental group from T1 to T3 ($\Delta = -0.28, p < .01, d = 0.24$), while it increased significantly for students of the teachers in the control group from T1 to T3 ($\Delta = +0.40, p < .01, d = 0.38$). While the two conditions did differ at baseline ($\Delta = +0.19, p < .01, d = 0.18$), perceived controlling was lesser for students of the teachers in the experimental group than it was for students of teachers in the control group at both T2 ($\Delta = -0.54, p < .01, d = 0.44$) and T3 ($\Delta = -0.49, p < .01, d = 0.37$).

Students' Psychological Needs

For *psychological need satisfaction*, the condition main effect was significant, $F(1, 1,225) = 31.38, p < .01$, the time main effect was significant, $F(2, 2,450) = 68.22, p < .01$, and, most importantly, the Condition \times Time interaction was significant, $F(2, 2,450) = 56.61, p < .01$. As illustrated in the lower left panel of Figure 2, need satisfaction increased significantly for students of the teachers in the experimental group from T1 to T3 ($\Delta = +0.63, p < .01, d = 0.61$), while it rose significantly but more modestly for students of the teachers in the control group from T1 to T3 ($\Delta = +0.16, p < .01, d = 0.15$). While the two conditions did not differ at baseline ($\Delta = +0.02, ns$), need satisfaction was greater for students of the teachers in the experimental group than it was for students of teachers in the control group at both T2 ($\Delta = +0.45, p < .01, d = 0.44$) and T3 ($\Delta = +0.45, p < .01, d = 0.42$).

For *psychological need frustration*, the condition main effect was significant, $F(1, 1,225) = 18.19, p < .01$, the time main effect was not significant, $F < 1$, and the Condition \times Time interaction was significant, $F(2, 2,450) = 34.36, p < .01$. As illustrated in the lower right panel of Figure 2, need frustration decreased significantly for students of the teachers in the experimental group from T1 to T3 ($\Delta = -0.27, p < .01, d = 0.24$), while it increased significantly for students of the teachers in the control group from T1 to T3 ($\Delta = +0.23, p < .01, d = 0.21$). While the two conditions did not differ at baseline ($\Delta = +0.07, ns$), need frustration was lesser for students of the teachers in the experimental group than it was for students of teachers in the control group at both T2 ($\Delta = -0.35, p < .01, d = 0.31$) and T3 ($\Delta = -0.43, p < .01, d = 0.35$).

Teacher Outcomes

For *psychological need satisfaction* during teaching, the condition main effect was significant, $F(1, 24) = 9.11, p < .01$, the time main effect was significant, $F(2, 48) = 6.70, p < .01$, and, most importantly, the Condition \times Time interaction was significant, $F(2, 48) = 7.62, p < .01$. As illustrated in the left panel of Figure 3, need satisfaction increased significantly for teachers in the experimental group from T1 to T3 ($\Delta = +0.69, p < .01, d = 1.26$), while it remained unchanged for teachers in the control group from T1 to T3 ($\Delta = -0.04, ns$). While the two conditions did not differ at T1 baseline ($\Delta = -0.11, ns$), need

satisfaction was greater for teachers in the experimental group than it was for teachers in the control group at both T2 ($\Delta = +0.69, p < .01, d = 1.25$) and T3 ($\Delta = +0.84, p < .01, d = 1.57$).

For *autonomous motivation* to teach, the condition main effect was significant, $F(1, 24) = 13.09, p < .01$, the time main effect was significant, $F(2, 48) = 6.35, p < .01$, and the Condition \times Time interaction was significant, $F(2, 48) = 5.95, p < .01$. As illustrated in the center panel of Figure 3, autonomous motivation increased significantly for teachers in the experimental group from T1 to T3 ($\Delta = +0.95, p < .01, d = 1.61$), while it remained unchanged for teachers in the control group from T1 to T3 ($\Delta = +0.05, ns$). While the two conditions did not differ at T1 baseline ($\Delta = 0.08, ns$), autonomous motivation was greater for teachers in the experimental group than it was for teachers in the control group at both T2 ($\Delta = +0.78, p < .01, d = 1.25$) and T3 ($\Delta = +0.98, p < .01, d = 1.73$).

For the *intrinsic goal to develop teaching skill*, the condition main effect was significant, $F(1, 24) = 4.94, p < .05$, the time main effect was significant, $F(2, 48) = 4.80, p < .05$, and the Condition \times Time interaction was significant, $F(2, 48) = 8.72, p < .01$. As illustrated in the right panel of Figure 3, the intrinsic goal to develop teaching skill significantly increased for teachers in the experimental group from T1 to T3 ($\Delta = +1.07, p < .01, d = 1.59$), while it remained unchanged for teachers in the control group from T1 to T3 ($\Delta = -0.14, ns$). While the two conditions did not differ at T1 baseline ($\Delta = -0.30, ns$), the intrinsic goal was greater for teachers in the experimental group than it was for teachers in the control group at both T2 ($\Delta = +0.69, p < .01, d = 0.98$) and T3 ($\Delta = +0.91, p < .01, d = 1.29$).

For the *extrinsic goal for social status/recognition*, the condition main effect was marginally significant, $F(1, 24) = 4.01, p < .06$, the time main effect was significant, $F(2, 48) = 3.41, p < .05$, and the Condition \times Time interaction was not significant, $F(2, 48) = 0.34, ns$.

For *teaching efficacy for instructional strategies*, the condition main effect was significant, $F(1, 24) = 9.77, p < .01$, the time main effect was significant, $F(2, 48) = 4.59, p < .05$, and the Condition \times Time interaction was significant, $F(2, 48) = 12.29, p < .01$. As illustrated in the left panel of Figure 4, teaching efficacy for instructional strategies increased significantly for teachers in the experimental group from T1 to T3 ($\Delta = +1.74, p < .01, d = 1.77$), while it remained unchanged for teachers in the control group from T1 to T3 ($\Delta = -0.40, ns$). While the two conditions did not differ at T1 baseline ($\Delta = +0.05, ns$), teaching efficacy for instructional strategies was greater for teachers in the experimental group than it was for teachers in the control group at both T2 ($\Delta = +1.16, p < .01, d = 0.96$) and T3 ($\Delta = +2.09, p < .01, d = 2.47$).

For *teaching efficacy for student engagement*, the condition main effect was significant, $F(1, 24) = 11.73, p < .01$, the time main effect was only marginally significant, $F(2, 48) = 2.97, p < .07$, and the Condition \times Time interaction was significant, $F(2, 48) = 8.64, p < .01$. As illustrated in the right panel of Figure 4, teaching efficacy

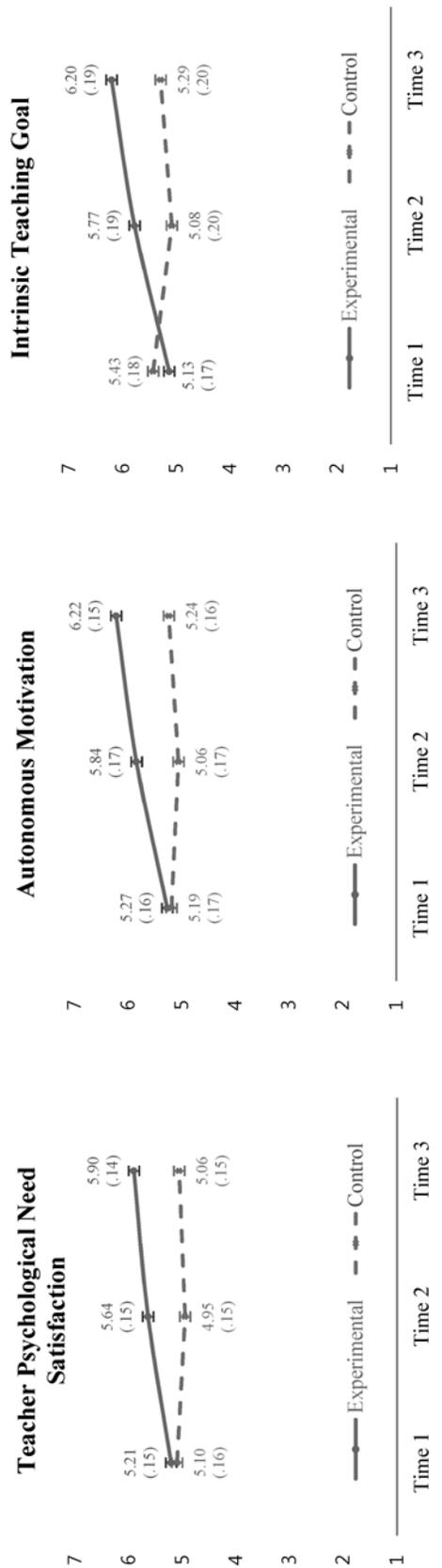


Figure 3 — Teacher-reported psychological need satisfaction, autonomous motivation, and intrinsic teaching goal broken down by experimental condition and time of assessment. Numbers represent mean scores at each time point assessment, while bars represent the standard error of those means.

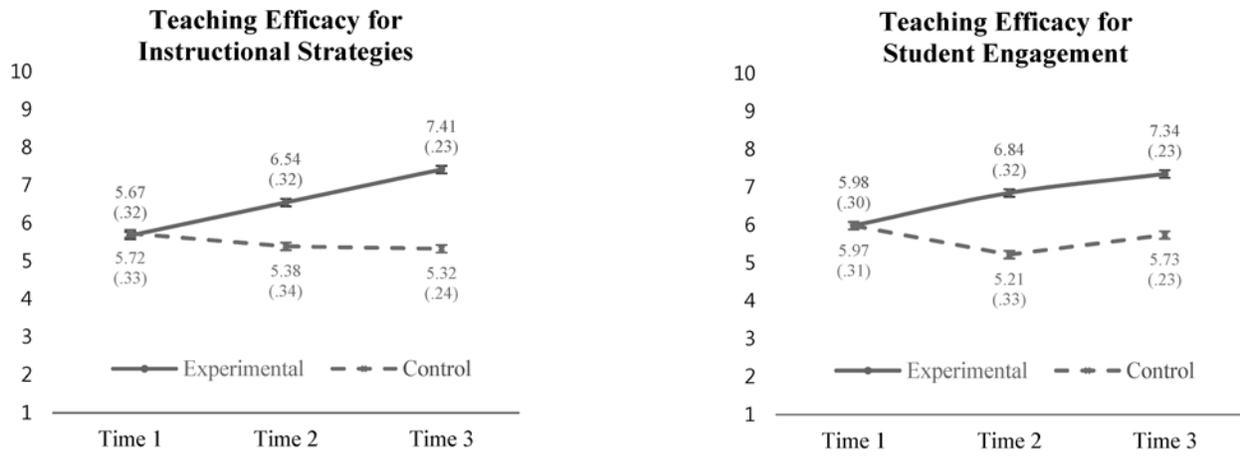


Figure 4 — Teacher-reported teaching efficacy both for instructional strategies and for student engagement broken down by experimental condition and time of assessment. Numbers represent mean scores at each time point assessment, while bars represent the standard error of those means.

for student engagement increased significantly for teachers in the experimental group from T1 to T3 ($\Delta = +1.36$, $p < .01$, $d = 1.37$), while it remained unchanged for teachers in the control group from T1 to T3 ($\Delta = -0.24$, ns). While the two conditions did not differ at T1 baseline ($\Delta = -0.01$, ns), teaching efficacy for student engagement was greater for teachers in the experimental group than it was for teachers in the control group at both T2 ($\Delta = +1.63$, $p < .01$, $d = 1.36$) and T3 ($\Delta = +1.61$, $p < .01$, $d = 1.91$).

For subjective *vitality* during teaching, the condition main effect was significant, $F(1, 24) = 7.90$, $p = .01$, the time main effect was significant, $F(2, 48) = 16.93$, $p < .01$, and the Condition \times Time interaction was significant, $F(2, 48) = 9.85$, $p < .01$. As illustrated in the left panel of Figure 5, vitality increased significantly for teachers in the experimental group from T1 to T3 ($\Delta = +1.48$, $p < .01$, $d = 1.98$), while it remained unchanged for teachers in the control group from T1 to T3 ($\Delta = +0.22$, ns). While the two conditions did not differ at T1 baseline ($\Delta = +0.06$, ns), vitality was greater for teachers in the experimental group than it was for teachers in the control group at both T2 ($\Delta = +0.80$, $p < .01$, $d = 0.91$) and T3 ($\Delta = +1.31$, $p < .01$, $d = 1.61$).

For *job satisfaction*, the condition main effect was significant, $F(1, 24) = 6.95$, $p < .05$, the time main effect was significant, $F(2, 48) = 8.00$, $p < .01$, and the Condition \times Time interaction was significant, $F(2, 48) = 4.79$, $p < .05$. As illustrated in the center panel of Figure 5, job satisfaction increased significantly for teachers in the experimental group from T1 to T3 ($\Delta = +1.19$, $p < .01$, $d = 1.39$), while it remained unchanged for teachers in the control group from T1 to T3 ($\Delta = +0.16$, ns). While the two conditions did not differ at T1 baseline ($\Delta = -0.01$, ns), job satisfaction was greater for teachers in the experimental group than it was for teachers in the control group at both T2 ($\Delta = +0.82$, $p < .01$, $d = 1.23$) and T3 ($\Delta = +1.02$, $p < .01$, $d = 1.39$).

For *teacher emotional-physical exhaustion*, the condition main effect was significant, $F(1, 24) = 11.66$, $p < .01$, the time main effect was significant, $F(2, 48) = 4.90$, $p < .05$, and the Condition \times Time interaction was significant, $F(2, 48) = 7.53$, $p < .01$. As illustrated in the right side of Figure 5, emotional-physical exhaustion decreased significantly for teachers in the experimental group from T1 to T3 ($\Delta = -1.76$, $p < .01$, $d = 1.54$), while it remained unchanged for teachers in the control group from T1 to T3 ($\Delta = +0.20$, ns). While the two conditions did not differ at T1 baseline ($\Delta = +0.25$, ns), emotional-physical exhaustion was lesser for teachers in the experimental group than it was for teachers in the control group at both T2 ($\Delta = -1.43$, $p < .01$, $d = 1.45$) and T3 ($\Delta = -1.71$, $p < .01$, $d = 1.46$).

Discussion

The present study benefited from several past autonomy-supportive intervention studies to design and implement a teacher-focused, experimentally based, longitudinally designed, state-of-the-art ASIP. Manipulation checks showed that the intervention was successful as the students of teachers who participated in the intervention, compared with the students of teachers who did not participate in the intervention, perceived that their teachers became significantly more autonomy-supportive and significantly less controlling over the course of the semester (see Figure 2). Trained observers also scored teachers in the experimental group as enacting significantly more autonomy-supportive instructional behaviors than did teachers in the control group. Analyses of students' psychological needs also showed that the intervention was successful in terms of helping teachers deliver instruction in ways that increased students' need satisfaction and decreased students' need frustration.

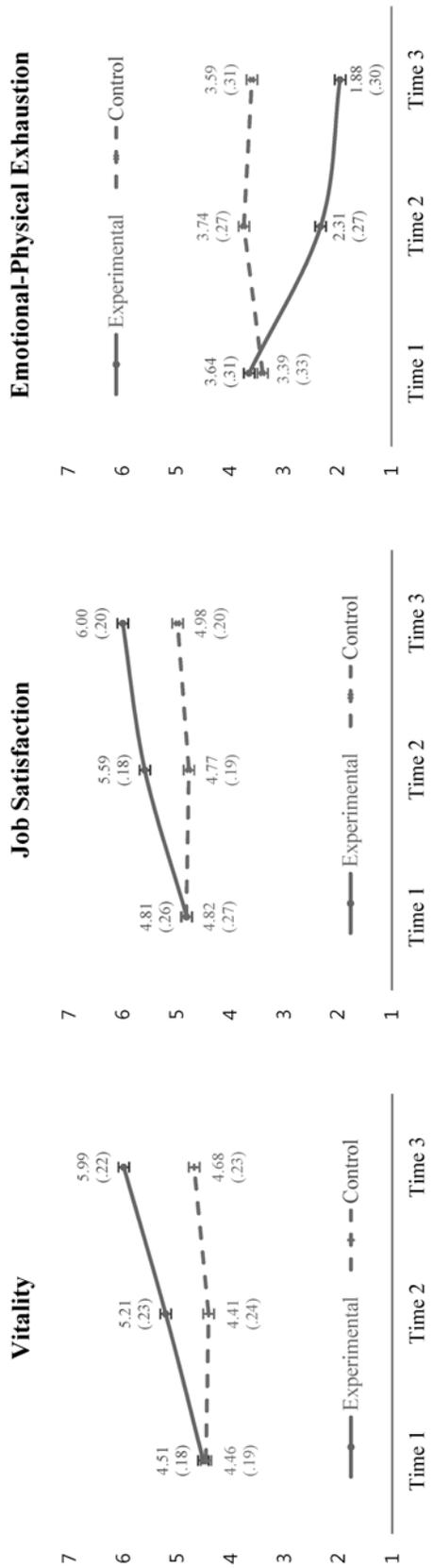


Figure 5 — Teacher-reported vitality, job satisfaction, and emotional-physical exhaustion broken down by experimental condition and time of assessment. Numbers represent mean scores at each time point assessment, while bars represent the standard error of those means.

These ASIP-induced effects on students' psychological needs are important because, according to both SDT (Ryan & Deci, 2000) and previous ASIP-based research (Cheon et al., 2012), psychological need satisfaction fully mediates and explains the positive effect that ASIP has on students' positive course outcomes, such as engagement, achievement, and well-being.

The main focus of the current study was not on the students but, rather, on the teachers themselves and how they might have benefitted from ASIP. Our study was inspired by the recent SDT finding that giving autonomy support to others yields the giver as much psychological need satisfaction and well-being as does its receiving (Deci et al., 2006). Noting that teachers too might benefit from giving autonomy support, we hypothesized that teachers who participated in ASIP would show three clusters of teacher benefits—namely, gains in teaching motivation, teaching skill, and teaching well-being.

Teachers who participated in ASIP showed enhanced teaching motivation. While teachers in the control group showed levels of need satisfaction, autonomous motivation, and intrinsic goal adoption that were essentially stable or unchanged over the course of the semester, teachers in the experimental group showed steadily rising levels of all three of these indicators of constructive teaching motivation (see Figure 3). The magnitude of the effect sizes associated with these gains in teaching motivation were all quite large ($ds > 1$).

Teachers who participated in ASIP also showed enhanced teaching skill. While teachers in the control group reported unchanged levels of teaching efficacy, teachers in the experimental group reported steadily rising levels of both indicators of teaching efficacy (see Figure 4). The effect sizes associated with these longitudinal gains in efficacy were large ($ds > 1$). Self-reported teaching efficacy is not the same as objective ratings of teaching skill, but we believe that these observed gains in teaching skill were very real. This is so because teachers who participated in ASIP showed an increased capacity to enact autonomy-supportive instructional strategies, as scored by the trained raters. Past studies have shown that similar ASIP interventions afforded teachers with the instructional skill they needed to produce significant longitudinal gains in their students' classroom motivation, engagement, and learning (Cheon et al., 2012; Reeve et al., 2004).

Teachers who participated in ASIP also showed enhanced well-being. While teachers in the control group showed unchanged levels of vitality, job satisfaction, and emotional and physical exhaustion over the course of the semester, teachers in the experimental group showed steadily rising levels of subjective vitality and job satisfaction and declining levels of emotional and physical exhaustion (see Figure 5). Again, the effect sizes associated with these ASIP-induced improvements were all large in magnitude ($ds > 1$).

Why Did Teachers Benefit From ASIP?

The present study was designed to test the hypothesis that teachers would benefit from the giving of autonomy support. It was not, however, designed to explain why these benefits might occur. To address this question, we offer two likely explanations.

The explanatory mechanism most consistent with our SDT framework is that teachers who participated in ASIP experienced greater psychological need satisfaction during the semester and this need satisfaction experience during teaching translated into subsequent gains in terms of teaching motivation, skill, and well-being. Teachers in the experimental group did experience large ASIP-induced gains in their need satisfaction compared with teachers in the control group (see Figure 3; $d = 1.25$ at T2; $d = 1.57$ at T3). These need satisfaction gains are important because previous research has shown that increased need satisfaction tends to produce a wide range of downstream benefits, including those that reflect enhanced motivation, skill, and well-being, as reviewed in the introduction.

A second likely explanatory mechanism is that teachers who participated in ASIP experienced a significant boost to their teaching efficacy. ASIP participation allowed teachers to expand their existing teaching repertoire to incorporate a new-and-improved repertoire of instructional strategies that have been empirically validated as ways to enhance students' motivation and engagement. Teachers who participated in ASIP did experience meaningful gains in their teaching efficacy (see Figure 4). Teaching efficacy likely rose as ASIP-trained teachers observed their students' favorable engagement reaction to their new autonomy-supportive instructional strategies. These gains are important because previous research has shown that gains in teaching efficacy produce subsequent gains in teaching motivation (Guskey, 1984), the capacity to produce student learning and achievement (i.e., teaching skill; Anderson, Greene, & Loewen, 1988; Ross, 1992), and teaching well-being (Caprara et al., 2003).

While both of these explanations seem likely, the current study was not sufficiently powered to conduct the mediation analyses necessary to test need satisfaction and teaching efficacy as possible mediating processes of the otherwise direct positive effect of ASIP on teachers' benefits. Hence, the small number of participating teachers ($N = 27$) was a limitation of the current study. With a larger sample size of teachers, a future study could use multilevel analyses to analyze the data set both at the student level (Level 1 analyses to document student benefits and to explain why they occur) and at the teacher level (Level 2 analyses to document teacher benefits and to explain why they occur).

Limitations and Future Research

The implementation of any classroom-based intervention brings with it several possible limitations that need to be

acknowledged. The first limitation was that teachers in the control group were not given a professional developmental opportunity in the same way teachers in the experimental group were, and this methodological feature means that a Hawthorne effect cannot be ruled out. The Hawthorne effect refers to the tendency for people who are in an experiment to work harder and to perform better merely because of the extra attention paid to them by the researchers. In the current study, we compared teachers in the experimental group against teachers who continued to teach with their existing motivating styles (“standard practice in the PE course”), so it may now be helpful if a future study will use an alternative control group (for one example, see Chatzisarantis & Hagger’s, 2009).

While the study showed that teachers benefitted in multiple ways from ASIP, it did not assess whether these benefits might endure on a long-term basis. It remains an open question as to whether the positive benefits from ASIP would endure once the ASIP-based support system was removed and teachers were effectively left on their own to instruct a new group of students. One ASIP intervention study that focused on teachers’ capacity to produce student benefits did show that ASIP-induced student benefits endured one year later (Cheon & Reeve, 2013). We suspect that future research will show that the teacher benefits identified in the current study will prove to be just as durable as these earlier observed student benefits, though this remains an open question for future research.

A related future research question is to ask how coupled ASIP-induced student benefits and teacher benefits might be. Teacher benefits may be somewhat dependent on student benefits, or they may occur independently of student benefits. To determine how intertwined or coupled these two types of benefits are, a longitudinal study is needed to test for cross-lagged effects of student benefits on teacher benefits and for cross-lagged effects of teacher benefits on student benefits.

A final methodological limitation involved the rater’s bipolar scoring sheet. We had our raters use bipolar scales to score teachers’ autonomy-supportive vs. controlling instructional strategies as opposite ends of a single continuum, following theoretical (Deci et al., 1981) and empirical (Reeve et al., 2004) precedent. We nevertheless recognize that other investigators prefer to assess autonomy support and teacher control as separate categories. That is, raters score teachers once on how autonomy supportive they are and score teachers a second time on how controlling they are. The correlations between rated autonomy-supportive and rated controlling instructional strategies are sometimes low, which suggests that autonomy support and teacher control are somewhat independent aspects of motivating style, rather than opposites (Bartholomew et al., 2011). Future research may find that there is some methodological and analytical precision to gain in assessing this conceptually bipolar construct with two separate scales, as measures of autonomy support might be particularly well suited to predict need satisfaction and positive teacher and student

outcomes while measures of teacher control might be particularly well suited to predict need frustration and negative teacher and student outcomes.

Conclusion

The conclusion gained from the current study is that giving autonomy support benefits teachers in much the same way that receiving it benefits their students.

Acknowledgments

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