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A Needs-Supportive Intervention to Help PE Teachers Enhance Students' Prosocial Behavior and Diminish Antisocial Behavior

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Abstract

Objectives: Grounded in self-determination theory, we implemented an autonomy-supportive intervention program (ASIP) to help physical education (PE) teachers become more autonomy-supportive and less controlling toward their students. We tested whether such changes in teachers' classroom motivating styles could promote students' prosocial behaviors and diminish their antisocial behaviors.

Design: We used an experimental research design to manipulate teachers' motivating style and a three-wave longitudinal design to assess the student-reported dependent measures.

Method: We randomly assigned PE teachers (8 women, 25 men; 15 middle, 18 high school) to participate or not in the ASIP. At mid-semester, classroom observers rated teachers' autonomy-supportive and controlling instructional behaviors. At the end of the semester, teachers rated their students' prosocial and antisocial behaviors. At the beginning, middle, and end of the semester, the 1,824 students of these teachers completed measures of need satisfaction, need frustration, prosocial behavior, and antisocial behavior.

Results: ASIP participation increased teachers' autonomy support, students' need satisfaction, and students' prosocial behavior, and it decreased teachers' control, students' need frustration, and students' antisocial behavior. Multilevel structural equation modeling showed that these intervention-enabled increases in students' need satisfaction longitudinally increased their prosocial behavior, while intervention-enabled decreases in students' need frustration longitudinally decreased their antisocial behavior and acceptance of cheating.

Conclusion: ASIP-enabled student benefits extend beyond previously-documented personal adjustment gains (e.g., engagement, learning) to include social adjustment gains as well.

Keywords: autonomy support; intervention; need satisfaction; need frustration; self-determination theory; acceptance of cheating.

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A Needs-Supportive Intervention to Help PE Teachers

Enhance Students' Prosocial Behavior and Diminish Antisocial Behavior

Prosocial behavior is an intentional act to benefit another person. Benefitting others is prosocial when it is done volitionally rather than in response to another's directive or by the anticipation of a reward or punishment (Grusec, Hastings, & Almas, 2011). Prosocial behavior occurs as classmates help, share, encourage, comfort, support, cooperate, and show respect for one another. Antisocial behavior is an intentional act to harm another person. Harming others is antisocial when it too is done volitionally, as unintentional harm is not considered to be antisocial (Coyne, Nelson, & Underwood, 2011). Antisocial behavior among classmates occurs in ways that are verbal (e.g., verbally abusing), physical (e.g., hitting, injuring) and relational (e.g., intimidating, showing disrespect). Prosocial and antisocial behaviors have profound implications for both the actor's and the recipient's development (empathic *vs*. callous), emotionality (gratitude *vs*. hostility), interpersonal relations (social competence *vs*. social dominance), friendships (peer acceptance *vs*. rejection), personal functioning (adjustment *vs*. maladjustment), and academics (school success *vs*. school failure) (Ladd, Herald-Brown, & Kochel, 2009; Wentzel, 2003, 2004).

The purpose of the present paper was to investigate how classroom PE teachers can alter the nature of their teacher-student interactions during instruction so to enhance their students' prosocial behaviors and to diminish their students' antisocial behaviors. Teachers' naturally-occurring social support, social goals, and prosocial expectations reliably predict students' high prosocial and low antisocial tendencies (Wentzel, Filisetti, & Looney, 2007), but when school programs try to prescribe or incentivize prosociability, the intended effects rarely materialize and sometimes even backfire to decrease prosocial behavior (Fabes et al., 1989). The essential problem with socially-engineered attempts to promote prosocial behavior is that the offering of incentives, requirements, or obligations to benefit others

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interferes with students' volition or internal causality (Kunda & Schwartz, 1983) and, therefore, defeats the purpose of trying to develop a long-term prosocial orientation toward one's classmates (Gagne, 2003; Sobus, 1995; Stukas, Snyder, & Clary, 1999).

Rather than emerging from prescribed or incentivized programs, changes in students' prosocial and antisocial behavior are more responsive to supportive relationships and enmeshing students within a caring community. One way educators can do this is a social approach. When socially structured, teachers and others (e.g., administrators, bus drivers, peers) first model caring and respectful behavior to build students' social skills and connection with the school community (Solomon, Watson, Delucchi, Schaps, & Battistich, 1988) and second communicate clear expectations and special opportunities (e.g., peer mediation) for prosocial behavior (Metzler, Biglan, Rusby, & Sprague, 2001). Another way educators can offer students caring, supportive relationships is a motivational approach. When motivationally supportive, teachers create the classroom conditions that nurture students' already-existing inner motivational resources linked to prosocial behavior (e.g., empathy, need satisfaction) (Delrue, Vansteenkiste, Mouratidis, Gevaert, Vande Broek, & Haerens, 2017). In the present paper, we adopted such a needs-supportive (i.e., motivational) approach, as informed by a self-determination theory perspective (Gagne, 2003; Hodge & Gucciardi, 2015; Hodge & Lonsdale, 2011; Ntoumanis & Standage, 2009; Roth, Kanat-Maymon, & Bibi, 2010).

Teachers' Autonomy Support and Students' Need Satisfaction and Prosocial Behavior

Self-determination theory (SDT) is an approach to motivation and social functioning that highlights students' psychological needs (autonomy, competence, and relatedness) as inherent motivational assets that, when supported, facilitate adaptive personal and social functioning (Ryan & Deci, 2017). In the typical PE classroom, the most salient source of students' need support is the teacher's motivating style (Reeve, 2009). As evidenced by both

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experimental manipulations (Cheon, Reeve, & Moon, 2012; Tessier, Sarrazin, & Ntoumanis, 2010) and longitudinal surveys (Jang, Kim, & Reeve, 2012, 2016), autonomy-supportive teaching enhances students' positive classroom functioning (e.g., engagement, conceptual learning, well-being). Autonomy-supportive teaching achieves these benefits because it creates opportunities for students to experience psychological need satisfaction during instruction (Deci et al., 2001; Cheon et al., 2012; Jang et al., 2012, 2016).

Autonomy support is the delivery of instruction through an interpersonal tone of support and understanding that appreciates, supports, and vitalizes students' psychological needs for autonomy, competence, and relatedness (Reeve, 2015). This tone is communicated to students through acts of instruction such as adopting their perspective, creating opportunities for student input and initiative, teaching in students' preferred ways, and acknowledging and accepting expressions of negative affect (Reeve, 2009).

Psychological need satisfaction, once it has been supported by autonomy-supportive teaching, can be expected to enhance prosocial behavior because students who experience need satisfaction show more effective and responsive interactions with social partners, experience and display more positive emotions, experience greater empathy and more mature moral reasoning, display better coping with conflict, cope proactively, tend to accept and internalize prosocial classroom rules and regulations, and see more intrinsic and identified (and less introjected and extrinsic) reasons for their prosocial behavior (Gagne, 2003; Knee, Patrick, Vietor, Nanayakkara, & Neighbors, 2002; Pavey, Greitemeyer, & Sparks, 2011; Ryan & Connell, 1989).

Teachers' Control and Students' Need Frustration and Antisocial Behavior

While SDT's emphasis on autonomy support and need satisfaction can explain students' prosocial behavior well, it serves as a less compelling model to explain PE students' antisocial behavior. That is, antisocial behavior flows less out of low autonomy support and

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low need satisfaction and more out of high interpersonal control and high need frustration (Hein, Koka, & Hagger, 2015; Hodge & Gucciardi, 2015; Rutten et al., 2011). To explain both adaptive (prosocial) and maladaptive (antisocial) social functioning, self-determination theorists now highlight two differentiated explanatory processes (Bartholomew et al., 2011a; Bartholomew et al., 2011b; Cheon, Reeve, & Song, 2016; Gunnell et al., 2013; Haerens et al., 2015) such that autonomy-supportive teaching vitalizes the "brighter" side of students' motivation and functioning (Autonomy-support → increased need satisfaction → increased prosocial behavior) while it has only a mild, supplemental effect on diminishing students' need frustration and maladaptive functioning, while interpersonal control galvanizes the "darker" side of students' motivation and functioning (Teacher control → increased need frustration → increased antisocial behavior) while it has only a mild, supplemental effect on diminishing students' need satisfaction and adaptive functioning.

Teacher control is the delivery of instruction through an interpersonal tone of coercion that pressures students into thinking, feeling, and behaving in teacher-prescribed ways (Reeve, 2015). This tone frustrates students' psychological needs for autonomy, competence, and relatedness (Bartholomew et al., 2011a), and it is communicated to students through acts of instruction such as adopting only the teacher's perspective, relying on environmental sources of motivation to engage students (e.g., rewards), uttering directives without explanations, and by asserting power and relying on pressuring language to silence students' complaints and to push them into compliance with the teacher's agenda (Reeve, 2009).

Psychological need frustration, once it has been exacerbated by controlling teaching, can be expected to fuel antisocial behavior because students who experience need frustration show more conflictual and ineffective interactions with social partners, experience and display more negative emotions, experience more inner stress and a sense of vulnerability, experience lesser empathy and perspective taking, display poor coping with conflict, cope

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reactively, and tend to reject and defy prosocial classroom rules and regulations (Gagne, 2003; Knee et al., 2002; Pavey et al., 2011; Ryan & Connell, 1989).

Experimental, Longitudinal Research Design

Many investigations have shown that autonomy support, need satisfaction, and prosocial behavior covary (Gagne, 2003; Hodge & Gucciardi, 2015; Hodge & Lonsdale, 2011; Ntoumanis & Standage, 2009; Roth et al., 2010; Rutten et al., 2011), and a subset of these studies show further that teacher control, need frustration, and antisocial behavior covary (Cheon, Hwang et al., 2016; Hodge & Gucciardi, 2015; Hodge & Lonsdale, 2011). But all of these studies have relied on a correlational research design. This is a methodological and interpretative concern because autonomy-supportive teaching and need satisfaction may enhance prosocial behavior, but it is also possible that prosocial behavior may enhance autonomy-supportive teaching and need satisfaction, just as antisocial behavior may enhance teacher control and need frustration.

To overcome these methodological limitations and to enhance the capacity of this line of research to offer directional statements, we capitalized on previous investigations that utilized an autonomy-supportive intervention program (ASIP) to help teachers learn how to become significantly more autonomy supportive and significantly less controlling toward their students during instruction (Cheon & Reeve, 2013, 2015; Cheon et al., 2012; Cheon et al., 2016; Cheon, Reeve, Yu, & Jang, 2014). These experiments have been classroom-based and utilized both random assignment to conditions and a multi-wave longitudinal design.

In the present study, we added three methodological features to this ASIP methodology to strengthen its rigor and scope of application. First, we collected data from multiple informants. To assess teachers' motivating style, we obtained ratings for autonomy-supportive and controlling teaching from both students and trained classroom observers. Similarly, to assess students' prosocial and antisocial behavior, we obtained both student and

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teacher reports. Second, we collected a supplemental measure of students' antisocial tendency—namely, acceptance of cheating. Acceptance of cheating is an antisocial attitude in the sports context that refers to endorsement of rule violations and unfair play (Lee, Whitehead, & Ntoumanis, 2007), attitudes that are highly associated with antisocial behaviors and poor sportspersonship among adolescents (Ntoumanis, Taylor, & Thøgersen-Ntoumani, 2012). Acceptance of cheating is volitional harm to others because it seeks illegitimate gains at the expense of one's classmates or competitors. Third, we both manipulated teachers' autonomy-supportive and controlling motivating styles (via teacher participation in the ASIP or not) and assessed teachers' already-existing (beginning of the semester) autonomy-supportive and controlling motivating styles. By including these measures of teachers' pre-intervention motivating styles, we gained the opportunity to examine if intervention-enabled gains in autonomy-supportive teaching might increase students' need satisfaction and prosocial behavior and decrease students' need frustration and antisocial behavior in ways that were above and beyond those effects documented in the correlational and cross-sectional research.

Hypotheses and Hypothesized Model

Hypotheses. We predicted that PE teacher participation in the ASIP (experimental group), relative to non-participation in the ASIP (control group), would significantly increase students' post-intervention T2 and T3 perceived autonomy-supportive teaching, need satisfaction, and prosocial behavior and significantly decrease students' T2 and T3 perceived controlling teaching, need frustration, antisocial behavior, and acceptance of cheating. We further predicted that PE teacher participation in the ASIP would significantly increase raters' post-intervention scoring of teachers' in-class autonomy-supportive instructional behaviors and decrease raters' scoring of teachers' in-class controlling instructional behaviors. And, we predicted that PE teacher participation in ASIP would significantly increase teachers' post-

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intervention rating of their students' prosocial behavior and decrease teachers' rating of their students' antisocial behavior.

Hypothesized Model. The hypothesized dual-process model appears in Figure 1. Central to the hypothesized model are the five boldface, sloped lines/paths. As shown in the upper part of Figure 1, experimental condition was hypothesized to increase T2 need satisfaction, and these mid-semester gains in need satisfaction were then predicted to longitudinally increase T3 prosocial behavior. As shown in the lower part of Figure 1, experimental condition was further hypothesized to decrease T2 need frustration, and these mid-semester declines in need frustration were then predicted to longitudinally decrease both T3 antisocial behavior and T3 acceptance of cheating. Figure 1 also includes a dashed upwardly-sloped path from T1 need satisfaction to T3 prosocial behavior and two dashed downwardly-sloped paths from T1 need frustration to T3 antisocial behavior and T3 acceptance of cheating to function as statistical controls that allowed us to test that it was changes in T2 need satisfaction-frustration (and not level of T2 need satisfaction-frustration per se) that explained changes in each T3 prosocial-antisocial outcome.

While our primary focus was on how manipulated motivating style (via ASIP participation) would affect changes in students' need satisfaction-frustration, we further assessed for the effects of teachers' naturally-occurring (i.e., beginning-of-semester, pre-intervention) motivating styles on longitudinal changes in students' T2 need satisfaction-frustration. Based on prior longitudinal findings (Jang et al., 2012, 2016), we expected that T1 assessed autonomy support would predict a longitudinal increase in students' T2 need satisfaction and also that T1 assessed teacher control would predict a longitudinal increase in students' T2 need frustration. We were also interested to see if the aforementioned effects of manipulated motivating style on students' need satisfaction-frustration would materialize even after controlling for these pre-existing differences in teachers' motivating styles.

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The dual-process model also predicts mild but significant supplemental cross-over effects that need satisfaction would diminish antisocial behavior and need frustration would diminish prosocial behavior. So, we added two solid (but not boldface—to depict their supplemental nature) downwardly-sloped lines from T2 need satisfaction to (decreased) T3 antisocial behavior and to T3 acceptance of cheating and one upwardly-sloped sold line from T2 need frustration to (decreased) T3 prosocial behavior. And, we again added 3 additional dashed upwardly- and downwardly-sloped lines from each T1 need state to each T3 prosocial-antisocial outcome to function as statistical controls in the test of these cross-over effects.

In addition, on the left side of Figure 1, we added three supplemental paths depicted by slopped (but not boldfaced) lines: T1 need satisfaction would increase T2 prosocial behavior, and T1 need frustration would increase both T2 antisocial behavior and T2 acceptance of cheating. We added these three paths based on the logic that if we expected these experimentally-induced effects to occur late in the semester (as per the hypothesized model) then they may similarly occur as naturally-occurring effects early in the semester.

Finally, based on prior findings (Jang et al., 2012; Reeve & Lee, 2014), we acknowledged that students' own classroom behaviors sometimes create self-generated changes in their need satisfaction and need frustration, which is one of the primary reasons we relied on an experimental rather than on a correlational research design. Thus, we included six possible reciprocal pathways in which students' prosocial and antisocial attitudes and behaviors predict a longitudinal change in their own subsequent classroom need satisfaction and need frustration, even after controlling for the effects that manipulated and measured teachers' motivating styles might have on students' need satisfaction and need frustration. These six sloped lines appear in Figure 1 as solid (but not boldface) lines: T1 prosocial behavior → T2 need satisfaction; T2 prosocial behavior → T3 need satisfaction; T1

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antisocial and T1 acceptance of cheating → T2 need frustration; and T2 antisocial behavior and T2 acceptance of cheating → T3 need frustration.[1]

Method

The full procedural timeline for the intervention program and the three waves of data collection appear in Figure 2. The research protocol was approved by the University Research Ethics Committee of the first author's university.

Participants and Procedure

Teacher-participants included 33 ethnic Korean certified physical education teachers, 8 women and 25 men. Teachers taught in 33 different secondary schools (15 middle, 18 high) in the Seoul and Kyoungi-Do metropolitan areas. Teachers averaged 36.0 (*SD* = 4.4) years of age and 6.5 (*SD* = 2.6) years of PE teaching experience. At the end of the semester, each participating teacher received the equivalent of $50 in appreciation of his or her participation. No teacher dropped out over the course of the semester-long study, so the teacher retention rate was 100%.

One month prior to the beginning of the school year, we contacted 40 PE teachers who worked in either the Seoul or Kyoungi-Do metropolitan areas to invite them to participate in our semester-long study and 33 agreed to participate. These 33 teachers were then randomly assigned into either the experimental (*n* = 15) or control (*n* = 18) condition. For 29 of the 33 teachers, we administered the student survey to two classes; for the remaining four teachers, we administered the student survey to only one class (for a total of 62 classrooms associated with 33 teachers). For the teachers' data collection, teachers rated their students' class-wide prosocial behavior and their students' class-wide antisocial behavior at the end of the semester (week 19).

Student-participants were those students who completed the study questionnaire over all three waves of data collection. At T1, 1,951 ethnic Korean students completed the

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questionnaire. At T2, 1,888 students completed the questionnaire for a second time, while 63 did not. The T2 dropout students did not differ from the persisting students on experimental condition, grade level, prosocial behavior, perceived autonomy-supportive teaching, or perceived controlling teaching, but they did include more males, score lower on T1 need satisfaction, and score higher on T1 need frustration, antisocial behavior, and acceptance of cheating. At T3, 1,824 of the students completed the questionnaire for a third time, while 64 of the T2 persisting students did not. The T3 dropout students did not differ from the persisting students on experimental condition, gender, grade level, or the T1 and T2 measures for perceived autonomy support, perceived teacher control, need satisfaction, need frustration, prosocial behavior, or acceptance of cheating, but they did score higher on T1 and T2 antisocial behavior. So the final analyzed sample represented an overall retention rate of 93.5% (1,824/1,951) that was generally biased (because of attrition) by an under-representation of students who reported high levels of antisocial behavior. The final analyzed sample consisted of the following: 1,053 (57.7%) females and 771 (42.3%) males; 871 (47.8%) middle school and 953 (52.2%) high school students; and 873 (47.9%) in the experimental group and 951 (52.1%) in the control group.

Students' data were collected in three waves in which students completed the same four-page questionnaire at the beginning (T1; week 1), middle (T2; week 10), and end (T3; week 19) of the spring semester (which is the first semester of the school year in Korea—early March to late July). The survey was administered at the beginning of the class period, students completed the questionnaire in reference to that particular teacher and class, and students were assured that their responses would be confidential.

For the classroom observers' data collection, a pair of trained raters visited one of the teacher's classrooms (selected at random) halfway through the semester (during either week 10 or 11) to score objectively that teacher's in-class autonomy-supportive and controlling

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instructional behaviors.

Autonomy-Supportive Intervention Program (ASIP)

For teachers in the experimental condition, we delivered the ASIP in three parts. Part 1 was a three hour morning workshop that took place two weeks before the school year began. The workshop began with a pair of reflective warm-up activities to help teachers become aware of their own tendencies toward autonomy-supportive teaching (warm-up activity #1) and controlling teaching (warm-up activity #2). Teacher-participants then received a media-rich Power-Point presentation that featured information on the nature of student motivation, teachers' autonomy-supportive motivating style, teachers' controlling motivating style, empirical evidence on the benefits of autonomy support and the costs of control, and PE-specific examples of six recommended autonomy-supportive instructional behaviors.

Part 2 was a same-day, two-and-a-half hour afternoon workshop that focused on the "how to" of six specific autonomy-supportive instructional behaviors, including perspective taking, vitalize inner motivational resources, use invitational language, provide explanatory rationales, acknowledge and accept negative affect, and display patience. Each autonomy-supportive act of instruction was first described and modeled (via brief video clips) and then practiced and refined until teachers felt sufficiently skilled to try it out in their own classrooms. During the afternoon workshop, we helped teachers not only learn how to enact the 6 recommended autonomy-supportive instructional behaviors, but we further helped them learn how to replace their existing controlling instructional behaviors (e.g., take only the teacher's perspective, utter directives without rationales, rely on pressuring language) with alternative autonomy-supportive instructional behaviors (e.g., take the students' perspective, offer explanatory rationales for teacher requests, rely on invitational language).

Part 3 took place during week 6 of the semester (2 months after Parts 1 and 2), and it featured a peer-to-peer group discussion about teachers' early-semester experiences with

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autonomy-supportive teaching. Teachers both gave and received instructional help, tips, and strategies on how to become more autonomy supportive and less controlling toward students.

Measures

We used a previously-validated and successfully used Korean translation for each measure, each of which was originally developed in English (Cheon, Hwang et al., 2016; Cheon & Jang, 2012; Cheon et al., 2012). We did not, however, have available a previously-translated version of the acceptance of cheating measure, so we used Brislin's (1980) back-translation procedures to create a Korean translated version of this measure (the AMDYSQ).

Raters' Scoring of Teachers' Motivating Styles. Before the data collection, a team of four students (2 undergraduates, 2 graduates) with an understanding of self-determination theory, teachers' motivating styles, and Korean PE classrooms received instruction, training, and practice with rating sheets adapted from previous studies (Cheon et al., 2012; Cheon & Reeve, 2015) to score both autonomy-supportive and controlling instructional behaviors. During the data collection (weeks 10 and 11, see Fig. 1), raters worked in pairs, came to the class unannounced 5–10 min before its start, did not know into which group (experimental or control) the observed teacher had been randomly assigned, and made independent ratings. The autonomy-supportive teaching rating sheet, presented on a 1-7 unipolar scale (1 = *not at all*, 7 = *very much*), listed the following five instructional behaviors that the two classroom observers rated in a consistent way: vitalizes inner motivational resources, $r(33) = .83$; provides explanatory rationales, $r = .79$; uses invitational language, $r = .76$; acknowledges and accepts negative affect, $r = .88$; and displays patience, $r = 79$. We averaged the two ratings into a single score for each behavior and then averaged these five intercorrelated ratings into one overall "rater-scored autonomy-supportive instructional behaviors" score (5-items, $\alpha = .95$). The controlling teaching rating sheet, also presented on a 1-7 unipolar scale (1 = *not at all*, 7 = *very much*), listed the following five instructional behaviors: introduces

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extrinsic motivators, $r(33) = .80$; neglects explanatory rationales, $r = 77$; uses pressuring language, $r = .79$; counters and tries to change negative affect, $r = .80$; and displays impatience, $r = .86$. We averaged the two ratings into a single score for each behavior and then averaged the five intercorrelated ratings into one overall "rater-scored controlling instructional behaviors" score (5-items, $\alpha = .96$).

Teachers' Rating of their Students' Prosocial and Antisocial Behaviors. Teachers rated their students' prosocial and antisocial behaviors at the class (or group average) level. To assess prosocial behavior teachers used the 4-item prosocial teammate scale (e.g., "encouraged a classmate"; $\alpha = .79$), and to assess antisocial behavior teachers used the 4-item antisocial teammate scale (e.g., "verbally abused a classmate"; $\alpha = .81$) from the Prosocial and Antisocial Behavior in Sport Scale (PABSS; Kavussanu & Boardley, 2009). For our purposes, we modified the word "teammate" from the original PABSS to the word "classmate", and teachers used a 7-point response scale (1 = *Strongly disagree*, 7 = *Strongly agree*). The PABSS' antisocial teammate scale is actually a 5-item scale, but we did not include the "swore at a classmate" item because this behavior never occurs in the Korean PE classroom. So, overall, teachers rated eight items (4 prosocial, 4 antisocial) in response to "As a group, the students in my class engaged in the following behaviors during this semester:". These two teacher ratings intercorrelated significantly and negatively, $r(62) = -.58$, $p < .001$.

Students' Perceived Autonomy-Supportive and Controlling Teaching. We assessed students' perceived autonomy-supportive teaching with the 6-item version of Learning Climate Questionnaire (LCQ; Williams & Deci, 1996). The LCQ includes items such as, "My PE teacher listens to how I would like to do things", and it has been used successfully in previous studies in the PE context to assess autonomy-supportive teaching and to predict need satisfaction (Cheon et al., 2016; Taylor et al., 2010). Students' LCQ scores were internally consistent across the three waves of data collection (α's at T1, T2, and T3

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were .90, .92, and .94, respectively). We assessed students' perceived controlling teaching with the 4-item Controlling Teacher Scale (CTS; Jang et al., 2009). The TCQ includes items such as, "My PE teacher puts a lot of pressure on me", and it has been used successfully in previous studies in the PE context to assess controlling teaching and to predict need frustration (Cheon & Reeve, 2013; Cheon et al., 2016). Students' CTS scores were internally consistent in each assessment period (α's were .83, .83, and .84). Both measures used the same 7-point response scale (1 = *Strongly disagree*, 7 = *Strongly agree*).

Students' Psychological Need Satisfaction and Need Frustration. We assessed students' autonomy, competence, and relatedness satisfaction with three separate scales, each of which used a 7-point response scale (1 = *Strongly disagree*, 7 = *Strongly agree*). For autonomy satisfaction, we used the 5-item Perceived Autonomy scale (Standage, Duda, & Ntoumanis, 2006). A sample item is, "I feel that I do PE activities because I want to" (α's at T1, T2, and T3 = .86, .89, and .92). For competence satisfaction, we used the 4-item Perceived Competence scale from the Intrinsic Motivation Inventory (McAuley, Duncan, & Tammen, 1989). A sample item is, "I think I am pretty good at physical education" (α's = .91, .91, and .91). For relatedness satisfaction, we used the 5-item Perceived Relatedness scale from the Basic Needs Satisfaction Scale (Ng, Lonsdale, & Hodge, 2011). A sample item is, "I have close relationships with others in my PE class" (α's = .72, .76, and .82). We assessed students' autonomy, competence, and relatedness frustration with the 12-item Psychological Need Thwarting Scale (PNTS; Bartholomew et al., 2011b), which is the most widely-used scale to assess need frustration in tests of the dual-process model (Gunnell et al., 2013; Hein et al., 2015; Mallinson & Hill, 2011). The PNTS uses a 7-point response scale (1 = *Strongly disagree*, 7 = *Strongly agree*), and it includes three 4-item subscales to assess autonomy frustration ("In PE class, I feel pushed to behave in certain ways"; α's = .72, .71, and .74), competence frustration ("In PE class, there are situations where I am made to feel

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inadequate"; α's = .81, .84, and .87), and relatedness frustration ("I feel rejected by my PE teacher"; α's = .89, .91, and .93).

Students' Prosocial and Antisocial Classroom Behaviors. To assess students' prosocial and antisocial behaviors, we used the aforementioned Prosocial and Antisocial Behavior in Sport Scale (PABSS; Kavussanu & Boardley, 2009). The full 4-scale, 20-item PABSS features two subscales to assess prosocial behavior (toward teammates, toward opponents) and two subscales to assess antisocial behavior (toward teammates, toward opponents), and we used a 7-point response scale (1 = *Strongly disagree*, 7 = *Strongly agree*). To assess prosocial behavior, we used the 4-item prosocial teammate scale (e.g., "encouraged a classmate"; α's = .80, .84, and .86, which we refer to as *prosocial encourage*) and the 3-item prosocial opponent scale (e.g., "helped an injured classmate"; α's = .84, .87, and .89, which we refer to as *prosocial help*). To assess antisocial behavior, we used the 4-item antisocial teammate scale (e.g., "verbally abused a classmate"; α's = .81, .86, and .89, which we refer to as *antisocial abuse*) and the 8-item antisocial opponent scale (e.g., "tried to injure a classmate"; α's = .90, .92, and .94, which we refer to as *antisocial hurt*). The PABSS has been successfully used in both the Korean (Cheon, Hwang et al., 2016) and European (e.g., Kavussanu, Boardley, Sagar, & Ring, 2013; Ntoumanis & Standage, 2009) PE and sport contexts.

Acceptance of Cheating. To collect a second antisocial measure, students completed the 7-item Acceptance of Cheating subscale from the Attitude to Moral Decision-making in Youth Sport Questionnaire (AMDYSQ; Lee, Whitehead, & Ntoumanis, 2007). While participants completed the full 7-item scale, we followed the recommendations of the AMDYSQ's authors and analyzed the data only from the first three items (Lee et al., 2007; see Study 5), which were as follows: "It is OK to cheat if nobody knows"; "I would cheat if I thought it would help me win"; and "If other people are cheating, I think I can too." In the

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present study, we used a 7-point response scale (1 = *Strongly disagree*, 7 = *Strongly agree*), and scores on the 3-item acceptance of cheating scale showed acceptable internal consistency (α's = .86, .90, and .91).

Data Analyses to Test the Individual Hypotheses

To test each individual hypothesis, we used a t-test when the dependent measure was reported by either the raters or the teachers but a multilevel repeated measures analysis when the dependent measure was reported by the students. In the later analyses, experimental condition served as the between-groups independent variable and time or wave served as the within-groups repeated measure [with teacher gender and grade level serving as a pair of covariates (statistical controls)]. For each of these dependent measures the critical hypothesis test was for a significant condition *x* time interaction to determine whether the predicted changes in students' T3 score depended on experimental condition. To estimate effect sizes, we used the independent-groups pretest-posttest design test ($d_{\text{IGPP-CHANGE}}$) that is appropriate for multilevel, repeated-measures group comparisons to determine the magnitude of the change in the intervention group relative to the change in the control group on each dependent measure (Feinglod, 2009). The $d_{\text{IGPP-CHANGE}}$ statistic may be interpret in the same was as is Cohen's *d*, which is .10 for a small effect, .35 for a moderate effect, and .50 for a large effect (Cohen, 1988).

Data Analyses to Test the Hypothesized Model

The student data had a 3-level cross-classified hierarchical (i.e., multilevel) structure with repeated measures (Level 1, 3-waves) nested within students (Level 2, N = 1,824) nested within classrooms (Level 3, k = 62) nested within teachers (a cross-classified Level 3, k = 33). At level 1 (within student), the longitudinal data allowed us to measure students' increase or decrease on each dependent measure over three time points—the beginning, middle, and end of the semester. Accordingly, we scored the ''time'' independent variable as 0 (T1), 1 (T2),

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and 2 (T3). At level 2 (between students), we entered the student-level variables of gender and grade level as group mean centered covariates to function as statistical controls. At level 3 (between classrooms, nested within teachers), we entered experimental condition as an un-centered independent variable to retain its raw metric form (control group = 0, experimental group = 1). Finally, we entered the condition *x* time interaction as a cross-level predictor (experimental condition was a level 3 predictor, time was a level 1 predictor) to test the extent to which the changes in students' T3 scores depended on experimental condition.

In the test of the hypothesized model (see Fig. 1), we used multilevel latent variable structural equation modeling (LISREL 8.80; Joreskog & Sorbom, 2006) to evaluate both the measurement and the hypothesized (structural) models. To evaluate model fit, we relied on the chi-square test statistic and multiple indices of fit (as recommended by Kline, 2011), including the root-mean-square error of approximation (*RMSEA*), the standardized root mean square residual (SRMR), the comparative fit index (*CFI*), and the non-normed fit index (NNFI). For *RMSEA* and *SRMR*, values less than .08 indicate good fit; for *CFI* and *NNFI*, values greater than .95 indicate good fit (Hu & Bentler, 1999; Kline, 2011). To test for mediation (i.e., ASIP → T2 need satisfaction → T3 prosocial behavior; ASIP → need frustration → T3 antisocial behavior; ASIP → need frustration → T3 acceptance of cheating), we used multilevel modeling for clustered data (Krull & MacKinnon, 2001).

Results

Preliminary Analyses

Missing values and normal distribution of scores. Missing data among the student- and rater-reported scores were rare (< 0.1%), so we used the expectation-maximization (EM) algorithm for imputing missing values. Values for skewness and kurtosis for the 49 assessed variables were all less than |1.7|, indicating little deviation from normality.

Students' demographic characteristics. We tested for possible associations

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between gender and grade level with the 23 student dependent measures (7 dependent measures *x* 3 waves, plus T1 autonomy support and T1 teacher control) to check if these demographic characteristics needed to be controlled for in the hypothesis tests. Gender was associated with 13 of the 23 dependent measures, and grade level was associated with 12 of the 23 dependent measures. Given these associations, we included student gender (females = 0; males = 1) and grade level (middle = 0; high = 1) as covariates (i.e., as statistical controls) in the analyses of the student dependent measures.

Effect of the ASIP Manipulation on Teachers' Motivating Styles

We tested the effectiveness of the ASIP manipulation by assessing teachers' autonomy support and control using both observer-scored ratings and student self-reports. Before doing so, we first checked to see whether observers' and students' middle-of-semester ratings corresponded with each other, and they did. Observers' ratings of autonomy-supportive instructional behavior, which were aggregated at the teacher level (n = 33, M = 4.78, SD = 0.97), significantly and rather strongly predicted (i.e., agreed with) students' T2 perceived autonomy-supportive teaching (n = 1,824, M = 5.06, SD = 0.83): *Estimate* = .22, SE = .02, $t(1822) = 10.78$, $p < .001$. Similarly, observers' ratings of controlling instructional behavior, which were also aggregated at the teacher level (n = 33, M = 2.98, SD = 0.96), significantly and rather strongly predicted (i.e., agreed with) students' T2 perceived controlling teaching (n = 1,824, M = 2.45, SD = 0.83): *Estimate* = .21, SE = .02, $t(1822) = 10.39$, $p < .001$.

For *observer-scored autonomy supportive and controlling instructional behaviors*, observers rated PE teachers in the experimental group as enacting more autonomy-supportive instructional behaviors during classroom instruction than did PE teachers in the control group (*M*s, 5.51 *vs*. 4.23), $t(31) = 6.30$, $p < .001$, d = 2.26. Observers also rated PE teachers in the experimental group as enacting less controlling instructional behaviors than did PE teachers in the control group (*M*s, 2.67 *vs*. 3.57), $t(31) = 3.53$, $p = .001$, d = 1.27.

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For *students' perceptions of autonomy-supportive teaching*, the critical condition *x* time interaction was significant, $t(3,518) = 17.64$, $p < .001$ ($d_{\text{IGPP-CHANGE}} = 0.99$)[2]. As illustrated in the upper left panel of Figure 3, perceived autonomy-supportive teaching increased significantly for students of teachers in the experimental group from T1 to T3 ($\Delta = +0.92$, $t = 26.49$, $p < .001$), while it decreased significantly for students of teachers in the control group from T1 to T3 ($\Delta = -0.08$, $t = 2.59$, $p = .010$).

For *students perceptions of controlling teaching*, the critical condition *x* time interaction was significant, $t(3,518) = 9.46$, $p < .001$ ($d_{\text{IGPP-CHANGE}} = 0.64$). As illustrated in the upper right panel of Figure 3, perceived controlling teaching decreased significantly for students of teachers in the experimental group from T1 to T3 ($\Delta = -0.71$, $t = 19.64$, $p < .001$), while it also decreased significantly (but more modestly so) for students of teachers in the control group from T1 to T3 ($\Delta = -0.10$, $t = 2.81$, $p = .005$).

Effects of ASIP on Students' Need States

For *students' need satisfaction*, the critical condition *x* time interaction was significant, $t(3,518) = 12.52$, $p < .001$ ($d_{\text{IGPP-CHANGE}} = 0.56$). As illustrated in the lower left panel of Figure 3, need satisfaction increased significantly for students of teachers in the experimental group from T1 to T3 ($\Delta = +0.71$, $t = 21.28$, $p < .001$), while it also increased significantly (but more modestly so) for students of teachers in the control group from T1 to T3 ($\Delta = +0.11$, $t = 3.43$, $p < .001$).

For *students' need frustration*, the critical condition *x* time interaction was significant, $t(3,518) = 11.19$, $p < .001$ ($d_{\text{IGPP-CHANGE}} = 0.63$). As illustrated in the lower right panel of Figure 3, need frustration decreased significantly for students of teachers in the experimental group from T1 to T3 ($\Delta = -0.40$, $t = 13.17$, $p < .001$), while it increased significantly for students of teachers in the control group from T1 to T3 ($\Delta = +0.16$, $t = 5.52$, $p < .001$).

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Effects of ASIP on Students' Prosocial and Antisocial Behavior

We assessed students' prosocial and antisocial behavior by using both teacher ratings and student self-reports. As before (with the raters' and students' scores), we first checked to see whether teachers' and students' end-of-semester ratings corresponded with each other, and they did. Teachers' ratings of their students' prosocial behavior, which were aggregated at the classroom level (n = 62, M = 5.15, SD = 0.48), predicted (i.e., agreed with) students' T3 self-reported prosocial behavior (n = 1,824, M = 4.92, SD = 0.90): *Estimate* = .10, SE = .04, $t(1822) = 2.33$, $p = .020$. Similarly, teachers' ratings of their students' antisocial behavior, which were also aggregated at the classroom level (n = 62, M = 2.38, SD = 0.53), significantly predicted (i.e., agreed with) students' T3 self-reported antisocial behavior (n = 1,824, M = 2.00, SD = 0.71): *Estimate* = .10, SE = .03, $t(1822) = 3.16$, $p = .002$.

For *teacher-rated prosocial and antisocial behavior*, teachers in the experimental group rated their students as displaying significantly more prosocial behavior than did teachers in the control group (*M*s, 5.49 *vs.* 4.85), $t(31) = 7.34$, $p < .001$, $d = 2.64$. Teachers in the experimental group also rated their students as displaying significantly less antisocial behavior than did teachers in the control group (*M*s, 2.00 *vs.* 2.68), $t(35) = 6.98$, $p < .001$, d = 2.51.

For *students' self-reported prosocial behavior*, the critical condition *x* time interaction was significant, $t(3,518) = 11.64$, $p < .001$ ($d_{\text{IGPP-CHANGE}} = 0.55$). As illustrated in the left panel of Figure 4, prosocial behavior increased significantly for students of teachers in the experimental group from T1 to T3 ($\Delta = +0.53$, $t = 15.11$, $p < .001$), while it decreased significantly for students of teachers in the control group from T1 to T3 ($\Delta = -0.09$, $t = 2.56$, p = .010).

For *students' self-reported antisocial behavior*, the critical condition *x* time interaction was significant, $t(3,518) = 12.96$, $p < .001$ ($d_{\text{IGPP-CHANGE}} = 0.72$). As illustrated in the middle

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panel of Figure 4, antisocial behavior decreased significantly for students of teachers in the experimental group from T1 to T3 (Δ = -0.25, t = 8.48, p < .001), while it increased significantly for students of teachers in the control group from T1 to T3 (Δ = +0.37, t = 13.29, p < .001).

For *students' acceptance of cheating*, the critical condition *x* time interaction was significant, $t(3,518) = 8.20$, $p < .001$ ($d_{\text{IGPP-CHANGE}} = 0.44$) As illustrated in the right panel of Figure 4, acceptance of cheating decreased significantly for students of teachers in the experimental group from T1 to T3 (Δ = -0.31, t = 7.51, p < .001), while it increased significantly for students of teachers in the control group from T1 to T3 (Δ = +0.22, t = 5.69, p < .001).

Test of the Hypothesized Model

We first tested the measurement model, which featured 17 latent variables (7 latent variables assessed at T1, 5 latent variables assessed at T2 and T3), including two indicators for perceived autonomy support (parcel 1, parcel 2), two indicators for perceived teacher control (parcel 1, parcel 2), three indicators for need satisfaction (autonomy, competence, and relatedness), three indicators for need frustration (autonomy, competence, and relatedness), two indicators for prosocial behavior (prosocial-encourage, prosocial-help), two indicators for antisocial behavior (antisocial-abuse, antisocial-hurt), and three indicators for acceptance of cheating (3 items from the AMDYSQ). To represent the longitudinal character of the data set, we allowed the between-wave error terms of each repeated-measures indicator to correlate with itself from T1 to T2, T2 to T3, and T1 to T3. The measurement model fit the data reasonable well, X^2 (2,644) = 6,138.95, p < .001, *RMSEA* = .069 (.068-.070), *SRMR* = .040, *CFI* = .98, *NNFI* = .98. Table 1 shows the descriptive statistics and factor loadings for all 41 individual indicators included in the measurement model, while Table 2 shows the intercorrelations among experimental condition and the 17 latent variables.

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We next tested the hypothesized (structural) model. Before doing so, we added student gender and grade level as T1 predictors (statistical controls). Within T1, the eight predictor variables and the two statistical controls (gender, grade level) were allowed to correlate freely. Within T2 and T3, the errors of the five within-wave variables were allowed to correlate. Overall, the hypothesized model fit the data reasonably well, X^2 (2,895) = 7,364.68, $p < .001$, *RMSEA* = .074 (.072-.075), SRMR = .065, *CFI* = .97, *NNFI* = .97. The path diagram showing the standardized estimates for each of the five hypothesized paths (all of which were significant), for the T1 perceived autonomy support and T1 perceived teacher control paths (both of which were significant), each of the three possible dual-process T2 → T3 cross-over paths (all of which were significant), the three early-semester supplemental paths (none of which were significant), and the six reciprocal paths (three of which were significant) appear in Figure 5. For clarity, we do not show the T1 statistical controls in the figure, but we do report each of these paths in the full statistical results below.

As shown on the upper half of Figure 5, experimental condition (ASIP) (*B* = .16, *SE B* = .02, β = .19, *t* = 10.28, *p* < .001) and perceived teacher autonomy support (*B* = .07, *SE B* = .02, β = .07, *t* = 2.72, *p* = .007) both increased T2 need satisfaction, as did students' own T1 prosocial behavior (*B* = .10, *SE B* = .03, β = .10, *t* = 3.93, *p* < .001), even after controlling for T1 need satisfaction (*B* = .41, *SE B* = .03, β = .43, *t* = 13.56, *p* < .001), gender (*B* = -.04, *SE B* = .02, β = -.04, *t* = 2.05, *p* = .040), and grade level (*B* = -.04, *SE B* = .02, β = -.04, *t* = 2.03, *p* = .043). The increased T2 need satisfaction in turn longitudinally increased T3 prosocial behavior (*B* = .20, *SE B* = .03, β = .21, *t* = 6.24, *p* < .001), as did the cross-over decrease in need frustration (*B* = -.08, *SE B* = .03, β = -.07, *t* = 2.92, *p* = .003), even after controlling for T1 prosocial behavior (*B* = .22, *SE B* = .04, β = .23, *t* = 6.41, *p* < .001), T2 prosocial behavior (*B* = .41, *SE B* = .04, β = .42, *t* = 11.14, *p* < .001), T1 need satisfaction (*B* = -.07, *SE B* = .03, β = -.07, *t* = 2.24, *p* = .025), T1 need frustration (*B* = .07, *SE B* = .03, β = .07, *t* = 2.58, *p*

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= .009), gender (*B* = .00, *SE B* = .02, β = .01, *t* = 0.24, *p* = .810), and grade level (*B* = .03, *SE B* = .02, β = .03, *t* = 1.74, *p* = .082). Overall, as expected, the B_a B_b estimate of the T2 need satisfaction mediated effect on ASIP → T3 prosocial behavior was significant (*B* = .032, *SE* = .007, *t* = 4.71, *p* < .001), which confirmed multilevel mediation.

As shown on the lower half of Figure 4, experimental condition (ASIP) decreased (*B* = -.04, *SE B* = .02, β = -.05, *t* = 2.78, *p* = .005) while perceived teacher control increased (*B* = .04, *SE B* = .02, β = .05, *t* = 2.13, *p* = .043) T2 need frustration, as did students' own T1 antisocial behavior (*B* = .13, *SE B* = .04, β = .14, *t* = 3.36, *p* < .001) while T1 acceptance of cheating did not (*B* = .03, *SE B* = .03, β = .03, *t* = 0.95, *p* = .342), even after controlling for T1 need frustration (*B* = .28, *SE B* = .04, β = .27, *t* = 7.37, *p* < .001), gender (*B* = -.06, *SE B* = .02, β = -.07, *t* = 2.88, *p* = .004), and grade level (*B* = .03, *SE B* = .02, β = .03, *t* = 1.41, *p* = .159). The increased T2 need frustration in turn longitudinally increased both (a) T3 antisocial behavior (*B* = .17, *SE B* = .04, β = .16, *t* = 4.27, *p* < .001), as did the cross-over decrease in need satisfaction (*B* = -.08, *SE B* = .03, β = -.08, *t* = 3.04, *p* = .003), even after controlling for T1 antisocial behavior (*B* = .24, *SE B* = .03, β = .24, *t* = 7.25, *p* < .001), T2 antisocial behavior (*B* = .36, *SE B* = .03, β = .36, *t* = 10.92, *p* < .001), T1 need frustration (*B* = -.12, *SE B* = .04, β = -.11, *t* = 2.88, *p* = .004), T1 need satisfaction (*B* = .04, *SE B* = .03, β = .04, *t* = 1.43, *p* = .153), gender (*B* = -.05, *SE B* = .02, β = -.06, *t* = 2.70, *p* = .007), and grade level (*B* = -.03, *SE B* = .02, β = -.03, *t* = 1.45, *p* = .147) and (b) T3 acceptance of cheating (*B* = .12, *SE B* = .03, β = .11, *t* = 3.54, *p* < .001), as did the cross-over decrease in need satisfaction (*B* = -.08, *SE B* = .03, β = -.08, *t* = 2.83, *p* = .005), even after controlling for T1 acceptance of cheating (*B* = .16, *SE B* = .03, β = .16, *t* = 6.16, *p* < .001), T2 acceptance of cheating (*B* = .41, *SE B* = .03, β = .41, *t* = 15.27, *p* < .001), T1 need frustration (*B* = -.01, *SE B* = .03, β = -.01, *t* = 0.40, *p* = .689), T1 need satisfaction (*B* = .04, *SE B* = .03, β = .04, *t* = 1.39, *p* = .165), gender (*B* = -.05, *SE B* = .02, β = -.06, *t* = 2.80, *p* = .005), and grade level (*B*

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= -.02, *SE B* = .02, β = -.02, *t* = 0.97, *p* = .332). Overall, against expectation, the B_a B_b estimate of the T2 need frustration mediated effect on ASIP → T3 antisocial behavior (*B* = .007, *SE* = .009, *t* = 0.73, *p* = .465) and the B_a B_b estimate of the T2 need frustration mediated effect on ASIP → T3 acceptance of cheating (*B* = .005, *SE* = .007, *t* = 0.66, *p* = .511) were both non-significant, which failed to confirm multilevel mediation.

None of the three early-semester supplemental paths were individually significant. T1 need satisfaction did not longitudinally increase T2 prosocial behavior (*B* = .05, *SE B* = .02, β = .05, *t* = 1.93, *p* = .054, after controlling for T1 prosocial behavior (*B* = .61, *SE B* = .03, β = .60, *t* = 20.82, *p* < .001), gender (*B* = .01, *SE B* = .02, β = .01, *t* = 0.39, *p* = .700), and grade level (*B* = .05, *SE B* = .02, β = .05, *t* = 2.46, *p* = .014). Similarly, T1 need frustration did longitudinally increase either (a) T2 antisocial behavior (*B* = .00, *SE B* = .04, β = .00, *t* = 0.01, *p* = .992), after controlling for T1 antisocial behavior (*B* = .43, *SE B* = .03, β = .42, *t* = 12.79, *p* < .001), gender (*B* = -.14, *SE B* = .02, β = -.15, *t* = 6.83, *p* < .001), and grade level (*B* = .00, *SE B* = .02, β = .00, *t* = 0.06, *p* = .952), or (b) T2 acceptance of cheating (*B* = .05, *SE B* = .03, β = .04, *t* = 1.59, *p* = .112), after controlling for T1 acceptance of cheating (*B* = .49, *SE B* = .03, β = .49, *t* = 19.63, *p* < .001), gender (*B* = -.05, *SE B* = .02, β = -.05, *t* = 2.38, *p* = .017), and grade level (*B* = .04, *SE B* = .02, β = .05, *t* = 2.26, *p* = .024).

Three (of the six) reciprocal paths were individually significant. The analyses above showed the early-semester significant effects of T1 prosocial behavior → T2 need satisfaction (β = .10, *p* < .001) and T1 antisocial behavior → T2 need frustration (β = .14, *p* < .001) and the non-significant effect of T1 acceptance of cheating → T2 need frustration (β = .03, *p* = .342). Here we report the three late-semester reciprocal effects. Increases in T2 prosocial behavior did not longitudinally increase students' own T3 need satisfaction (*B* = .06, *SE B* = .03, β = .06, *t* = 1.75, *p* = .080), at least not after controlling for T1 need satisfaction (*B* = .07, *SE B* = .03, β = .08, *t* = 2.80, *p* = .005), T2 need satisfaction (*B* = .57, *SE B* = .03, β

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= .57, t = 18.65, p < .001), T1 prosocial behavior (B = .03, $SE\ B$ = .03, β = .03, t = 1.05, p = .293), gender (B = .00, $SE\ B$ = .02, β = .00, t = 0.20, p = .841), and grade level (B = .00, $SE\ B$ = .02, β = -.01, t = 0.26, p = .795). Increases in T2 antisocial behavior did longitudinally increase students' own T3 need frustration (B = .12, $SE\ B$ = .04, β = .12, t = 2.87, p = .004), while increases in T2 acceptance of cheating did not (B = .00, $SE\ B$ = .03, β = .00, t = 0.06, p = .952), after controlling for T1 need frustration (B = .13, $SE\ B$ = .04, β = .12, t = 3.48, p < .001), T2 need frustration (B = .45, $SE\ B$ = .04, β = .42, t = 11.83, p < .001), T1 antisocial behavior (B = -.04, $SE\ B$ = .04, β = -.04, t = 0.89, p = .374), T1 acceptance of cheating (B = .03, $SE\ B$ = .03, β = .03, t = 0.95, p = .342), gender (B = -.01, $SE\ B$ = .02, β = -.01, t = 0.32, p = .749), and grade level (B = -.02, $SE\ B$ = .02, β = -.02, t = 1.03, p = .303).

Discussion

We designed and carried out the present investigation to help PE teachers address the very practical problem of enhancing their students' prosocial behavior and diminishing their students' antisocial behavior. We adopted a needs-based motivationally- and relationship-supportive approach to explain the conditions under which students' prosocial and antisocial behaviors increased and decreased over time. We first replicated previous investigations showing that a teacher-focused ASIP (intervention) could increase autonomy-supportive teaching and decrease controlling teaching. Given that starting point, we tested whether such intervention-enabled changes in teachers' motivating styles could help teachers (a) facilitate students' psychological need satisfaction and hence promote their prosocial behavior and (b) alleviate students' psychological need frustration and hence diminish their antisocial behavior.

Increasing Students' Prosocial Behavior

When PE teachers participated in the ASIP, their students showed an increase in prosocial behavior. This ASIP-induced boost in prosocial behavior can be seen in both the teacher ratings and in students' own self-reports (see Fig.4). When teachers learned how to be

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more autonomy-supportive, their students showed greater in-class need satisfaction and lesser in-class need frustration. Both of these ASIP-enabled changes in students' need status were important as increased need satisfaction and decreased need frustration both predicted changes in students' end-of-semester prosocial behavior. And, the mediation analysis confirmed the basic ASIP → increased need satisfaction → increased prosocial behavior relations, which puts a clear spotlight on the predictive and explanatory effects of students' need status on their subsequent prosocial behavior.

Students who have their needs for autonomy, competence, and relatedness satisfied by the people and activities around them are well positioned to engage themselves prosocially. Psychological need satisfaction energizes people toward growth, positive emotions, intrinsic motivation, and well-being (while psychological need frustration pushes people toward defensiveness, negative emotions, amotivation, and ill-being). Need satisfaction also increases people's beneficence (feeling that they want to help others) and actual helping (Martela & Ryan, 2015). Given these known relations, our primary focus was on creating the conditions under which need satisfaction might increase while need frustration might decrease, and teachers' intervention-enabled gains in autonomy-supportive teaching and teachers' naturally-occurring tendency toward autonomy-supportive teaching were significant antecedents to both of these desired effects (i.e., gains in need satisfaction, declines in need frustration). In addition, students' own naturally-occurring (T1) prosocial behavior was another significant antecedent to gains in need satisfaction. The overall findings regarding the educational goal of increasing students' prosocial behavior is therefore quite clear—namely, help teachers support students' autonomy during instruction.

Decreasing Students' Antisocial Behavior and Acceptance of Cheating

Just as it was the case that manipulated gains in autonomy support, teachers' natural tendencies toward autonomy support, and students' own prosocial behavior explained

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students' increased need satisfaction and prosocial behavior, the parallel was true when explaining students' antisocial behavior and acceptance of cheating. That is, manipulated declines in teacher control, teachers' natural tendencies to not be controlling, and students' own lack of antisocial behavior explained students' decreased need frustration, antisocial behavior, and acceptance of cheating. While this pattern was generally true, it was also the case that the dark side effects were not as cohesive and linear as were the bright side effects.

ASIP-enabled decreases in T2 need frustration did clearly predict longitudinal decreases in T3 antisocial behavior and T3 acceptance of cheating, as can be seen in the teacher ratings and students' self-reports. But changes in T2 need frustration did not emerge as an explanatory mediating variable, and students' own T1 and T2 antisocial behavior seemed to be just as important and as predictive as were teachers' manipulated and measured motivating styles. This suggest that controlling teaching, especially when intense (e.g., yelling, intimidating, shaming), may do more than just suppress and frustrate students' psychological needs. When teachers do not allow students to voice opinions that differ from those expressed by the teacher, when teachers constantly dole out unexplained directives, and when teachers regularly counter and denigrate students' thinking, feeling and behaving, it is possible that another key psychological process not assessed in the present study may also occur—namely, intense negative emotions such as anger, resentment, anxiety, and shame (Assor, Kaplan, Kanat-Maymon, & Roth, 2005). That is, negative emotions may be just as potent a catalyst to students' antisocial behavior as is need frustration, though this alternative model of predicting and explaining increases and decreases in students' classroom antisocial attitudes and behavior will require future empirical work to resolve.

Implications, Limitations, and Future Research

These findings are important to understanding why students are (and are not) prosocial and antisocial in the classroom, but they are further important with respect to the

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breadth of student benefits that accrue from teacher participation in ASIPs. Past interventions have shown that teacher participation in ASIP facilitates students' personal benefits, including gains in motivation (intrinsic motivation, need satisfaction, autonomous motivation, lesser amotivation), engagement (effort, agency, lesser dropout), development (self-worth, preference for optimal challenge), learning (conceptual understanding, deep processing), performance (task performance, grades), and well-being (vitality, school satisfaction, lesser cortisol) (Chatzisarantis & Hagger, 2009; Cheon & Reeve, 2015; Cheon et al., 2016; Tessier et al., 2010). However, this was the first study to investigate possible ASIP-enabled gains in social-relationship benefits, including students' capacity to engage in more adaptive, prosocial, and high-quality interactions and relationships. These findings therefore extend previously-shown ASIP-enabled student benefits beyond personal gains (e.g., engagement, learning) to further include interpersonal adjustment gains.

We note two limitations to the present research. First, we focused our experimental manipulation and data collection efforts only on the role of the teacher-student relationship. We did not include a similar focus on the peer climate, though the potential importance of peers' controlling interpersonal behaviors on students' need states has been suggested by correlational research (Hodge & Gucciardi, 2015, Study 2). So, we recommend that future investigations on students' prosocial and antisocial behaviors assess both teacher-provided and peer-provided autonomy support and interpersonal control. Second, the outcome measures in the present study were general categories of prosocial behavior and antisocial attitudes and behaviors (i.e., encourage and help, verbally abuse and hurt). Some researchers might be additionally interested in more specific prosocial or antisocial classroom behaviors. For instance, it would be interesting if future research investigated a similar needs-supportive approach to predicting and understanding bullying.

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Footnotes

1. Figure 1 also includes 10 thin horizontal lines to represent stability effects of each measured variable on itself at a later time (e.g., T1 Prosocial behavior → T2 Prosocial behavior; and T2 Prosocial behavior → T3 Prosocial Behavior). These stability effect paths represent statistical controls, rather than hypothesized paths. Lastly, though not shown in Figure 1 (for purposes of clarity), we included a series of 5 statistical controls from each T1 to each T3 measure (i.e., T1 need satisfaction → T3 need satisfaction) so that the T3 outcomes could be interpreted as late-semester *changes* in each outcome.

2. In the 7 multilevel modeling analyses, we report only the results for the hypothesized test, which was the condition *x* time interaction effect. In all 7 analyses [need satisfaction, need frustration, prosocial behavior (teacher rating, student-reported), antisocial behavior (teacher rating, student-reported), and acceptance of cheating], the 7 unreported condition main effects were all non-significant, the 7 time main effects were all statistically significant ($p < .001$), and the 7 random effects test for meaningful classroom-level variance were all statistically significant ($p < .001$).

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References

Assor, A., Kaplan, H., Kanat-Maymon, Y., & Roth, G. (2005). Directly controlling teachers' behaviors as predictors of poor motivation and engagement in girls and boys: The role of anger and anxiety. *Learning and Instruction, 15*, 397-413.

Bartholomew, K. J., Ntoumanis, N., Ryan, R., Bosch, J. A., & Thøgersen-Ntoumani, C. (2011a). Self-determination theory and diminished functioning: The role of interpersonal control and psychological need thwarting. *Personality and Social Psychology, 37,* 1459-1473.

Bartholomew, K. J., Ntoumanis, N., Ryan, R. M., & Thøgersen-Ntoumanis, C. (2011b). Psychological need thwarting in the sport context: assessing the darker side of athletic experience. *Journal of Sport & Exercise Psychology, 33*, 75-102.

Brislin, R. (1980). Translation and content analysis of oral and written material. In H. C. Triandis & J. W. Berry (Eds.), *Handbook of cross-cultural psychology* (Vol. 2, pp. 389-444). Boston: Allyn & Bacon.

Chatzisarantis, N. L., & Hagger, M. S. (2009). Effects of an intervention based on self-determination theory on self-reported leisure-time physical activity participation. *Psychology and Health, 24,* 29-48.

Cheon, S. H., Hwang, S. H., Lee, C., Kim, S. J., Lee, J. W., & Song, Y. G. (2016). Development and validation of the Korean version of prosocial and antisocial behavior in sport scale. *The Korean Journal of Measurement & Evaluation in Physical Education and Sport Science, 18,* 51-62.

Cheon, S. H., & Jang, H. (2012). Development and validation of student amotivation scale in high school physical education. *The Korean Journal of Physical Education, 51*, 473–485.

Cheon, S. H., & Reeve, J. (2013). Do the benefits from autonomy-supportive PE teacher

,

training programs endure?: a one-year follow-up investigation. *Psychology of Sport & Exercise, 14,* 508-518.

Cheon, S. H., & Reeve, J. (2015). A classroom-based intervention to help teachers decrease students' amotivation. *Contemporary Educational Psychology, 40,* 99-111.

Cheon, S. H., Reeve, J., & Moon, I. S. (2012). Experimentally-based, longitudinally designed, teacher-focused intervention to help physical education teachers be more autonomy supportive toward their students. *Journal of Sport & Exercise Psychology, 34,* 365-396.

Cheon, S. H., Reeve, J., & Song, Y.-G. (2016). A teacher-focused intervention to decrease PE students' amotivation by increasing need satisfaction and decreasing need frustration. *Journal of Sport and Exercise Psychology, 38,* 217-235.

Cheon, S. H., Reeve, J., Yu, T. H., & Jang, H. R. (2014). The teacher benefits from giving autonomy support during physical education instruction. *Journal of Sport and Exercise Psychology, 36,* 331-346.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Mahwah, NJ: Erlbaum.

Coyne, S. M., Nelson, D. A., & Underwood, M. (2011). Aggression in children. In P. K. Smith & C. H. Hart (Eds.), *Childhood social development* (2nd ed., Chpt. 26, pp. 491-509). Hoboken, NJ: Wiley.

Deci, E. L., Ryan, R. M., Gagné, M., Leone, D. R., Usunov, J., & Kornazheva, B. P. (2001). Need satisfaction, motivation, and well-being in the work organizations of a former Eastern Bloc country. *Personality and Social Psychology Bulletin, 27,* 930-942.

Delrue, J., Vansteenkiste, M., Mouratidis, A., Gevaert, K., Vande Broek, G., & Haerens, L. (2017). A game-to-game investigation of the relation between need-supportive and need-thwartive coaching and moral behavior in soccer.

,

Psychology of Sport and Exercise, 31, 1-10.

Fabes R. A., Fultz, J., Eisenberg, N., May-Plumlee, T., & Christopher, F. S. (1989). Effects of rewards on children's prosocial motivation: A socialization study. *Developmental Psychology, 25*, 509-515.

Feinglod, A. (2009). Effect sizes for growth-modeling analysis for controlled clinical trials in the same metric as for classical analysis. *Psychological Methods, 14*, 43-53.

Gagné, M. (2003). The role of autonomy support and autonomy orientation in prosocial behavior engagement. *Motivation and Emotion, 27*, 199-223.

Grusec, J. E., Hastings, P., & Almas, A. (2011). Prosocial behavior. In P. K. Smith & C. H. Hart (Eds.), *Childhood social development* (2nd ed., Chpt. 29, pp. 491-509). Hoboken, NJ: Wiley.

Gunnell, K., Crocker, P. R. E., Wilson, P. M., Mack, D. E., & Zumbo, B. D. (2013). Psychological need satisfaction and thwarting: A test of basic psychological needs theory in physical activity contexts. *Psychology of Sport and Exercise, 14*, 599-607.

Haerens, L., Aelterman, N., Vansteenkiste, M., Soenens, B., & Van Petegem, S. (2015). Do perceived autonomy-supportive and controlling teaching relate to physical education students' motivational experiences through unique pathways? Distinguishing between the bright and dark side of motivation. *Psychology of Sport and Exercise, 16*, 26-36.

Hein, V., Koka, A., & Hagger, M. S. (2015). Relationships between perceived teachers' Controlling behavior, psychological need thwarting, anger, and bullying behavior in high-school students. *Journal of Adolescence, 42*, 103-114.

Hodge, K., & Gucciardi, D. F. (2015). Antisocial and prosocial behavior in sport: the role of motivational climate, basic psychological needs, and moral disengagement. *Journal of Sport & Exercise Psychology, 37*, 257-273.

,

Hodge, K., & Lonsdale, C. (2011). Prosocial and antisocial behavior in sport: the role of coaching style, autonomous vs. controlled motivation, and moral disengagement. *Journal of Sport & Exercise Psychology, 33,* 527-547.

Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling, 6,* 1-55.

Jang, H., Kim, E. J., & Reeve, J. (2012). Longitudinal test of self-determination theory's motivation mediation model in a naturally-occurring classroom context. *Journal of Educational Psychology, 104,* 1175-1188.

Jang, H., Kim, E.-J., & Reeve, J. (2016). Why students become more engaged or more disengaged during the semester: A self-determination theory dual-process model. *Learning and Instruction, 43,* 27-38.

Jang, H., Reeve, J., Ryan, R. M., & Kim. A. (2009). Can self-determination theory explain what underlies the productive, satisfying learning experiences of collectivistically-oriented South Korean adolescents? *Journal of Educational Psychology, 101,* 644-661.

Joreskog, K. G., & Sorbom, D. (2006). *LISREL 8.80 for Windows* [Computer software]. Lincolnwood, IL: Scientific Software International.

Kavussanu, M., & Boardley, I. (2009). The prosocial and antisocial behavior in sport scale. *Journal of Sport & Exercise Psychology, 31,* 97-117.

Kavussanu, M., Stanger, N., &Boardley, I. (2013). The prosocial and antisocial behaviors in sport scale: further evidence for construct validity and reliability. *Journal of Sports Sciences, 31,* 1208-1221.

Kline, R. B. (2011). *Principles and practice of structural equation modeling* (3rd ed.). New York: Guilford Press.

Knee, C. R., Patrick, H., Vietor, N. A., Nanayakkara, A., & Neighbors, C. (2002). Self-determination as growth motivation in romantic relationships.

Personality and Social Psychology Bulletin, *28*, 609-619.

Krull, J. L., & MacKinnon, D. P. (2001). Multilevel modeling of individual and group level mediated effects. *Multivariate Behavioral Research, 36*, 249–277.

Kunda, Z., & Schwartz, S. H. (1983). Undermining intrinsic moral motivation: External reward and self-presentation. *Journal of Personality and Social Psychology, 45*, 763-771.

Ladd, G. W., Herald-Brown, S. L., & Kochel, K. P. (2009). Peers and motivation. In K. R. Wentzel & A. Wigfield (Eds.), *Handbook on motivation at school* (Chpt. 16, pp. 323-348). Hillsdale, N.J.: Erlbaum.

Lee, M. J., Whitehead, J., & Ntoumanis, N. (2007). Development of the Attitudes to Moral Decision-making in Youth Sport Questionnaire (AMDYSQ). *Psychology of Sport and Exercise, 8*, 369-392.

Mallinson, S. H., & Hill, A. P. (2011). The relationship between multidimensional perfectionism and psychological need thwarting in junior sports participants. *Psychology of Sport & Exercise, 12*, 676-684.

Martela, F., & Ryan, R. M. (2015). The benefits of benevolence: Basic psychological needs, beneficence, and the enhancement of well-being. *Journal of Personality, 84*, 750-764.

McAuley, E., Duncan, T., & Tammen, V. V. (1989). Psychometric properties of the intrinsic motivation inventory in a competitive sport setting: A confirmatory factor analysis. *Research Quarterly for Exercise and Sport, 60,* 48-58.

Metzler, C. W., Biglan, A., Rusby, J. C., & Sprague, J. R. (2001). Evaluation of a comprehensive behavior management program to improve school-wide positive behavior support. *Education and Treatment of Children, 24*, 448–479.

Ng, J. Y. Y., Lonsdale, C., & Hodge, K. (2011). The basic needs satisfaction in sport scale

,

(BNSSS): Instrument development and initial validity evidence. *Psychology of Sport & Exercise, 12,* 257-264.

Ntoumanis, N., & Standage, M. (2009). Morality in sport: a self-determination theory perspective. *Journal of Applied Sport Psychology, 21,* 365-380.

Ntoumanis, N., Taylor, I. M., & Thøgersen-Ntoumani, C. (2012). A longitudinal examination of coach and peer motivational climates in youth sport: Implications for moral attitudes, well-being, and behavioral investment. *Developmental Psychology, 48,* 213-223.

Pavey, P., Greitemeyer, T., & Sparks, P. (2011). Highlighting relatedness promotes prosocial motives and behavior. *Personality and Social Psychology Bulletin, 37,* 905–917.

Reeve, J. (2009). Why teachers adopt a controlling motivating style toward students and how they can become more autonomy supportive. *Educational Psychologist, 44,* 159-178.

Reeve, J. (2015). Autonomy-supportive teaching: What it is, how to do it. In J. C. K. Wang, W. C. Liu, and R. M. Ryan's (Eds.), *Motivation in educational research: Translating theory into classroom practice* (Chpt 5). New York: Springer.

Reeve, J., & Lee, W. (2014). Students' classroom engagement produces longitudinal changes in classroom motivation. *Journal of Educational Psychology, 106,* 527-540.

Roth, G., Kanat-Maymon, Y., & Bibi, U. (2010). Prevention of school bullying: The important role of autonomy-supportive teaching and internalization of pro-social values. *British Journal of Educational Psychology, 81,* 654-666.

Ryan, R. M., & Connell, J. P. (1989). Perceived locus of causality and internalization: Examining reasons for acting in two domains. *Journal of Personality and Social*

Psychology, 57, 749-761.

Ryan, R. M., & Deci, E. L. (2017). *Self-determination theory: Basic psychological needs in motivation, development, and wellness*. New York: Guilford Press.

Rutten, E., Schuengel, C., Dirks, E., Stames, G., Biesta, G., & Hoeksma, J. (2011). Predictors of antisocial and prosocial behavior in an adolescent sports context. *Social Development, 20,* 294-315.

Sobus, M. S. (1995). Mandating community service: Psychological implications of requiring prosocial behavior. *Law and Psychology Review, 19,* 153–182.

Solomon, D., Watson, M. S., Delucchi, K. L., Schaps, E., & Battistich, V. (1988). Enhancing children's prosocial behavior in the classroom. *American Educational Research Journal, 25*(4), 527–554.

Standage, M., Duda, J. L., & Ntoumanis, N. (2006). Students' motivational processes and their relationship to teacher ratings in school physical education: A self-determination theory approach. *Research Quarterly for Exercise and Sport, 77,* 100-110.

Stukas, A. A., Snyder, M.,& Clary, E.G. (1999). The effects of "mandatory volunteerism" on intentions to volunteer. *Psychological Science, 10,* 59–64.

Taylor, I., Ntoumanis, N., Standage, M., & Spray, C. M. (2010). Motivational predictors of physical education students' effort, exercise intentions, and leisure-time physical activity: A multilevel linear growth analysis. *Journal of Sport and Exercise Psychology, 32,* 99-120.

Tessier, D., Sarrazin, P., & Ntoumanis, N. (2010). The effect of an intervention to improve newly qualified teachers' interpersonal style, students' motivation and psychological need satisfaction in sport-based physical education. *Contemporary Educational*

Psychology, 35, 242-253.

Wentzel, K. R. (2003). School adjustment. In W. M. Reynolds & G. E. Miller (Eds.), *Handbook of Psychology: Educational Psychology* (Vol 7, Chpt. 11, pp. 235-258). Hoboken, NJ: Wiley.

Wentzel, K. R. (2004). Understanding classroom competence: The role of social-motivational and self-processes. *Advances in Child Development and Behaviour, 32*, 213-241.

Wentzel, K. R., Filisetti, L., & Looney, L. (2007). Adolescent prosocial behavior: The role of self-processes and contextual cues. *Child Development, 78*, 895-910.

Williams, G. C., & Deci, E. L. (1996). Internalization of biopsychosocial values by medical students: A test of self-determination theory. *Journal of Personality and Social Psychology, 70,* 767-779.

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Table 1

Descriptive Statistics, Unstandardized, and Standardized Factor Loadings Associated with the Student-Based Dependent Measures in the Measurement Model

	Time 1					Time 2					Time 3				
Dependent Measure	*M*	(*SD*)	*B*	SE	*β*	*M*	(*SD*)	*B*	SE	*β*	*M*	(*SD*)	*B*	SE	β
Perceived Autonomy Support Indicators															
1. Parcel 1	4.74	(0.98)	1.00	-	.93										
2. Parcel 2	4.82	(1.02)	.98	.02	.91										
Perceived Teacher Control Indicators															
1. Parcel 1	2.52	(1.17)	1.00	-	.92										
2. Parcel 2	2.91	(1.21)	.88	.02	.81										
Need Satisfaction Indicators															
1. Autonomy	4.78	(1.01)	1.00	-	.91	5.22	(1.05)	1.00	-	.91	5.17	(1.13)	1.00	-	.92
2. Competence	4.05	(1.30)	.77	.02	.73	4.48	(1.30)	.79	.02	.74	4.56	(1.31)	.85	.02	.79
3. Relatedness	4.77	(1.09)	.69	.02	.63	5.09	(1.18)	.80	.02	.74	5.07	(1.23)	.83	.02	.77
Need Frustration Indicators															
1. Autonomy	3.17	(1.00)	.75	.03	.60	2.94	(1.02)	.77	.02	.67	2.91	(1.04)	.76	.02	.68
2. Competence	2.53	(1.12)	.90	.03	.81	2.37	(1.16)	.95	.02	.82	2.39	(1.17)	.95	.02	.84
3. Relatedness	1.94	(0.95)	1.00	-	.82	1.90	(1.00)	1.00	-	.85	2.01	(1.06)	1.00	-	.88
Prosocial Behavior Indicators															
1. Prosocial Encourage	4.81	(1.05)	.97	.03	.85	5.02	(1.15)	.96	.02	.86	4.95	(1.22)	.95	.02	.85
2. Prosocial Help	4.73	(1.07)	1.00	-	.88	5.01	(1.17)	1.00	-	.90	5.01	(1.22)	1.00	-	.90
Antisocial Behavior Indicators															
1. Antisocial Abuse	2.00	(0.89)	.94	.02	.84	1.96	(0.96)	.95	.02	.87	2.04	(1.01)	.97	.02	.88
2. Antisocial Hurt	1.97	(0.85)	1.00	-	.88	1.97	(0.95)	1.00	-	.91	2.09	(1.03)	1.00	-	.91

Acceptance of Cheating Indicators															
1. Item 1	2.15	(1.29)	.94	.02	.84	2.12	(1.33)	.91	.02	.83	2.18	(1.32)	.94	.02	.88
2. Item 2	2.08	(1.25)	1.00	-	.89	2.04	(1.27)	1.00	-	.92	2.12	(1.27)	1.00	-	.94
3. Item 3	2.54	(1.48)	.81	.02	.73	2.34	(1.44)	.88	.02	.81	2.38	(1.42)	.86	.02	.81

Possible range for each variable, 1—7. *Note*. All *B*s are statistically significant ($p < .001$). On the Acceptance of Cheating scale, item 1 is "It is OK to cheat if nobody knows."; item 2 is "I would cheat if I thought it would help me win."; and item 3 is "If other people are cheating, I think I can too."

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Table 2 *Intercorrelation Matrix among Experimental Condition and the 17 Dependent Measures Included in the Test of the Structural Model*

Variable	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.
1. Experimental Condition	-																	
Time 1																		
2. P. Autonomy Support	-.05	-																
3. P. Teacher Control	.00	-.45																
4. Need Satisfaction	-.01	.63	-.33	-														
3. Need Frustration	.08	-.41	.46	-.57	-													
4. Prosocial Behavior	-.06	.43	-.18	.55	-.38	-												
5. Antisocial Behavior	.12	-.33	.38	-.29	.66	-.41	-											
6. Acceptance of Cheating	.01	-.17	.18	-.26	.44	-.27	.65	-										
Time 2																		
7. Need Satisfaction	.25	.37	-.28	.55	-.37	.37	-.18	-.20	-									
8. Need Frustration	-.13	-.23	.27	-.32	.42	-.26	.37	.30	-.60	-								
9. Prosocial Behavior	.13	.29	-.15	.41	-.29	.66	-.30	-.24	.64	-.46	-							
10. Antisocial Behavior	-.13	-.16	.18	-.14	.29	-.23	.45	.35	-.36	.73	-.43	-						
11. Acceptance of Cheating	-.13	-.17	.19	-.18	.26	-.22	.35	.54	-.34	.54	-.35	.69	-					
Time 3																		
12. Need Satisfaction	.33	.31	-.17	.45	-.29	.33	-.13	-.16	.70	-.44	.50	-.25	-.29	-				
13. Need Frustration	-.28	-.17	.21	-.27	.31	-.22	.26	.23	-.53	.54	-.37	.47	.39	-.62	-			
14. Prosocial Behavior	.25	.24	-.11	.33	-.21	.54	-.19	-.15	.56	-.41	.70	-.34	-.30	.72	-.51	-		
15. Antisocial Behavior	-.27	-.15	.19	-.13	.22	-.22	.40	.30	-.38	.49	-.36	.60	.43	-.42	.79	-.48	-	
16. Acceptance of Cheating	-.21	-.14	.15	-.14	.20	-.17	.28	.42	-.34	.39	-.29	.47	.60	-.38	.59	-.35	.73	-

N = 1,824. *r*'s $\geq$ .05, $p < .05$; *r*'s $\geq$ .06, $p < .01$.

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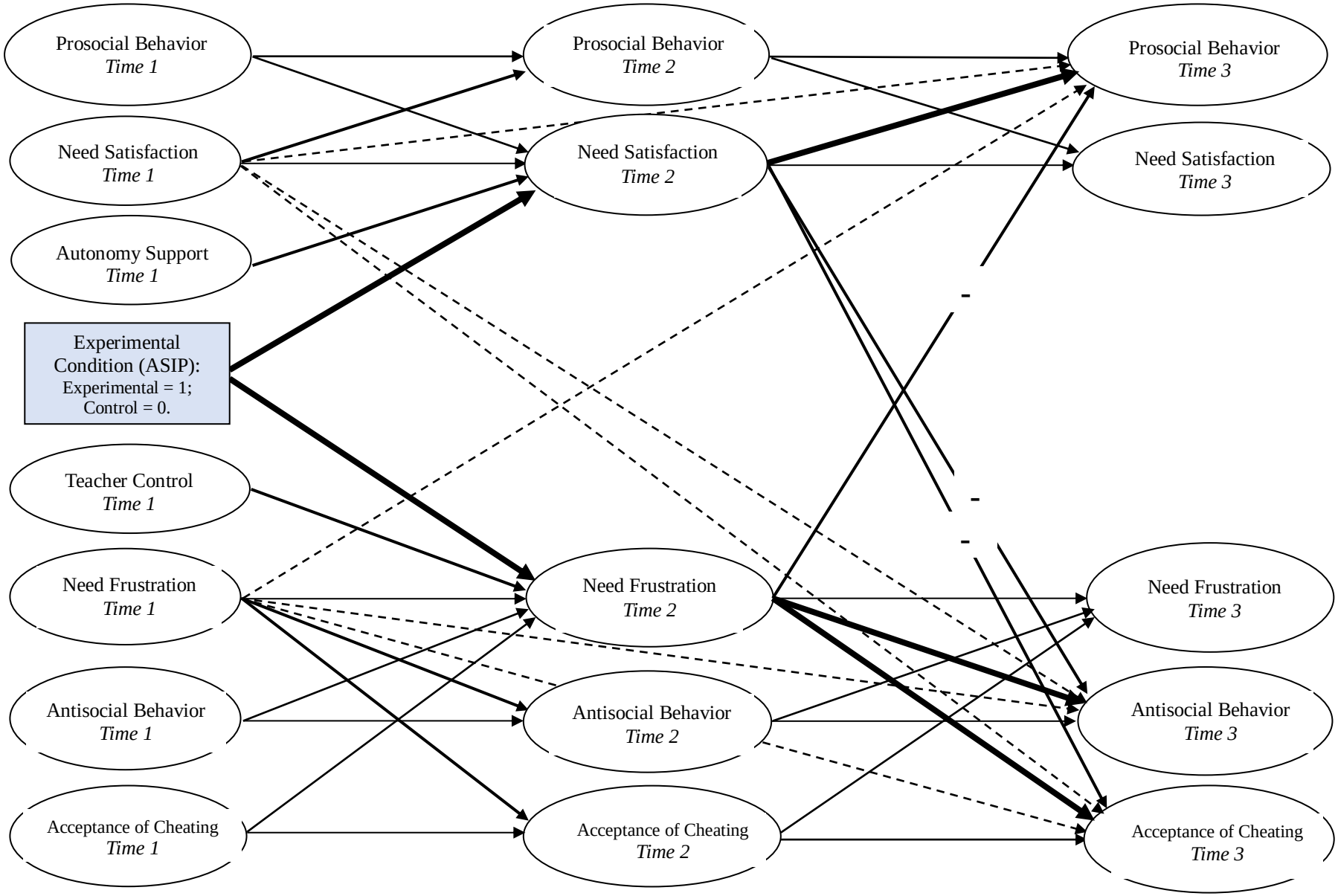

Figure 1. Hypothesized model in which bright side variables predict adaptive functioning while dark side variables predict maladaptive functioning. Solid lines represent hypothesized paths; dashed lines represent statistical controls.

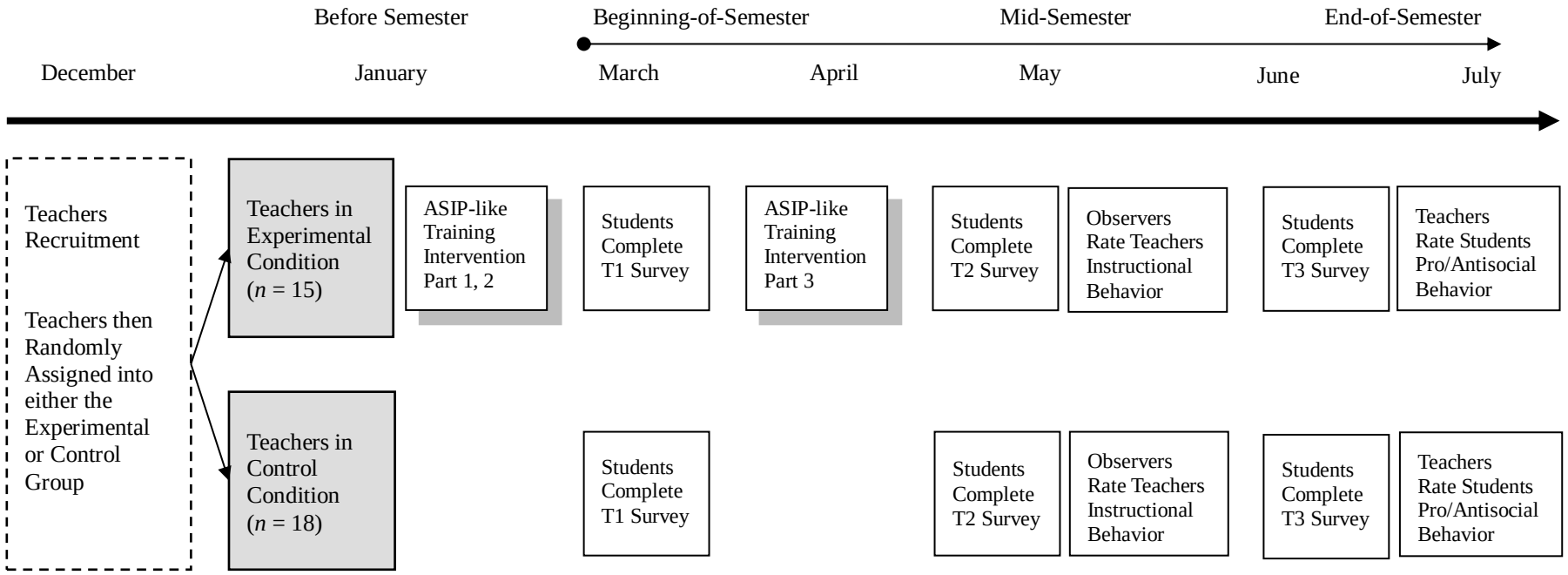

Figure 2. Procedural timeline for the 3-part autonomy-supportive teacher training program and the three waves of data collection.

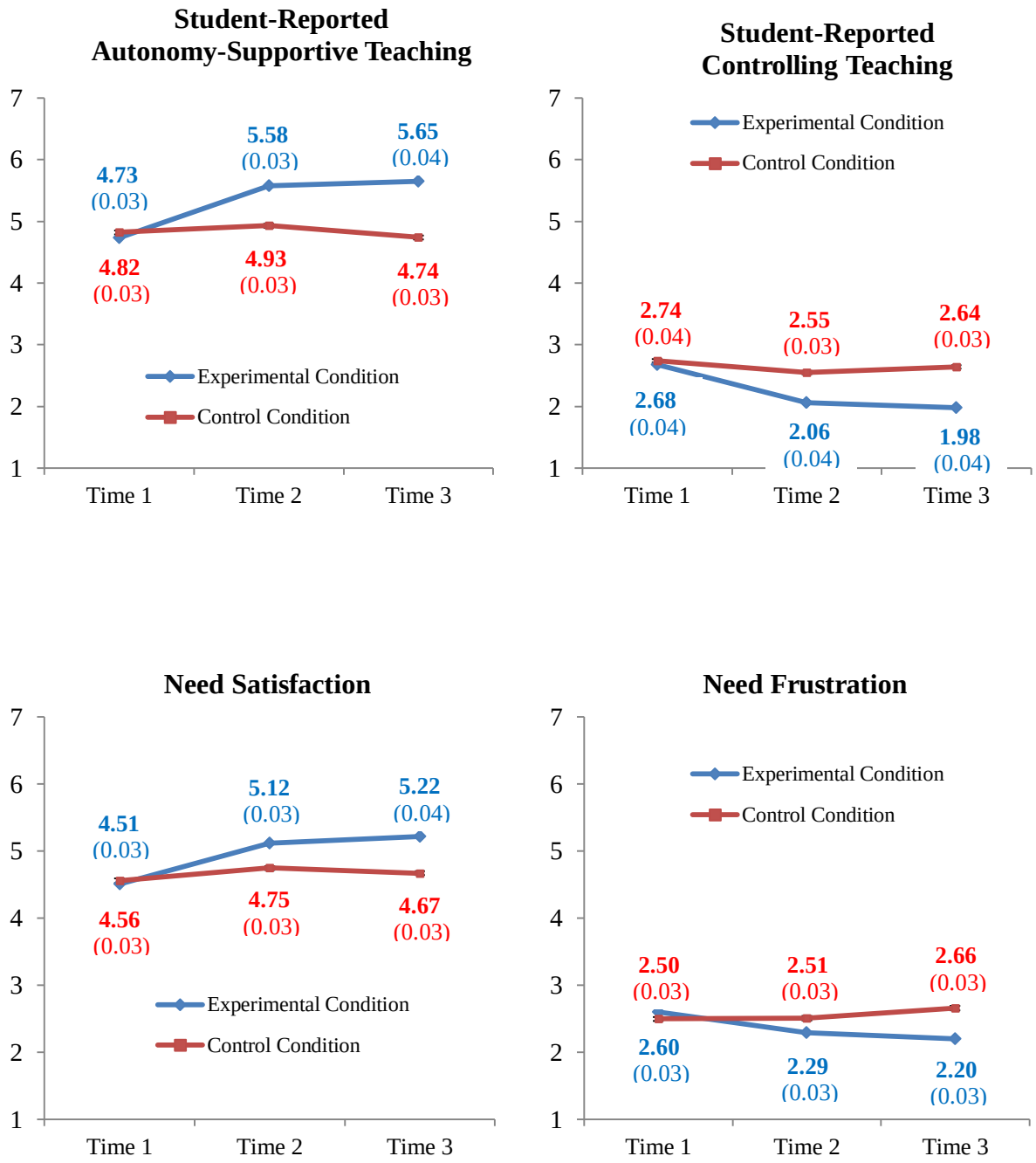

Figure 3. Means and standard errors for student-reported perceived autonomy-supportive teaching (upper left panel), perceived controlling teaching (upper right panel), need satisfaction (lower left panel), and need frustration (lower right panel) broken down by experimental condition and time of assessment.

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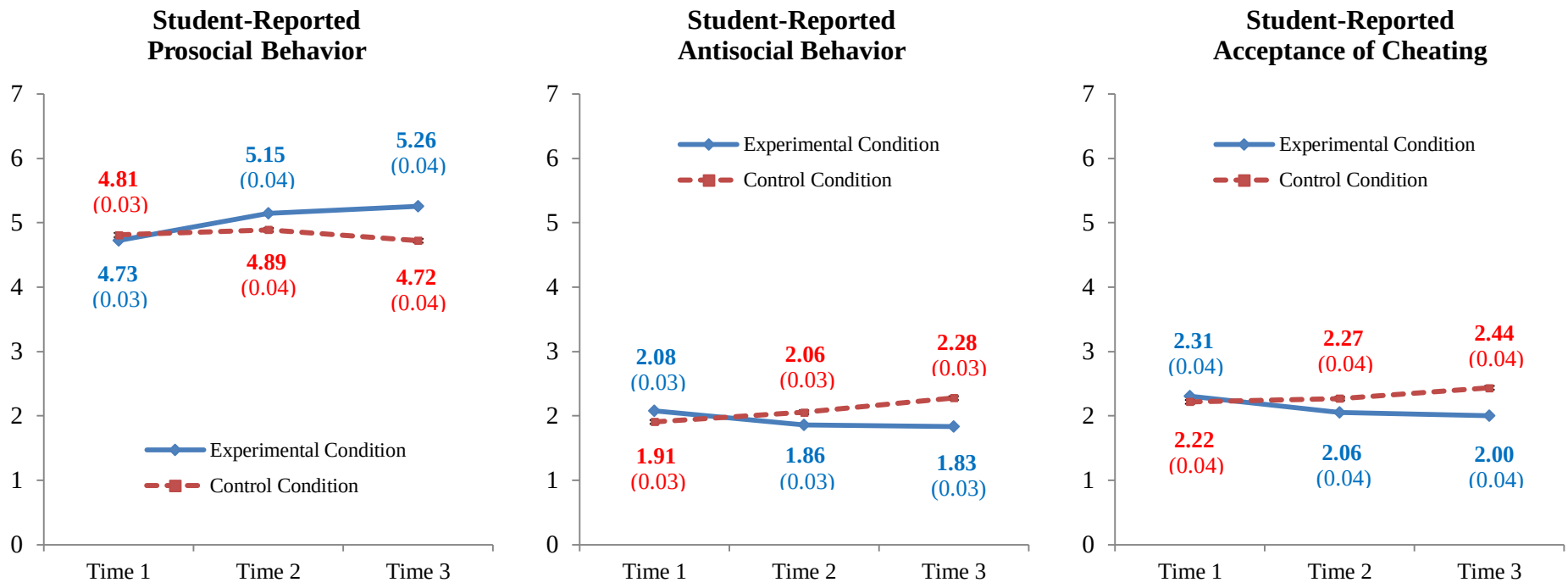

Figure 4. Means and standard errors for student-reported prosocial behavior (left panel), antisocial behavior (center panel), and acceptance of cheating (right panel) broken down by experimental condition and time of assessment.

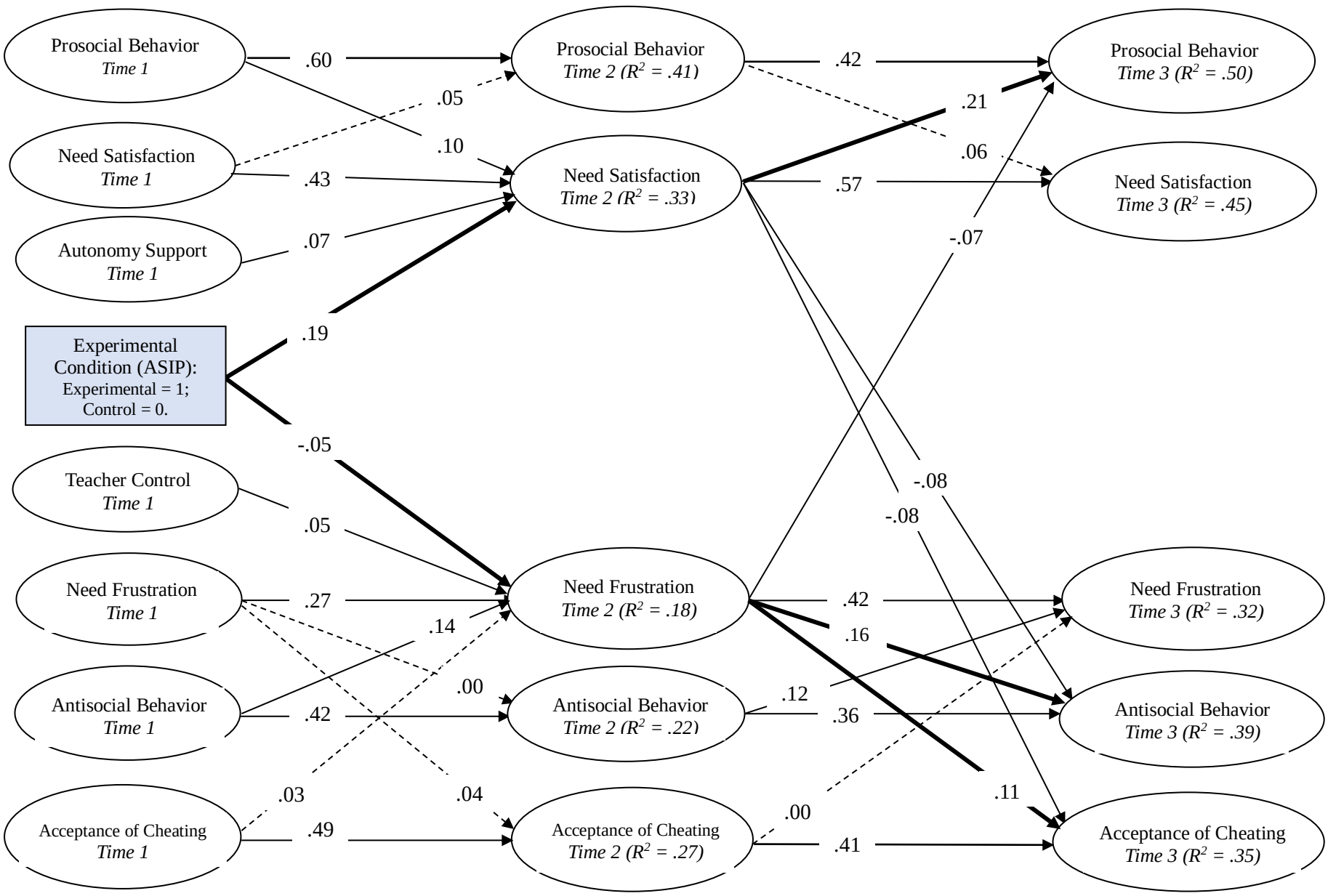

Figure 5. Hypothesized model in which bright side variables predict adaptive functioning while dark side variables predict maladaptive functioning. Solid lines represent hypothesized paths; dashed lines represent statistical controls.