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Dormant: an overlooked yet essential psychological need state

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Abstract
Self-determination theory's tripartite model of psychological need states posits that psychological needs can exist in three states—satisfied, dormant, or frustrated—and that these states have different origins and different influences on human functioning. In three studies, we sought to deepen our understanding of these three states, especially the overlooked dormant state. In Study 1, using a sample of 751 U.S. high school students, we refined the original Three States Questionnaire (TSQ) into the psychometrically stronger TSQ2, and we developed both full (TSQ2) and short (TSQ2s) forms. Structural equation modeling analyses revealed that the TSQ2's satisfied state predicted effective functioning, dormant predicted diminished functioning, and frustrated predicted defiant functioning and, further, that the much shorter TSQ2s retained 90% of the TSQ2's explanatory power, underscoring its practical utility. Study 2, a pre-registered investigation with 488 U.S. high school students, confirmed the TSQ2s's construct validity and predictive utility, as satisfied scores explained course-specific thriving while dormant scores explained dropout intention. In Study 3, also pre-registered, 602 Korean high school students completed the TSQ2s at multiple points during a 50-min class to explore reciprocal effects among the need states. A random intercept cross-lagged panel model (RI-CLPM) revealed that an early-class dormant experience significantly increased the likelihood of a later-class frustrated experience, highlighting the dynamic interplay between these states. Together, these studies highlight the importance of the dormant state and confirm the capacity of the tripartite model of psychological need states to explain students' effective, diminished, and defiant functioning.

Keywords Dormant · Dual-process · Frustrated · Satisfied · Psychological needs · RI-CLPM · Self-determination theory · Tripartite

Psychological needs lie at the heart of human motivation. According to Self-Determination Theory (SDT), the fulfilment of these needs—autonomy, competence, and relatedness—serves as the foundation for psychological growth, optimal functioning, and well-being (Ryan & Deci, 2017; Vansteenkiste et al., 2020). Environments that support these needs foster vitality, engagement, and resilience, whereas those that thwart them give rise to frustration, distress, and maladaptive functioning (Ryan & Deci, 2017; Vansteenkiste & Ryan, 2013). However, most research has focused on the dual processes of need satisfaction and need frustration, often overlooking a critical third state. Recognizing this neglected space invites a broader, tripartite model of motivation—one that captures experiences that are neither fully satisfying nor overtly frustrating. What happens, for example, when environments are neither supportive nor actively thwarting, but instead are indifferent or neglectful of individuals' psychological needs?

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Emerging research within SDT has begun to explore this middle ground through the concept of the dormant need state—a motivational condition characterized by energy depletion, emotional disengagement, and muted psychological activation (Bhavsar et al., 2020; Costa et al., 2015; Huyghebaert-Zouaghi et al., 2021, 2023; Ntoumanis, 2022). This state arises when individuals' basic psychological needs for autonomy, competence, and relatedness are neither actively supported nor overtly thwarted, but instead are neglected in passive or indifferent environments.

Unlike need satisfaction, which energizes volitional action, or need frustration, which evokes tension and resistance, the dormant state reflects a more subtle withdrawal—marked by apathy, boredom, diminished vitality, and motivational inertia (Huyghebaert-Zouaghi et al., 2021). It often emerges in contexts devoid of meaningful engagement—for example, when individuals are asked to complete monotonous or uninteresting tasks (Jang, 2008), or when instruction fails to acknowledge one's psychological needs (Bhavsar et al., 2019). In such cases, individuals frequently report a sense of psychological detachment or "failure to launch," reflecting a lack of volitional energy and emotional investment (Reeve et al., 2023).

Advancing the literature: key insights into the dormant state

The integration of the dormant state into the SDT framework as a distinct motivational phenomenon has garnered growing interest among researchers (Ntoumanis, 2022). By highlighting the often-overlooked consequences of need-neglecting activities, goals, jobs, and environments, emerging research has identified three key contributions of the dormant state: (1) its conceptual distinctiveness, (2) incremental predictive utility, and (3) potential to expand the SDT theoretical framework.

First, the dormant state is conceptually distinct from both satisfaction and frustration. Satisfaction reflects an energized state of fulfilment, typically experienced when psychological needs are being met. Frustration, in contrast, reflects a blocked or suppressed state in which efforts to meet one's needs are actively impeded. The dormant state, however, represents an energy-deflated condition characterized by psychological disengagement—where actions are neither supported nor thwarted but are simply disconnected from one's needs (Ntoumanis, 2022; Reeve et al., 2023). It is not merely a midpoint between satisfaction and frustration but a qualitatively distinct motivational experience.

Second, the dormant state demonstrates strong and incremental predictive power. Research has shown that it uniquely (independently) predicts outcomes such as disengagement, boredom, and dropout intentions (Cheon et al., 2019; Huyghebaert-Zouaghi et al., 2021, 2023). Importantly, it not only uniquely explains indices of diminished functioning, but it further explains additional (supplemental) variance in indices of adaptive and maladaptive functioning, even after accounting for the predictive effects of the satisfied and frustrated states.

Third, the inclusion of the dormant state extends SDT's dual-process model—originally consisting of satisfaction (the "bright path") and frustration (the "dark path")—by introducing a third, "dimly lit" pathway (Ntoumanis, 2022). This tripartite model of psychological need states captures how indifferent environments shape motivation, encompassing motivational experiences that are neither overtly supportive nor obstructive but are nonetheless consequential. By accounting for need-neglectful contexts, the expanded model provides a more comprehensive framework for understanding the full range of human motivation in real-world settings, offering greater explanatory power than the original dual-process perspective (Reeve et al., 2023).

Measurement and methodological challenges

To examine the dormant state, researchers have developed two key psychometric instruments: the Psychological Need States in Education Scale (PNSE-S) and the Three States Questionnaire (TSQ). The PNSE-S is a 35-item scale designed to measure the satisfaction, frustration, and dormancy (or "unfulfilled") of the three basic psychological needs—autonomy, competence, and relatedness—using a 3×3 matrix framework (Huyghebaert-Zouaghi et al., 2021, 2023). Similarly, the TSQ includes 39 items assessing the same three states across these needs (Reeve et al., 2023). While both instruments show strong psychometric properties, their length poses a practical limitation—particularly in studies requiring repeated measurement or longitudinal tracking—due to the undue time and effort burden placed on participants of assessing multiple items within a 3×3 framework.

A more pressing conceptual challenge concerns the high correlations often observed between the dormant and frustrated states. These high correlations raise questions about whether these constructs are empirically distinct. For example, correlations between the two states have been reported as high as $r = .66$ at the manifest level and $r = .73$ at the latent level (Reeve et al., 2023). These findings highlight the need for further validation efforts, particularly with regard to discriminant validity, which refers to "whether the two variables…are distinct from each other" (Hu & Lien, 2015, p. 1110).

To address this issue, it is essential to examine whether the dormant and frustrated states can be empirically distinguished. One recommended approach is the use of the "CI_{CFA} (sys)" statistic proposed by Rönkkö and Cho (2022), which evaluates whether the factor correlation between two constructs is sufficiently low to support discriminant validity. Applying such methods is particularly important for establishing whether the dormant and frustrated states reflect distinct psychological experiences, as theorized within the tripartite framework. In this context, the necessary steps to justify the inclusion of the dormant state requires evaluating not only construct and predictive validity but also discriminant validity.

Purpose, plan, and contribution of the present investigation

To address these challenges, the present study embarked on a series of three interconnected studies. The overarching goal was to undertake the research necessary to advance the understanding of the dormant state in terms of theory, measurement, and practical application.

The Three States Questionnaire (TSQ) was an early tool designed to assess the dormant state and evaluate its predictive capacity for key educational indicators, such as classroom disengagement. However, the need for scale refinement and improvement became evident, particularly in terms of its length and interscale intercorrelations. Study 1 sought to address these concerns by introducing both a slightly revised version (TSQ2) and a much-abbreviated short form (TSQ2s). For the short form, the goal was to reduce participant burden while maintaining predictive accuracy. We hypothesized that the TSQ2s, while only one-third the length of the full-scale TSQ2, would retain its ability to predict key indicators of adaptive, diminished, and defiant functioning.

Study 2 had two primary objectives: (1) establish the construct validity of the TSQ2 and (2) demonstrate its predictive capacity to account for students' experiences of personal growth and academic progress (i.e., effective functioning) and dropout intentions (i.e., diminished functioning) during a semester-long course. We used the widely respected Basic Psychological Need Satisfaction and Need Frustration Scale (BPNSFS; Chen et al., 2015) as a benchmark of the need states, correlating the TSQ2s satisfaction and frustration scales with the corresponding BPNSFS satisfaction and frustration scales (to test for construct validity). Additionally, to test for predictive validity, we sought to demonstrate that the TSQ2s satisfied scale could predict unique variance in students' experiences of personal growth and academic progress beyond the contributions of dormant and frustrated and that the TSQ2s dormant scale could predict unique variance in students' dropout intentions beyond the contributions of satisfied and frustrated.

Study 3 was designed to address the high correlation between the dormant and frustrated scales, a potential concern on both psychometric and theoretical grounds (Cheon et al., 2019; Bhavsar et al., 2020; Costa et al., 2015; Huyghebaert-Zouaghi et al., 2021, 2023; Reeve et al., 2023). If the two scales measure a single state (rather than two distinct states), it would challenge the tripartite model of psychological need states to instead reinforce the dual-process framework. We hypothesized that dormant and frustrated would be highly correlated for two reasons. First, we expected that the experience of one state would "spill over" into the other experience over time. That is, we expected that an initial dormant state would, over time, expand to also become a frustrating experience, because the person would be frustrated that the activity or social context was persistently indifferent to their needs. Similarly, we expected that an initial frustrated state would, over time, generate resentment and defiance such that the person might reject or avoid the activity or social context and thus create the need-neglecting conditions for the dormant state. Second, the dormant-frustrated factor correlation may be artificially inflated partly due to participants' difficulty in recognizing and reporting the dormant state. Experientially, it is challenging for participants to report the absence of an experience (i.e., dormant). If individuals struggle to recognize and label dormant, they may report frustration as a proxy. To test the hypotheses that (1) an initial dormant experience may expand to include a later frustrated experience and (2) an initial frustrated experience may transition over time into a dormant experience, we employed a short-term longitudinal design with a sophisticated statistical model—specifically, a random intercept cross-lagged panel model (RI-CLPM)—to investigate within-person reciprocal effects between the dormant and frustrated states during a one-hour class experience.

In sum, the present study set out to examine the satisfied, dormant, and frustrated states as distinct motivational conditions that may underlie adaptive, diminished, and defiant functioning within the SDT framework. Across three interconnected investigations, we explored the conceptual boundaries of the dormant state and evaluated measurement tools designed to capture it, addressing an important gap in the literature. By developing and validating the TSQ2 and TSQ2s, we sought to advance understanding of the dormant state both conceptually and methodologically. Together, these efforts provide a foundation for future research aimed at integrating the dormant state more fully into the SDT framework and further investigating its role in motivational dynamics.

Study 1

Study 1 aimed to accomplish two objectives: (1) develop the TSQ2, a theoretically grounded and psychometrically robust questionnaire, and (2) create a shorter, highly efficient version of the TSQ2—namely, the TSQ2s (the small "s" stands for "short form") to reduce participant burden while maintaining reliability and validity.

Development of the TSQ2

The TSQ2 retained the same 3-vignette format of the original TSQ, prompting participants to assess the current status of their needs for autonomy, competence, and relatedness. For the dormant state, psychometrically strong TSQ items such as "inactive" and "switched to 'off'" were retained, while the third item "unengaged" was replaced with "silent." We made this change to address the understandable concern that the TSQ's original "unengaged" item inadvertently conflated dormant with indicators of diminished functioning like disengagement.

To improve the frustrated state scale, revisions were made to better align items with the conceptual definition of need frustration—defined as the energy-blocking experience that arises when what one is currently doing (or is told to do) conflicts with one's desire for an experience of autonomy, competence, or relatedness (Reeve et al., 2023). The TSQ items were criticized for lacking direct references to energy-blocking frustrations and for potentially conflating a psychological state with a physical state. The three newly revised items—"frustrated," "upset," and "tense"—addressed these concerns. Notably, the inclusion of "frustrated" rectifies a key omission, and "tense" reflects the SDT tradition of using perceived tension as an indicator of need frustration (McAuley et al., 1987; Ryan et al., 1983). The satisfied state scale, which received minimal criticism, retained all three of its original items: "satisfied," "fully realized," and "deep satisfaction."

Development of the TSQ2s

The TSQ2s was designed to be an efficient and practical tool for assessing the three states. Based on pilot testing and conceptual definitions, we selected one representative item for each need state: "satisfied" for satisfaction, "frustrated" for frustration, and "inactive" for dormant. Despite their eponymous status in the name of both the TSQ and PNSE-S, the items "dormant" and "unfulfilled" were not selected due to their poor performance during both pilot testing and the earlier TSQ scale development process (Reeve et al., 2023), which we attribute to participants' unfamiliarity with their meaning (dormant) and capacity to report the absence of an experience (unfulfilled).

To evaluate the extent to which the TSQ2s retained the TSQ2's predictive power, we conducted a pair of structural equation modelling analyses. In the first, we used the three TSQ2 scales as predictors of six different indictors of students' functioning. In the second, we used the three TSQ2s scales as predictors of the same six indicators of students' functioning. For this comparative analysis, we compared the proportion of variance explained in each index of student functioning first by the TSQ2 and then by the TSQ2s. To evaluate whether the TSQ2s retained the TSQ2's predictive power, we adopted Sahdra et al. (2016) standard of retained predictive power by requiring that the Short Scale demonstrate a capacity to explain at least 80% of the variance explained by the Full Scale, while using only one-third of the items.

Method

Participants and Procedure

Using the online crowdsourcing service Qualtrics, we recruited a sample of 751 high school students in the USA who were finishing their course experience (during week 15 of an 18-week semester course) in one of a wide range of classes (e.g., math, English, history, science, foreign language; see Table 1). The left column in Table 1 shows the Study 1 sample's demographic characteristics. Students completed the questionnaire online using the Qualtrics commercial survey software program. The questionnaire began with a consent form. We assured student-participants that their responses would be confidential and used only for the purposes of the study. The second author's University Research Ethics Committee approved the research protocol.

Measures

Each measure used a 7-point bipolar response scale that ranged from 1 (Strongly disagree) to 7 (Strongly agree).

Three States Questionnaire 2 (TSQ2)

The TSQ2 adopted the same 3-vignette format as the TSQ. The first vignette asked students to report on the state of their relatedness need during that particular class; the second vignette asked students report on the state of their need for competence; and the third vignette asked students to report on the state of their need for autonomy. Following

Table 1 Demographic Characteristics of the Sample of Student-Participants in Studies 1, 2, and 3

Demographic Characteristic	Study 1 (N=751)	Study 2 (N=488)	Study 3 (N=602)
Gender			
Female	412 (54.9%)	254 (52.0%)	302 (50.2%)
Male	311 (41.4%)	228 (46.7%)	300 (49.8%)
Non-Binary	14 (1.9%)	6 (1.3%)	
I/They	8 (1.1%)		
Preferred not to Say	6 (0.8%)		
Grade Level			
10th grade	293 (39.0%)	76 (15.6%)	239 (39.7%)
11th grade	458 (61.0%)	85 (17.4%)	215 (35.7%)
12th grade		327 (67.0%)	148 (24.6%)
Average Age			
Years old	17.1	17.7	16.5
Nationality	USA	USA	Korea
Ethnicity			
Asian/Asian American	42 (5.6%)	12 (2.5%)	602 (100%)
Caucasian (White)	427 (56.9%)	291 (59.6%)	-
Black/African American	148 (19.7%)	136 (27.9%)	-
Hispanic	98 (13.0%)	36 (7.4%)	-
American Indian (Indigenous American)	14 (1.9%)	5 (1.0%)	-
Multi Racial	14 (1.9%)	7 (1.4%)	-
Other	8 (1.1%)	1 (0.2%)	-
Course			
Math	227 (30.2%)		139 (23.1%)
English	110 (14.6%)		103 (17.1%)
Science	108 (14.4%)		178 (29.6%)
History	93 (12.4%)		51 (8.5%)
Foreign Language	37 (4.9%)		49 (8.1%)
PE	31 (4.1%)		
Vocational Education	25 (3.3%)	488 (100%)	
Art	18 (2.4%)		
Other	102 (13.6%)		82 (13.6%)

each vignette, the same 9 items were listed (in order): satisfied; inactive (not active); frustrated; fully realized; silent; upset; deep satisfaction; switched to "off"; and tense. Pilot testing further tested (but eventually excluded) candidate items such as "dull" for the dormant scale and "discouraged" for the frustrated scale, among a few other candidates. To create the satisfied, dormant, and frustrated scores, we followed the TSQ's scoring system to aggregate/average participants' autonomy, competence, and relatedness scores across each item into a single score. For instance, if a participant reported a "4" for "satisfied" relatedness, a "3" for "satisfied" competence, and a "2" for "satisfied" autonomy, we entered a score of "3.0" for that participant's "satisfied state" score. We did this because need satisfaction produces its beneficial effects whether it derives from autonomy satisfaction, competence satisfaction, or relatedness satisfaction (Ryan & Deci, 2017). In the present study, students' reports showed reasonable internal consistency on each 3-item scale: Satisfied (α=.89; satisfied, fully realized, and deep satisfaction); Dormant (α=.92; inactive, silent, and switched to "off"); and Frustrated (α=.94; frustrated, upset, and tense).

TSQ2s

The short form of the Three States Questionnaire 2 (TSQ2s) adopted the same design and format as the TSQ2—except each vignette listed only 3 rather than all 9 items. The complete TSQ2s appears in Table 2. As can be seen in the table, the TSQ2s included only the first three items from the TSQ2—namely, "satisfied," "inactive (not active)," and "frustrated." Students' reports on the TSQ2s scales also showed reasonable internal consistency: Satisfied (α=.77; satisfied autonomy, satisfied competence, and satisfied relatedness); Dormant (α=.76; inactive autonomy, inactive competence, and inactive relatedness); and Frustrated (α=.78; frustrated autonomy, frustrated competence, and frustrated relatedness).

Indices of effective functioning

Participants completed two of the same indices of effective functioning included in the development of the TSQ: 5-item Behavioral Engagement scale to assess behavioral engagement (α=.89; Skinner et al., 2009; "In this class, I work as hard as I can."); and 5-item Agentic Engagement Scale to assess agentic engagement (α=.89; Reeve, 2013; "In this class, I let my teacher know what I need and want.").

Indices of diminished functioning

Participants completed two of the same indices of diminished functioning included in the development of the TSQ: 5-item Behavioral Disaffection scale to assess behavioral disengagement (α=.85; Skinner et al., 2009; "In this class, I don't try very hard."); and 5-item Agentic Disengagement Scale to assess agentic disengagement (α=.81; Reeve et al., 2020; "In this class, I avoid asking any questions.").

Table 2 TSQ2s: Three States Questionnaire 2 Short Form

TSQ2s

Instructions. Here are three classroom experiences that students sometimes have. Please complete this questionnaire in reference to your classroom experience *today*.

For each word, click a number near 7 if you strongly agree that you currently feel this way, but click a number near 1 if you strongly disagree that you currently feel this way.

During today's class, I feel:

My desire to have a close, caring relationship with my classmates feels…

	Strongly Disagree						Strongly Agree
1. Satisfied	1	2	3	4	5	6	7
2. Inactive (not active)	1	2	3	4	5	6	7
3. Frustrated	1	2	3	4	5	6	7

My desire to feel effective and finish with "a job well done" feels…

	Strongly Disagree						Strongly Agree
1. Satisfied	1	2	3	4	5	6	7
2. Inactive (not active)	1	2	3	4	5	6	7
3. Frustrated	1	2	3	4	5	6	7

My desire for self-direction and freedom to do interesting and important activities feels…

	Strongly Disagree						Strongly Agree
1. Satisfied	1	2	3	4	5	6	7
2. Inactive (not active)	1	2	3	4	5	6	7
3. Frustrated	1	2	3	4	5	6	7

Indices of defiant functioning

Participants completed two of the same indices of defiant functioning included in the development of the TSQ: 3-item Feelings of Resentment toward the Lesson scale to assess resentment ($\alpha = .79$; Aelterman et al., 2016; "In this class, I get angry because what we do in this class is stupid."); and 8-item Pressured Reasons to Not Comply with the Teacher's Request scale to assess anti-internalization ($\alpha = .90$; Aelterman et al., 2016; "I sometimes do NOT do what the teacher requests because the teacher should not expect that I just do everything he/she requests.").

Data analyses

We conducted three analyses. First, we conducted an exploratory factor analysis (EFA) of the TSQ2, because EFA is used routinely in the scale construction process (van Zyl & ten Klooster, 2022). In our EFA, we expected a 3-factor solution, and we used Promax rotation (that allows for intercorrelated factors). Of particular importance was whether each candidate item loaded high on its respective factor (convergent validity) and low on the other two factors (i.e., little or no cross-loading; divergent validity).

Second, we conducted a pair of structural equation modelling analyses—the first using the three TSQ2 scales as predictors of student functioning and the second using the three TSQ2s scales as predictors of student functioning. Both analyses used Mplus to test a model in which the satisfied, dormant, and frustrated scales collectively predicated the six outcomes: behavioral engagement, agentic engagement, behavioral disengagement, agentic disengagement, resentment, and anti-internalization. In both analyses, we included student gender (0 = male, 1 = female) and grade level (0 = 10th grade, 1 = 11th grade, 2 = 12th grade) as statistical controls. For all six outcomes, we calculated the proportion of variance explained by the TSQ2s relative to the proportion of variance explained by the TSQ2.

Third, we used Rönkkö & Cho's CI_{CFA} (sys) approach to evaluate for discriminant validity between the satisfied, dormant, and frustrated scales. The "CI_{CFA} (sys)" approach is a classification system (sys) based on the 95% confidence interval (CI) in a confirmatory factor analysis (CFA). The CI_{CFA} (sys) statistic reports the upper level of the 95% CI (UL = 97.5%) of the standardized factor correlation between two measures and compares that value against the following cut off scores: UL < .80, no problem—no evidence of a discriminant validity problem; .80 ≤ UL < .90, marginal problem; .90 ≤ UL < 1, moderate problem; and 1 < UL, severe problem.

Results

Factor loadings

The left side of Table 3 displays the descriptive statistics for all nine TSQ2 items, while the right side of Table 3 shows the parameter estimates (factor loadings) across the three factors. The 3-factor EFA solution accounted for 85.0% of the total variance in the 9-item questionnaire. The parameter estimates revealed well-defined factors with minimal cross-loadings for all three scales: *Satisfied*, λ's ranged from .801 to .961 (M = .898) with cross-loadings from |λ| = .035 to .236 (M = .137); *Dormant*, λ's ranged from .620 to .967 (M = .771) with cross-loadings from |λ| = .013 to .257 (M = .104); and *Frustrated*, λ's ranged from .741 to .962 (M = .853) with cross-loadings from |λ| .004 to .265 (M = .087).

CICFA (sys) test for discriminant validity

The lower part of Table 3 reports the factor intercorrelations among the three TSQ2 scales. Satisfied correlated negatively with both dormant (r = -.524, 97.5% UL = .574) and frustrated (r = -.545, 97.5% UL = .595), while dormant correlated positively with frustrated (r = .768, 97.5% UL = .786). While all three factor correlations were high, all three can be evaluated as "no problem" according to the CI_{CFA} (sys) classification system to evaluate discriminant validity (UL < .80).

Predictive power of the TSQ2 and TSQ2s

The upper part of Table 4 shows the descriptive statistics and correlations between the three TSQ2 predictors, the six outcomes assessing effective, diminished, and defiant functioning, and the two statistical controls. The lower part of Table 4 shows these same statistics and correlations for the three TSQ2s predictors.

Predictive power of the TSQ2

The model using the three TSQ2 predictors to predict the six indices of student functioning fit the data well, $X^2(6) = 15.76$, $p = .015$, $RMSEA = .047$, $SRMR = .033$, $CFI = .997$, and $TLI = .975$. Figure 1 shows the standardized beta weights for each TSQ2 predictor of all six indices of students' functioning. As shown in Fig. 1, for *behavioral engagement* ($R^2 = .39$), the individually significant predictors were satisfied ($\beta = .57$, $p < .001$) and dormant ($\beta = -.26$, $p < .001$) (while frustrated was significant in the opposite direction). For *agentic engagement* ($R^2 = .38$), the individually significant predictors were satisfied ($\beta = .48$, $p < .001$) and dormant ($\beta = -.15$, $p = .013$). For *behavioral disengagement* ($R^2 = .36$), the individually significant predictors were dormant ($\beta = .34$, $p < .001$), frustrated ($\beta = .16$, $p = .007$), and satisfied ($\beta = -.17$, $p < .001$). For *agentic disengagement* ($R^2 = .38$), the individually significant predictors were dormant ($\beta = .53$, $p < .001$) and satisfied ($\beta = -.16$, $p < .001$). For *resentment* ($R^2 = .46$), the individually significant predictors were frustrated ($\beta = .48$, $p < .001$) and dormant ($\beta = .18$, $p < .001$). For *anti-internalization* ($R^2 = .33$), the individually significant predictors were frustrated ($\beta = .40$, $p < .001$) and dormant ($\beta = .25$, $p < .001$) (while satisfied was significant in the opposite direction).

Table 3 Descriptive statistics and standardized factor loadings for the 3-factor EPA solution (Study 1)

	Descriptive Statistics				Factor Scores		
TSQ2 Item	*M*	*SD*	m^3	m^4	Frustrated λ	Satisfied λ	Dormant λ
Satisfied State Items							
1. Satisfied	4.87	1.38	-0.45	-0.25	-.234	.801	.035
2. Fully Realized	4.58	1.34	-0.26	-0.35	.236	.961	-.141
3. Deep Satisfaction	4.46	1.41	-0.11	-0.52	-.077	.931	.099
Dormant State Items							
1. Inactive	2.74	1.30	0.50	-0.36	.257	-.085	.620
2. Silent	2.97	1.52	0.47	-0.56	-.028	.013	.967
3. Switched to "Off"	2.75	1.44	0.57	-0.44	.227	-.013	.725
Frustrated State Items							
1. Frustrated	2.81	1.45	0.56	-0.57	.856	-.086	.036
2. Upset	2.47	1.39	0.74	-0.48	.962	.039	-.004
3. Tense	2.68	1.47	0.64	-0.57	.741	.091	.265
Interfactor Correlations							
Factor 1					-	-.545	.768
Factor 2						-	-.524
Factor 3							-

Note. $N = 751$ USA high-school students. Possible range for each variable, 1—7

M = Mean, SD = Standard deviation. m^3 = skewness, m^4 = kurtosis, λ (lambda) = factor loading

Predictive power of the TSQ2s

The model using the three TSQ2s predictors to predict the same six indices of student functioning also fit the data well, $X^2(6) = 17.33$, $p = .008$, $RMSEA = .050$, $SRMR = .030$, $CFI = .996$, and $TLI = .968$. Figure 2 shows the standardized beta weights for each TSQ2s predictor of all six indices of students' functioning. As shown in Fig. 2, for *behavioral engagement* ($R^2 = .33$), the individually significant predictors were satisfied ($\beta = .55$, $p < .001$) and dormant ($\beta = -.15$, $p = .003$) (while frustrated was significant in the opposite direction). For *agentic engagement* ($R^2 = .38$), the individually significant predictors were satisfied ($\beta = .50$, $p < .001$) and dormant ($\beta = -.18$, $p < .001$). For *behavioral disengagement* ($R^2 = .34$), the individually significant predictors were dormant ($\beta = .27$, $p < .001$), frustrated ($\beta = .22$, $p < .001$),

Table 4 Descriptive Statistics and Latent Variable Intercorrelations among the TSQ2 (Upper Part) and TSQ2s (Lower Part) Predictors and the Indicators of Effective, Diminished, and Defiant Functioning (Study 1)

Questionnaire	1	2	3	4	5	6	7	8	9	10	11
1. TSQ2 Satisfied	-	-.57	-.56	.61	.59	-.45	-.45	-.43	-.27	-.14	.06
2. TSQ2 Dormant		-	.85	-.41	-.47	.57	.60	.62	.53	.11	-.02
3. TSQ2 Frustrated			-	-.34	-.45	.54	.51	.67	.56	.09	-.03
4. Behavioral Engagement				-	.65	-.43	-.55	-.34	-.21	.02	.03
5. Agentic Engagement					-	-.63	-.46	-.49	-.38	.04	.01
6. Behavioral Disengagement						-	.69	.63	.50	-.07	.01
7. Agentic Disengagement							-	.60	.42	-.01	.01
8. Resentment								-	.61	-.01	.01
9. Anti-Internalization									-	-.05	-.04
10. Gender										-	.02
11. Grade Level											-
Descriptive Statistics											
Mean	4.64	2.82	2.65	5.54	4.66	3.08	3.48	2.74	2.38	0.68	0.61
Standard Deviation	1.25	1.29	1.33	1.22	1.48	1.44	1.34	1.51	1.28	0.72	0.49
Skewness	-0.24	0.39	0.59	-1.00	-0.37	0.51	0.10	0.61	0.78	1.93	-0.45
Kurtosis	-0.27	-0.68	-0.61	0.78	-0.51	-0.48	-0.68	-0.49	-0.26	7.03	-1.80
Questionnaire	1	2	3	4	5	6	7	8	9	10	11
1. TSQ2s Satisfied	-	-.59	-.63	.57	.60	-.47	-.43	-.47	-.32	-.13	.08
2. TSQ2s Dormant		-	.75	-.39	-.47	.53	.54	.57	.47	.09	.00
3. TSQ2s Frustrated			-	-.34	-.45	.52	.49	.63	.49	.09	-.01
4. Behavioral Engagement				-	.65	-.43	-.55	-.34	-.21	.01	.02
5. Agentic Engagement					-	-.63	-.46	-.49	-.38	.03	.00
6. Behavioral Disengagement						-	.69	.63	.50	-.06	.01
7. Agentic Disengagement							-	.60	.42	.01	.00
8. Resentment								-	.61	-.01	.00
9. Anti-Internalization									-	-.05	-.05
10. Gender										-	.02
11. Grade Level											-
Descriptive Statistics											
Mean	4.87	2.74	2.81	5.54	4.66	3.08	3.48	2.74	2.38	0.68	0.61
Standard Deviation	1.37	1.29	1.45	1.22	1.48	1.44	1.34	1.51	1.28	0.72	0.49
Skewness	-0.45	0.50	0.56	-1.00	-0.37	0.51	0.10	0.61	0.78	1.93	-0.45
Kurtosis	-0.25	-0.36	-0.58	0.78	-0.51	-0.48	-0.68	-0.49	-0.26	7.03	-1.80

$N = 751$ USA high school student-participants. Correlations $r > .12$ are $p < .001$. TSQ2 = Three States Questionnaire 2. TSQ2s = Three States Questionnaire 2—Short Form. Possible range for the first 9 variables, 1 to 7. Gender: 0 = male, 1 = female; Grade Level: 0 = 10th, 1 = 11th, 2 = 12th

and satisfied ($\beta = -.17$, $p < .001$). For *agentic disengagement* ($R^2 = .32$), the individually significant predictors were dormant ($\beta = .34$, $p < .001$), frustrated ($\beta = .15$, $p = .004$), and satisfied ($\beta = -.14$, $p = .002$) states. For *resentment* ($R^2 = .42$), the individually significant predictors were frustrated ($\beta = .44$, $p < .001$) and dormant ($\beta = .19$, $p < .001$). For *anti-internalization* ($R^2 = .27$), the individually significant predictors were frustrated ($\beta = .33$, $p < .001$) and dormant ($\beta = .24$, $p < .001$).

Relative predictive power of the TSQ2s

We compared the predictive power of the TSQ2s relative to the predictive power of the TSQ2. As shown on the right side of Fig. 1, the Full Scale explained an average of 38% of the variance in the six indices of effective, diminished, and defiant functioning, *range of* $R^2 = .33$ to .46, while the Short Scale explained an average of 34% of the variance in the same indices, *range of* $R^2 = .27$ to .42. Thus, across the six dependent measures, the TSQ2s accounted for 90% of the variance explained by the TSQ2 (i.e., .343/.383 = 89.6%). This means that while the Short Scale lost 10% of the Long Scale's predictive power, it did so with two-thirds fewer items.

Discussion

The findings from Study 1 provided support for the psychometric strength and practical utility of the TSQ2 and TSQ2s, effectively overcoming the key limitations of the TSQ. The

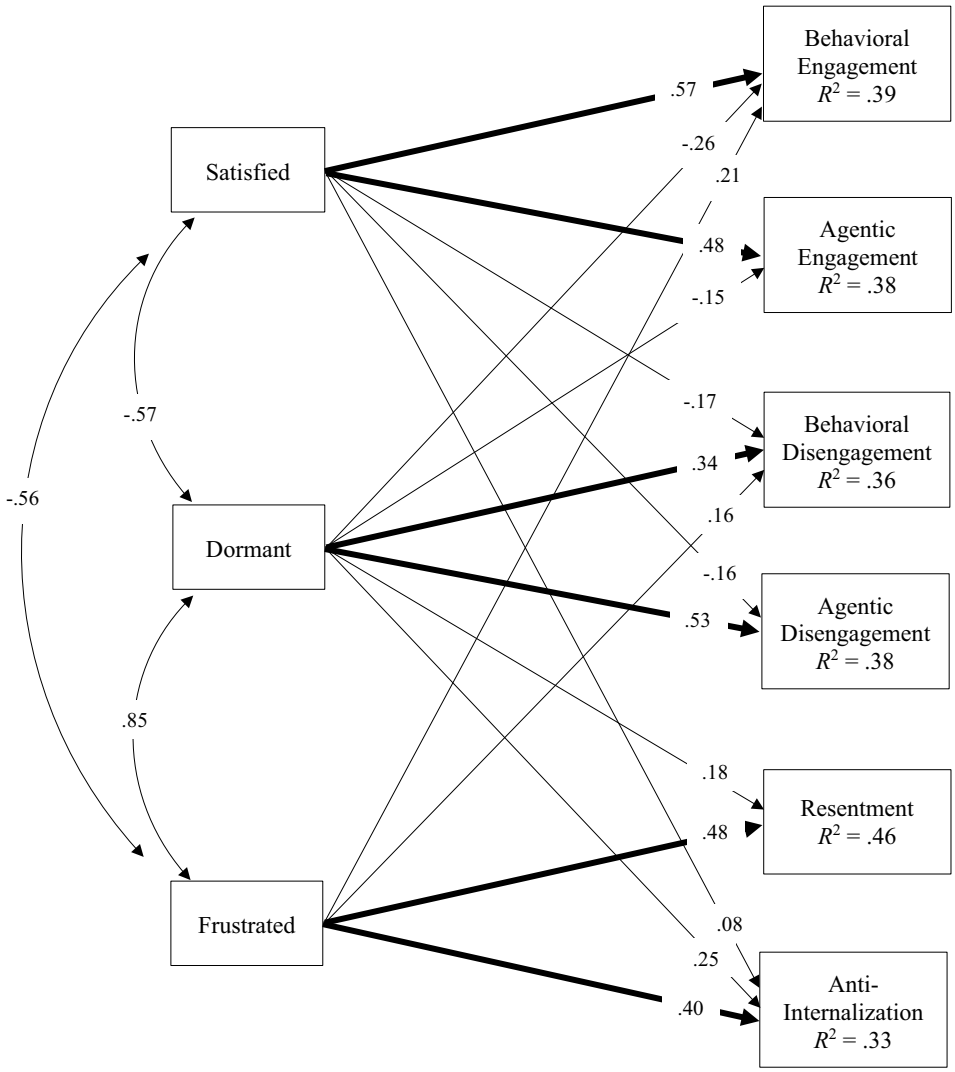


Fig. 1 Multiple Regressions to Test the Predictive Capacity of the TSQ2 Scales to Predict Hypothesized Outcomes (Study 1). Numbers overlaying the solid lines are standardized beta weights. Boldface lines represent primary/hypothesized paths, thin face lines represent supplemental paths, solid lines represent statistically significant paths, $p < .05$. R^2 = Proportion of variance explained

revised item structure of the TSQ2 demonstrated impressive predictive power across students' effective, diminished, and defiant functioning. Specifically, the satisfied scale emerged as the strongest predictor of effective functioning, with the dormant scale offered additional explanatory value. For diminished functioning, the dormant scale was the primary driver, with the frustrated and satisfied scales serving as secondary predictors. For defiant functioning, the frustrated scale was the primary predictor, while the dormant scale contributed supplemental explanatory variance.

The TSQ2s demonstrated a remarkable ability to predict these same outcomes, despite containing only one-third the number of items as the Full Scale. The Short Scale accounted for 90% of the variance explained by its longer counterpart, underscoring its efficiency without sacrificing predictive power. This finding highlights the practicality of the Short Scale, which offers a time-efficient alternative for researchers and practitioners while maintaining its robustness. Given the strength of these results, we adhered to our pre-registered decision to adopt the TSQ2s for Studies 2 and 3. Its concise format and strong explanatory power made it an ideal tool for further exploring the impact of psychological need states on student functioning.

Study 2

The primary aim of Study 2 was to evaluate the construct and predictive validity of the TSQ2s, while also contributing additional data on discriminant validity. To evaluate for construct validity, we compared the TSQ2s with the widely used and empirically validated BPNSFS scale (Chen et al., 2015; 4039 citations to date), which measures psychological need satisfaction and frustration. Using a high school student sample, we administered both the TSQ2s and the BPNSFS, enabling us to examine the correlations between the TSQ2's Satisfied and Frustrated scales and the BPNSFS's corresponding Satisfaction and Frustration scales.

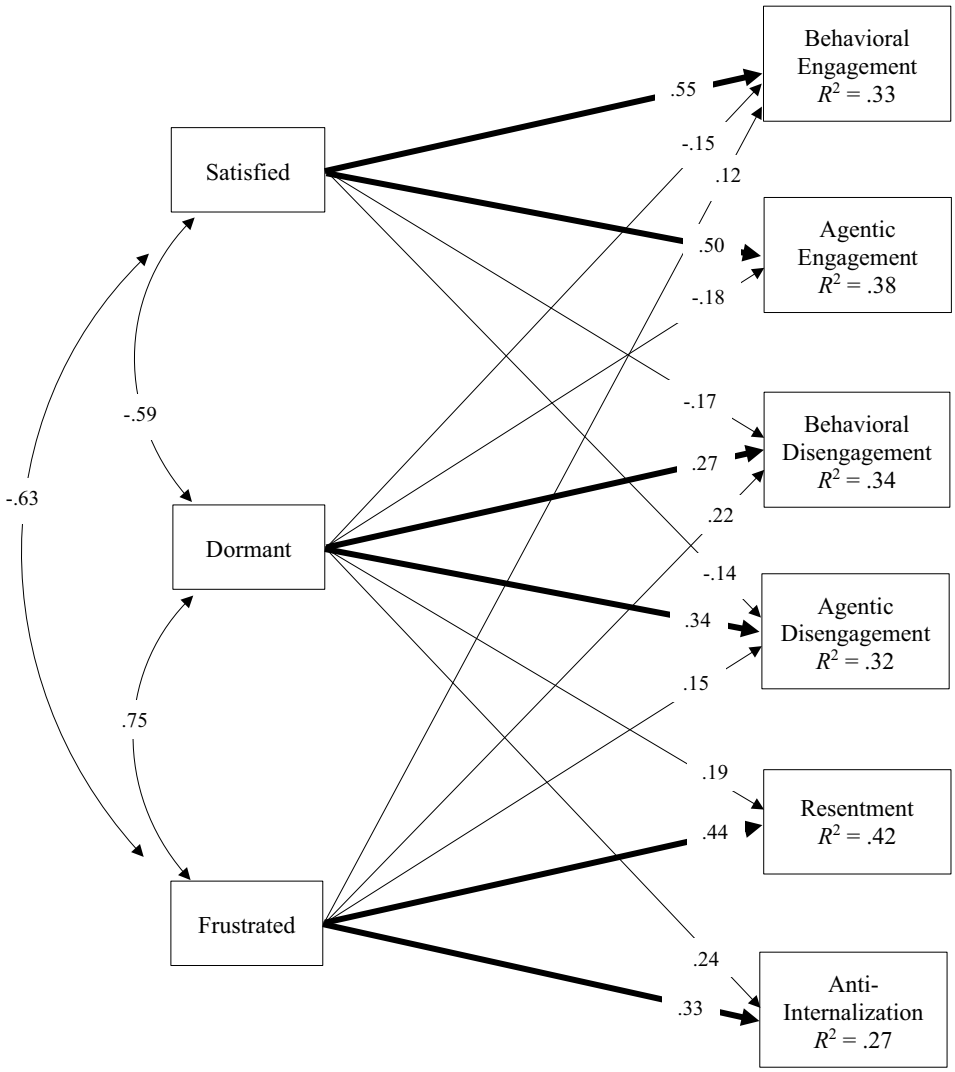


Fig. 2 Multiple Regressions to Test the Predictive Capacity of the TSQ2s Scales to Predict Hypothesized Outcomes (Study 1)**.** Numbers overlaying the solid lines are standardized beta weights. Boldface lines represent primary/hypothesized paths, thin face lines represent supplemental paths, solid lines represent statistically significant paths, $p < .05$. R^2 = Proportion of variance explained

However, since the BPNSFS does not assess the dormant state, we were unable to evaluate the construct validity of the TSQ2's Dormant scale.

To evaluate for predictive validity, we investigated the TSQ2's capacity to forecast one fundamental "bright side" indicator of students' academic thriving and one fundamental "dark side" indicator of students' academic suffering. To index academic thriving, we administered the Student Growth Instrument, which assesses course-specific academic progress and personal growth (Marsh et al., 2026). To index academic suffering, we administered the Drop-out Intention measure (Cheon et al., 2012). We hypothesized that the TSQ2s's Satisfied scale would positively and uniquely predict academic progress (indicating a personal growth experience during the course), while the TSQ2s's Dormant scale would positively and uniquely predict intentions to drop out (indicating a disengagement experience during the course).

Study 2 did not pursue a comprehensive construct validation strategy to identify the full range of outcomes relevant to each need state. This was because previous work had already accomplished this (Reeve et al., 2023). This early work established each of the following: (1) the satisfied state uniquely/independently predicted behavioral engagement, agentic engagement, intrinsic motivation, vitality, academic progress, positive self-concept, and positive activated affect; (2) the dormant state uniquely predicted amotivation, behavioral disengagement, agentic disengagement, boredom, and deactivated affect; (3) the frustrated state uniquely predicted anti-internalization, resentment, antisocial behavior, and problematic relationships; and (4) the dormant state was clearly distinct from its associated set of outcomes because the dormant items factor analyzed separately and cleanly (with minimal cross-loadings) from each of the items assessing amotivation, behavioral disengagement, agentic disengagement, boredom, and deactivated affect.

Method

Data availability and preregistration

Study 2 was pre-registered. The preregistration document, study questionnaires, and the data set are all available at our Open Science Framework (OSF) project site: https://osf.io/9whfy/?view_only=567d361267d74efdb9e097a7c8e25a4b.

Participants and procedure

Using the online crowdsourcing service Qualtrics, we recruited a sample of 488 high school students in the USA who were finishing their course experience (during week 15 of an 18-week semester course) in a vocational education course (e.g., automotive technology, carpentry, construction, culinary arts, dental assistant, nursing assistant, welding). The sample size was determined by an a priori power analysis for a correlation analysis using the G*Power 3 program (Faul et al., 2007). We aimed for a minimal sample size of at least $N=50$ to detect a moderate effect size ($r \geq .50$) for the correlation between two variables using conventional statistics ($\alpha=.05$, two-tailed, power = .95). The middle column in Table 1 shows the Study 2 sample's demographic characteristics. Students completed the questionnaire online using the Qualtrics commercial survey software program. The questionnaire began with a consent form. We assured student-participants that their responses would be confidential and used only for the purposes of the study. The second author's University Research Ethics Committee approved the research protocol.

Measures

Each measure used a 7-point bipolar response scale that ranged from 1 (Strongly disagree) to 7 (Strongly agree).

TSQ2s questionnaire

We used the TSQ2s developed in Study 1 to assess the three need states (as shown in Table 2). Students' reports on the TSQ2s showed reasonable internal consistency: Satisfied (3-item $\alpha=.81$); Dormant (3-item $\alpha=.83$); and Frustrated (3-item $\alpha=.87$).

BPNSFS questionnaire

We used the full 6-scale, 24-item version of the Basic Psychological Need Satisfaction and Need Frustration Scale (BPNSFS) to assess the course-specific satisfaction and frustration of students' psychological needs (Chen et al., 2015). Twelve items assess need satisfaction with four items assessing autonomy satisfaction (e.g., "In this class, I feel a sense of choice and freedom in the things I undertake"), four items assessing competence satisfaction, and four items assessing relatedness satisfaction. Twelve additional items assess need frustration with four items assessing autonomy frustration, four items assessing competence frustration (e.g., "In this class, I have serious doubts about whether I can do things well."), and four items assessing relatedness frustration. As is often done in this literature (Brenning et al., 2021), we created a 12-item total score for both need satisfaction and need frustration. Students' reports showed high internal consistency for both the need satisfaction ($\alpha=.92$) and need frustration ($\alpha=.90$) scales.

Student growth instrument

The 6-item Student Growth Instrument (SGI; Marsh et al., 2026) measures six indicators of the extent to which the student is making progress, developing skill, and experiencing course-specific personal growth. The SGI begins with the stem, "Compared to when the course began (i.e., the start of the semester, the start of this course),…" and includes individual items to assess course-specific growth in the six domains of learning, engagement, interest development, twenty-first century skill development, socio-behavioral adjustment, and personal growth. All 6 items appear in Appendix A. Factor analyses have shown the SGI to be a unidimensional scale (Marsh et al., 2026), and students' responses on the SGI showed high internal consistency in the present study ($\sigma=.87$).

Dropout Intention

We assessed dropout intention with the following item, "In the future, I do *not* intend to engage in a career related to technical education training" (Cheon et al., 2012).

Data analyses

To evaluate construct validity, we calculated descriptive statistics and intercorrelations among the seven scales. In this analysis, we used a Mplus analysis so that we could analyze latent (rather than manifest) scores. For the three TSQ2s scores, we used the autonomy, competence, and relatedness items to create the Satisfied, Dormant, and Frustrated latent variables. For the two BPNSFS scores, we used the 12 items on each corresponding scale (Satisfied, Frustrated) to create the two latent variables. Of primary interest were

the correlations between (1) the TSQ2s satisfied and the BPNSFS satisfied scores and (2) the TSQ2s frustrated and the BPNSFS frustrated scores.

To evaluate predictive validity, we used the six SGI items to create the student growth latent variable outcome, the single item for the Dropout Intention outcome, the autonomy, competence, and relatedness items from the TSQ2s to create the Satisfied, Dormant, and Frustrated latent variables, and single items for gender (0 = males, 1 = females) and grade level (0 = 10th, 1 = 11th, 2 = 12th grade). The primary predictive validity model therefore included 15 indicators for 5 latent variables plus the two covariates. As a point of comparison, we next performed a parallel predictive validity analysis that used items from the BPNSFS (rather than items from the TSQ2s). This supplemental BPNSFS model included 30 indicators for 4 latent variables and the two covariates.

Results

Table 5 shows the descriptive statistics and intercorrelations among the five predictors, the two outcomes, and the two statistical controls.

Construct validity analysis

The TSQ2s's satisfied scale correlated positively and highly with the BPNSFS need satisfaction scale, $r(488) = .83$, $p < .001$. Similarly, the TSQ2s's frustrated scale correlated positively with the BPNSFS need frustration scale, $r(488) = .69$, $p < .001$. Interestingly, the TSQ2s's dormant scale correlated as highly with the BPNSFS frustration scale as did the TSQ2s's frustrated state, $r(488) = .72$, $p < .001$. This suggests that the BPNSFS frustration scale might assess the dormant experience (e.g., "I feel the relationships I have are just superficial.") as much as it assesses the frustrated experience (e.g., "I feel excluded from the group I want to belong.").

Discriminant validity analysis

The TSQ2s's satisfied scale correlated negatively with both the dormant ($r = -.58$, 97.5% UL = .665) and frustrated ($r = -.61$, 97.5% UL = .682) scales, while the dormant and frustrated scales correlated positively ($r = .91$, $SE = .018$, 97.5% $UL = .947$). This latter CI_{CFA} (sys) UL value of .947 can be classified as a "moderate problem" according to Rönkkö and Cho's (2020) classification system to evaluate discriminant validity.

Predictive validity analysis

The 3-term model using the TSQ2s variables to predict student growth and dropout intentions fit the data reasonably well, $X^2(107) = 244.66$, $p < .001$, $RMSEA = .051$, $SRMR = .035$, $CFI = .966$, and $TLI = .957$. For course-specific student growth ($R^2 = .66$), satisfied was the single individually significant predictor ($B = .78$, $SE = .07$, $\beta = .82$, $p < .001$), as shown in Fig. 3. For dropout intentions ($R^2 = .30$), dormant was the single individually significant predictor ($B = .82$, $SE = .22$, $\beta = .65$, $p < .001$).

The supplemental 2-term model using the BPNSFS (rather than the TSQ2s) variables to predict student growth and dropout intentions fit the data only approximately well, $X^2(456) = 1{,}347.62$, $p < .001$, $RMSEA = .063$, $SRMR = .064$, $CFI = .888$, and $TLI = .878$. For course-specific student growth ($R^2 = .82$), need satisfaction was the single

Table 5 Descriptive statistics and latent variable intercorrelations among the TSQ2s, BPNSFS and personal growth questionnaires (Study 2)

Questionnaire	1	2	3	4	5	6	7	8	9
1. TSQ2s Satisfied	-	-.58	-.60	.83	-.45	.81	-.35	-.06	.04
2. TSQ2s Dormant		-	.91	-.51	.72	-.49	.54	.04	-.01
3. TSQ2s Frustrated			-	-.53	.69	-.47	.47	.03	-.04
4. BPNSFS Need Satisfaction				-	-.44	.90	-.35	-.04	.01
5. BPNSFS Need Frustration					-	-.41	.48	-.04	.01
6. Student Growth Instrument						-	-.36	.00	.01
7. Dropout Intention							-	-.04	.01
8. Gender								-	.03
9. Grade Level									-
Descriptive Statistics									
Mean	5.73	3.04	2.77	5.80	3.44	5.81	2.26	0.53	1.51
Standard Deviation	1.19	1.51	1.53	0.96	1.39	1.06	1.72	0.50	0.75
Skewness	-0.85	0.17	0.55	-0.87	0.30	-1.10	1.21	-0.11	-1.16
Kurtosis	0.30	-0.89	-0.44	0.93	-0.77	1.63	0.38	-1.98	-0.23

$N = 488$ USA student-participants in a vocational education curriculum. Correlations $r > .12$ are $p < .001$. TSQ2s = Three States Questionnaire 2—Short Form; BPNSFS = Basic Psychological Need Satisfaction and Need Frustration scale. Possible range for the first 7 variables, 1 to 7. Gender: 0 = male, 1 = female; Grade Level: 0 = 10th, 1 = 11th, 2 = 12th

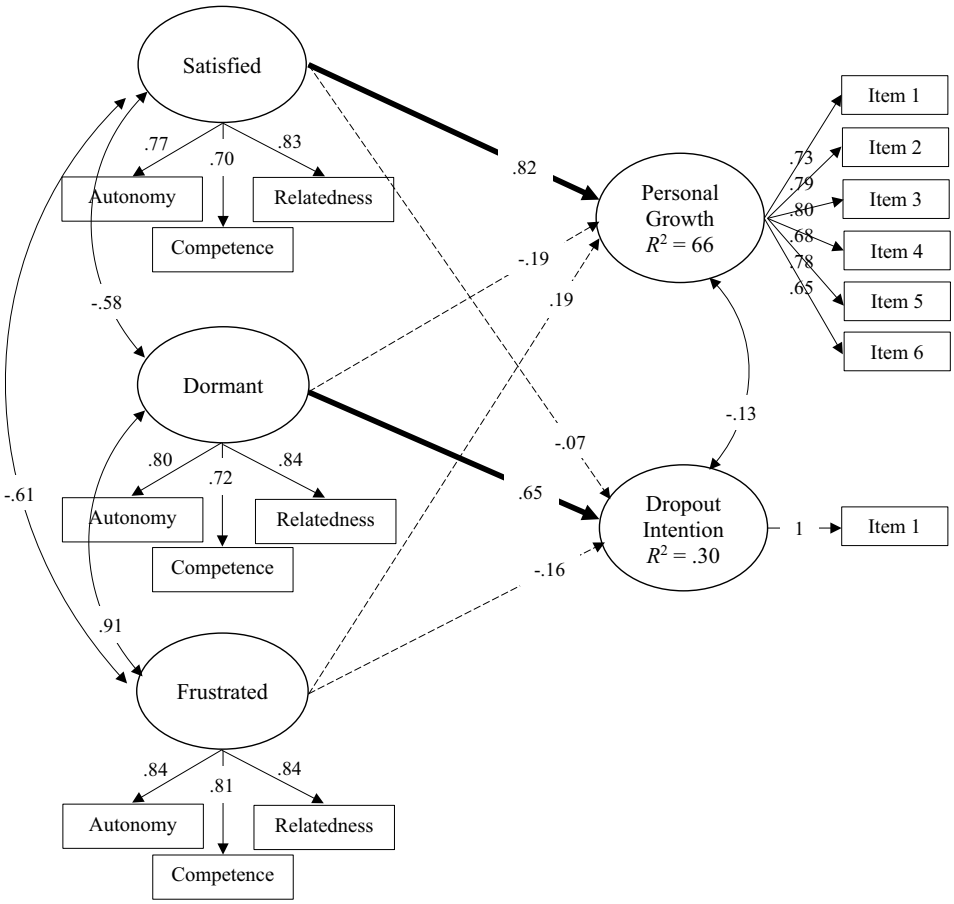


Fig. 3 Predictive Validity of the TSQ2s Scales (Study 2). Numbers represent standardized beta weights. Ovals represent latent variables, while rectangles represent indicators. Solid lines represent statistically significant paths, p < .05, while dashed lines represent non-significant paths. The content for items 1—6 for student growth appear in Appendix A. The statistical controls of gender and grade level were included in the analysis but not shown for clarity and because effects were non-significant. Model fit: $X.^2(107) = 244.66$, $p < .001$, $RMSEA = .051$, $SRMR = .035$, $CFI = .966$, $TLI = .957$

individually significant predictor ($B = .91$, $SE = .06$, $\beta = .90$, $p < .001$), as shown in Appendix B. For dropout intentions ($R^2 = .26$), need frustration was the single individually significant predictor ($B = .45$, $SE = .05$, $\beta = .41$, $p < .001$).

Discussion

The Study 2 results provided supportive evidence for the construct validity of the TSQ2s's Satisfied and Frustrated scales, as demonstrated by their significant correlations with their corresponding BPNSFS scales. This alignment with an established measure further supported the theoretical soundness of the TSQ2s in capturing these psychological need states. When examining the predictive validity of the TSQ2s, the satisfied scale emerged as a highly effective predictor of academic progress, while the dormant scale emerged as a moderately effective predictor of dropout intentions. The one problematic finding to emerge in Study 2 was that the discriminant validity between the dormant and frustrated variables was judged to be a moderate problem. Therefore, understanding why dormant and frustrated tend to co-occur experientially became a major goal of Study 3.

Study 3

Previous research consistently reports a strong positive correlation between the dormant and frustrated states (Bhavsar et al., 2020; Cheon et al., 2019; Costa et al., 2015; Huyghebaert-Zouaghi et al., 2023; Reeve et al., 2023). To explore the underlying reasons for this relationship, we conducted Study 3. Our primary hypothesis was that this strong association arises, in part, from a reciprocal, facilitating relationship between the two states. We expected that the prior experience of one state would "spill over" into a subsequent, complementary, and co-occurring experience of the other state. Specifically, we expected that an initial dormant state would, over time, expand to also become a frustrating experience, because the person would be frustrated that the activity or social context had become persistently indifferent to one's psychological needs. Similarly, we expected that an initial frustrated state would, over time, generate resentment and defiance such that the person might begin to avoid or reject the activity or social context and thus create the need neglecting conditions that give rise to a subsequent, complementary, and co-occurring dormant state.

To test this hypothesis, we employed a short-term longitudinal research design, assessing high school students'

dormant and frustrated states at three time points during a single 50-min class period: at the beginning, middle, and end of class. We employed this short-term longitudinal research design because we were interested in measuring the psychological needs as states—states that are highly sensitive to environmental changes and are not enduring person-centered traits. We assumed that if classroom conditions changed from one moment to the next (i.e., change of activities, change in the teacher's motivating style), then the need state would change in kind. For instance, a student might enter class in a satisfied state, but then the teacher's pressuring or critical language may quickly flip that state to a frustrated state. In other words, the satisfied, dormant, and frustrated states are highly dependent on the surrounding need supportive, indifferent, or thwartive context (Huyghebaert-Zouaghi et al., 2021; Ntoumanis, 2022). Thus, to test the ups and down of the three psychological need states, we considered the 50-min class period to be an ideal time frame.

To detect reciprocal effects, we utilized a methodologically rigorous within-subjects random intercept cross-lagged panel model (RI-CLPM) analysis. We proposed two hypotheses: first, that an early-class dormant experience would facilitate a later-class frustrated experience (H1), and second, that an early-class frustrated experience would facilitate a later-class dormant experience (H2). These hypothesized relationships are illustrated in Fig. 4. Specifically, H1 is represented by the two downward-sloping boldfaced lines connecting T1 to T2 and T2 to T3, while H2 is depicted by the two upward-sloping boldfaced lines.

After completing the test of the dormant-frustrated hypothesized model, we performed a pair of parallel supplemental RI-CLPM analyses that included (1) the dormant and satisfied (rather than the dormant and frustrated) states to explore for a possible negative reciprocal relation between these two states and (2) all three states in a single RI-CLPM model to explore for reciprocal relations among all three need states.

Method

Data availability and preregistration

Study 3 was pre-registered. Available on the Open Science Framework (OSF) project site, https://osf.io/9f4dc/?view_only=bc4190872c5640bfa357377ab17c6471, are the pre-registration document (showing the hypothesized model in Fig. 4), the study questionnaire (as shown earlier in Table 2), the data set, and the Mplus syntax and output files.

Participants

We recruited a sample of 602 high school students attending 26 different classes of various subject matters. Participants were recruited in equal numbers from two large, urban, middle-class, public high schools located in Seoul, South Korea.

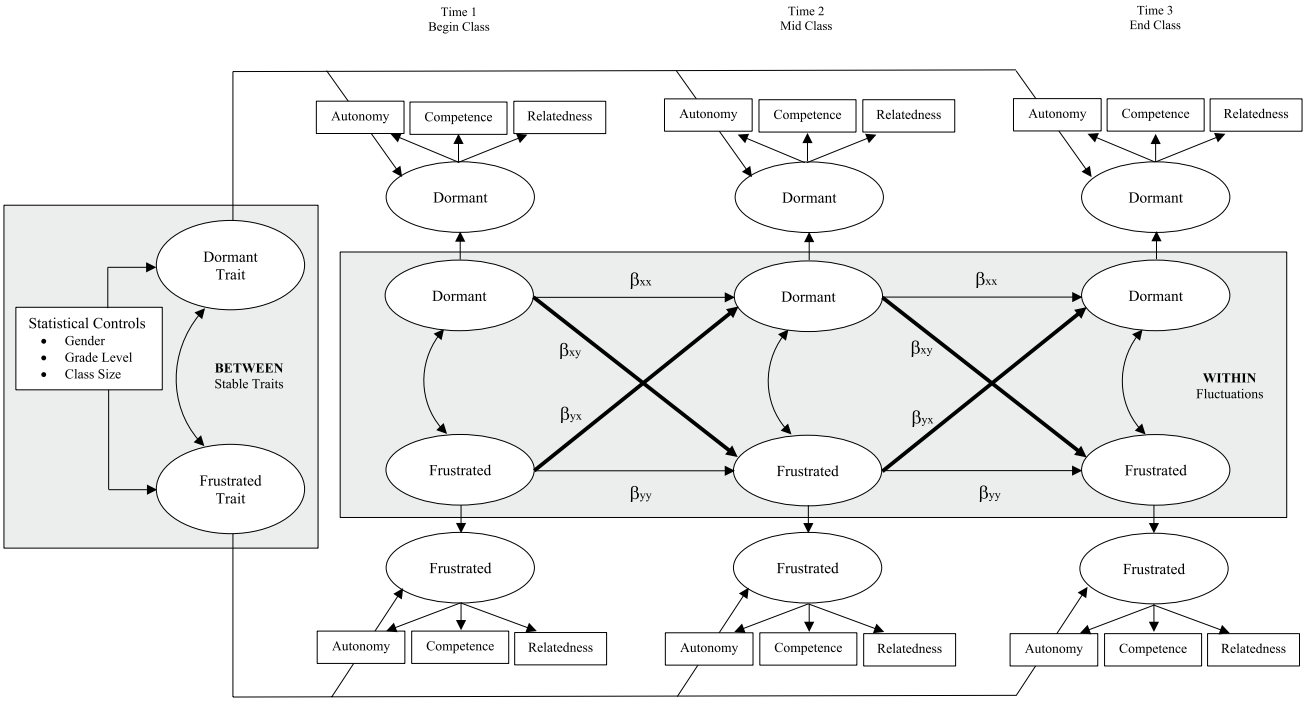


Fig. 4 Hypothesized model for the reciprocal relation between the dormant and frustrated states

Both schools followed the national curriculum mandated by the Ministry of Education. Preliminary analyses indicated no meaningful differences between the two schools on the dependent variables or covariates. Given that school-level effects were not the focus of the within-person hypotheses and statistical analyses, data from the two schools were combined into a single sample. The rightmost column in Table 1 shows the Study 3 sample's demographic characteristics. The sample size was determined by an a priori power analysis for regression-based analyses using the G*Power 3 program (Faul et al., 2007). We aimed for a sample size of at least $N = 225$ to detect a moderate effect size ($f^2 = .07$) in a structural equation modelling analysis using two predictors and conventional statistics ($\alpha = .05$, two-tailed, power = .95).

Procedure

Participants completed the questionnaire in the second half of a course-long semester (i.e., during week 12 of an 18-week semester). The questionnaire began with a consent form. Students completed the same questionnaire three times during one 50- or 55-min class—5 min into the beginning of class, the middle of class, and at the end of the class. We assured students that their responses would be confidential and used only for the purposes of the study. Participant attrition was 0% from T1 to T3, and missing data were rare (< 0.1%). The first author's University Research Ethics Committee approved the research protocol.

Measures

The single-page study questionnaire asked students to report their demographic information and to complete the TSQ2s, using a 7-point bipolar response scale that ranged from 1 (Strongly disagree) to 7 (Strongly agree).

TSQ2s

We assessed the state-like status of students' psychological needs at the beginning, middle, and end of the class period with the TSQ2s developed in Study 1. Students' responses on all three 3-item scales showed reasonable internal consistency across all time waves: Satisfied (αs at T1, T2, and T3 = .75, .79, and .81); Dormant (αs = .80, .82, and .85); and Frustrated (αs = .82, .82, and .86).

Data analysis

We employed a random intercept cross-lagged panel model (RI-CLPM), a widely recommended approach for testing within-person effects of one variable on another in longitudinal datasets (Hamaker et al., 2015; Mulder & Hamaker, 2021; Orth et al., 2021). The analysis was conducted using Mplus version 8.3 (Muthén & Muthén, 2019). Specifically, we used the "Model = NOCOV" command as recommended by Mulder and Hamaker (2021), the maximum likelihood robust (MLR) estimator, and the full information maximum likelihood (FIML) procedure to address rare missing values (< 0.01%; Enders, 2010). To evaluate model fit, we applied commonly accepted fit criteria: $RMSEA \leq 0.06$, $SRMR \leq 0.08$, $CFI \geq 0.95$, and $TLI \geq 0.95$ (Hu & Bentler, 1999).

To construct the hypothesized RI-CLPM (Fig. 4), we first developed the measurement model. The latent variable for "Dormant" was indicated by the three corresponding TSQ2s items (inactive autonomy, inactive competence, and inactive relatedness), while the latent variable for "Frustrated" was indicated by the three corresponding TSQ2s items (frustrated autonomy, frustrated competence, and frustrated relatedness). Altogether, the measurement model included 18 indicators to define six latent variables across three time points (T1, T2, T3). Given the longitudinal structure of the data, we allowed the uniqueness of each indicator to correlate with itself across time points (Marsh et al., 2013). To ensure measurement invariance, we constrained factor loadings and intercepts at T2 and T3 to their initial T1 values (Marsh et al., 2022).

In the construction of the hypothesized model, the latent variables for dormant and frustrated states were decomposed into two components: (1) a stable trait component (random intercept; depicted in the gray box on the left side of Fig. 4) and (2) a moment-to-moment fluctuation component (depicted in the gray rectangle on the right side of Fig. 4). The dormant random intercept (RI) was formed using the three indicators from the T1, T2, and T3 dormant latent variables, and the frustrated RI was constructed similarly using the three indicators from the T1, T2, and T3 frustrated latent variables. Covariates, including gender, grade level, and class size, were correlated with the two random intercepts (see Fig. 4, left panel).

The featured within-person moment-to-moment fluctuations were modeled as higher-order latent variables at each time point (Fig. 4, within-person gray rectangle). We allowed the within-person dormant and frustrated latent variables to correlate at each time wave and specified structural paths to represent the hypothesized reciprocal relationships (H1 and H2). These paths are depicted in Fig. 4 as crisscrossed reciprocal effects over the three time points. Additionally, we constrained all auto-regressive and cross-lagged paths to test for longitudinal equilibrium of the reciprocal relationships between dormant and frustrated states (Marsh et al., 2018; Mulder & Hamaker, 2021).

The hypothesized model focused specifically on the positive reciprocal relation between the dormant and frustrated states, but we also subsequently tested a supplemental model to explore for possible negative reciprocal effects between the dormant and satisfied states. This dormant-satisfied RI-CLPM model was created to be identical to the previously described dormant-frustrated RI-CLPM model except that (1) its second latent variable ("Satisfied") was measured using three items from the TSQ2s satisfied scale (satisfied autonomy, satisfied competence, and satisfied relatedness) and (2) the pre-registration document presented this analysis as an exploratory, not as a hypothesized, model test.

Before testing both models, we standardized each individual item (indicator) to a common metric (mean = 0, standard deviation = 1) based on participants' initial responses at T1 (the beginning of the class period). This standardization allowed for easier interpretation of the results, as observed effects could be understood relative to participants' baseline scores (Marsh et al., 2022). The associated Mplus files can be found on the OSF project site.

Results

Table 6 displays the latent correlations and descriptive statistics between the dormant and frustrated scores, along with the three covariates, across the three time points. Looking at the mean scores for each state, participants' dormant scores were significantly higher than their frustrated scores at each wave ($ps < .001$): T1 *M*s, 3.51 vs. 2.72, $t(601) = 13.38$, $d = 0.52$; T2 *M*s, 3.23 vs. 2.57, $t(601) = 11.88$, $d = 0.48$; and T3 *M*s, 3.03 vs. 2.47, $t(601) = 9.98$, $d = 0.36$.

Discriminant validity analysis

As shown in Table 6, dormant correlated positively but only moderately with frustrated across all three waves of data collection: Time 1, $r = .55$, 97.5% UL = .778); Time 2, $r = .67$, 97.5% UL = .834); and Time 3, $r = .65$, 97.5% UL = .834). While the T1 factor correlation represented "no problem" according to the CI_{CFA} (sys) classification system to evaluate discriminant validity, the T2 and T3 correlations were both classified as a "marginal problem."

Measurement model

The (unconstrained) measurement model fit the data reasonably well, χ^2 (126) = 378.05, *RMSEA* = .058, *SRMR* = .068, *CFI* = .948, and *TLI* = .937. The measurement model that constrained the indicators to be invariant across time (T1, T2, T3) also fit the data well, and it did so with no decrement in the fit indices, $X^2(134) = 398.72$, $p < .001$, *RMSEA* = .057, *SRMR* = .069, *CFI* = .945, and *TLI* = .938. Based on the evaluation criterion (**Δ** *CFI* < .01; Cheung & Rensvold, 2002), the measurement model showed strong metric invariance (**Δ** *CFI* = .003), thus establishing measurement invariance for the good-fitting measurement model.

Random intercept cross-lagged panel model (RI-CLPM)

The hypothesized RI-CLPM fit the data reasonably well, χ^2 (178) = 477.66, $p < .001$, *RMSEA* = .053, *SRMR* = .060, *CFI* = .945, *TLI* = .937. Figure 5 shows the unstandardized estimations (with standard errors in parentheses) of the moment-to-moment reciprocal relations between the

Table 6 Correlation matrix and descriptive statistics for latent variables and statistical controls included in the test of the hypothesized model (Study 3)

Questionnaire	1	2	3	4	5	6	7	8	9
Latent Variable									
1. TSQ2s Dormant, T1	-	.76	.66	.55	.46	.37	.19	.13	-.11
2. TSQ2s Dormant, T2		-	.82	.42	.67	.53	.18	.12	-.10
3. TSQ2s Dormant, T3			-	.35	.53	.65	.19	.12	-.10
4. TSQ2s Frustrated, T1				-	.72	.58	.25	.16	-.16
5. TSQ2s Frustrated, T2					-	.76	.24	.16	-.15
6. TSQ2s Frustrated, T3						-	.24	.16	-.15
7. Gender							-	.45	-.67
8. Grade Level								-	-.40
9. Class Size									-
Descriptive Statistics									
Mean	3.51	3.23	3.03	2.72	2.57	2.47	0.50	1.85	23.4
Standard Deviation	1.54	1.52	1.59	1.51	1.47	1.54	0.50	0.79	2.6
Skewness	0.09	0.29	0.46	0.74	0.77	1.09	-0.01	0.27	0.57
Kurtosis	-0.95	-0.78	-0.74	-0.23	-0.23	0.49	-0.92	-1.34	0.00

N = 602 Korean high school students. TSQ2s = Three States Questionnaire 2—Short Form. Possible range for the first 6 variables, 1 to 7. Gender: 0 = male, 1 = female; Grade Level: 0 = 10th, 1 = 11th, 2 = 12th

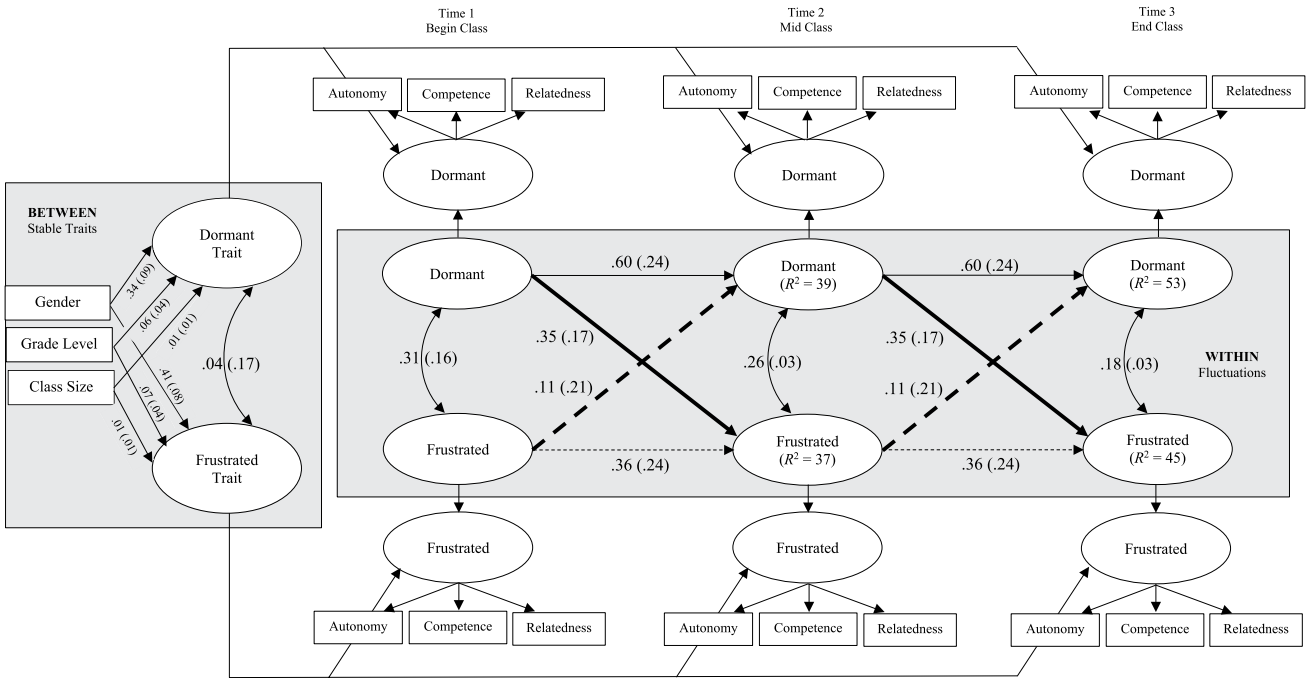


Fig. 5 Results from the Test of the Hypothesized Model for the Reciprocal Relation between the Dormant and Frustrated States

dormant and frustrated states. For H1, early-wave dormant invariantly predicted greater later-wave frustrated, $B = .35$, $SE = .17$, $p = .048$. For H2, early-wave frustrated did not invariantly predict greater later-wave dormant, $B = .11$, $SE = .21$, $p = .591$. Overall, the RI-CLPM analysis confirmed H1 but disconfirmed H2.

Three additional findings were that (1) the autoregressive effects showed that the dormant state was a relatively stable experience over the class period, $B = .60$, $SE = .24$, $p = .014$, while the frustrated state relatively unstable, $B = .36$, $SE = .24$, $p = .142$; (2) the dormant and the frustrated stable trait RIs did not correlate significantly ($B = .04$, $SE = .17$, $p = .793$); and (3) gender (but neither grade level nor class size) predicted both the dormant RI ($B = .34$, $SE = .09$, $p < .001$) and the frustrated RI ($B = .41$, $SE = .08$, $p < .001$).

Supplemental analysis

Supplemental Table 1 shows the latent correlations and descriptive statistics between the dormant and satisfied scores, along with the three covariates, across the three time points. The dormant and satisfied states (as latent variables) negatively correlated across all three waves ($p < .001$), $r = -.54$ at T1, 97.5% UL = .808; $r = -.61$ at T2, 97.5% UL = .750; and $r = -.62$ at T3, 97.5% UL = .800.

The supplemental dormant-satisfied RI-CLPM fit the data moderately well, χ^2 (178) = 607.88, $p < .001$, $RMSEA = .063$, $SRMR = .079$, $CFI = .919$, $TLI = .906$. Supplemental Fig. 1 shows the unstandardized estimations (with standard errors in parentheses) of the moment-to-moment reciprocal relations between the dormant and satisfied states. Early-wave dormant invariantly predicted lower later-wave satisfied, $B = -.28$, $SE = .12$, $p = .026$. Early-wave satisfied did not invariantly predict lower later-wave dormant, $B = -.27$, $SE = .23$, $p = .239$.

Three additional findings were that (1) the autoregressive effects showed that both states were relatively stable experiences over the class period: Dormant, $B = .53$, $SE = .16$, $p < .001$; Satisfied, $B = .61$, $SE = .25$, $p = .014$; (2) the dormant and satisfied stable trait RIs did not correlate significantly ($B = .24$, $SE = .46$, $p = .607$); and (3) gender (but neither grade level nor class size) predicted both the dormant RI ($B = .33$, $SE = .09$, $p < .001$) and the satisfied RI ($B = -.43$, $SE = .09$, $p < .001$).

An additional supplemental RI-CLPM included all three psychological need states in a single model. This dormant-frustrated-satisfied RI-CLPM fit the data only approximately well/poorly, χ^2 (373) = 1,526.12, $p < .001$, $RMSEA = .071$, $SRMR = .079$, $CFI = .869$, $TLI = .849$. Supplemental Fig. 2 shows the unstandardized estimations (with standard errors in parentheses) of the moment-to-moment reciprocal relations between the dormant, frustrated, and satisfied states. Early-wave dormant only marginally predicted lower later-wave frustrated, $B = .21$, $SE = .11$, $p = .073$ and did not invariantly predict lower later-wave satisfied, $B = -.19$, $SE = .13$, $p = .146$. Early-wave frustrated did not invariantly predict either later-wave dormant, $B = .02$, $SE = .15$, $p = .908$, or satisfied, $B = .06$, $SE = .22$, $p = .792$. Early-wave satisfied only

marginally predicted lower later-wave dormant, B=-.29, SE=.16, p=.064, and did not invariantly predict lower later-wave frustrated, B=-.25, SE=.20, p=.210. The reason why this 3-need state RI-CLPM model was unable to fit the data well was because (1) the three need states collectively intercorrelated highly at T1, T2, and T3 (a multicollinearity issue) and (2) the multicollinarity between dormant and frustrated increased over time as the two states appeared to merge toward a single subjective experience toward the end of class (Bs=.63 at T1, .75 at T2, and .80 at T3; see Bs for curved paths in Supplemental Fig. 2), though this same merging did not occur with dormant and satisfied (Bs=-.64 at T1, -.66 at T2, and -.62 at T3) or with frustrated and satisfied (Bs=-.67 at T1, -.67 at T2, and -.72 at T3).

Discussion

Dormant need states and frustrated need states positively and substantially correlated to such an extent as to raise a "marginal problem" in distinguishing between the two constructs. In the RI-CLPM analysis, prior dormant needs increased later frustrated needs, but prior frustrated needs did not increase later dormant needs (i.e., a one-way, not a reciprocal, relation). These results provide a partial explanation for why these two states highly correlate—namely, that, over time, the dormant state appears to somewhat facilitate or evolve or spillover into the more salient frustrated state, suggesting that dormant, while initially an inactive state, can in part transition into active frustration. A second interesting finding was that the dormant state was a relatively stable experience over the course of the 50-min class period, while the frustrated state was not. The satisfied state was also relatively stable, suggesting that while dormant and satisfied largely maintain their initial baseline state, the frustrated state rose and fell in response to changing classroom conditions. Finally, prior dormant decreased later satisfied, though prior satisfied did not decrease later dormant.

General Discussion

The present study aimed to deepen both the theoretical and empirical understanding of Self-Determination Theory's (SDT) tripartite model of psychological need states, which identifies three distinct states: satisfied, dormant, and frustrated. Each state emerges from specific environmental antecedents to generate unique patterns of psychological and behavioural functioning (Cheon et al., 2019; Ntoumanis, 2022; Reeve et al., 2023). Across three interconnected studies, we refined the theoretical framework and developed the Three States Questionnaire 2 (TSQ2), along with its short form (TSQ2s), as reliable, valid, and useful/practical measurement tools. The TSQ2s did, however, show a moderate discriminant validity problem between the dormant and frustrated states. We summarize below the key contributions of this research as well as the moderate discriminant validity problem.

Development of the TSQ2 and the TSQ2s

The original Three States Questionnaire (TSQ) represented an early attempt to assess psychological need states but faced criticism over two shortcomings: the inclusion of the "unengaged" item in the dormant scale and frustrated items that needed to better represent the conceptual definition of frustration. To address these issues, we developed the TSQ2, a more theoretically grounded and psychometrically robust instrument. In the TSQ2, the item "unengaged" was replaced with "silent," which demonstrated stronger psychometric performance. Additionally, the frustrated items "frustrated" and "tense" were added to improve construct alignment. These refinements resulted in a tool that more effectively captures the nuanced dynamics of psychological need states.

The TSQ2 did improve on the original TSQ, though its 27-item length presented a practical usability challenge. To enhance usability, we developed the TSQ2s, a concise 9-item short scale that assessed the three states across the three needs with a single item representing each state: "satisfied" (satisfied), "inactive (not active)" (dormant), and "frustrated" (frustrated). This Short Scale accounted for 90% of the Full Scale's capacity to predict six indicators of student functioning, thereby offering an efficient alternative. Study 3 demonstrated the TSQ2s's usability by minimizing participant burden during repeated measures within a 50-min class period. For instance, the participant attrition rate over the three waves of data collection was 0%.

Dormancy is a commonly occurring need state

Across all three studies, participants consistently reported higher levels of the dormant state compared to the frustrated state. For instance, the students in Study 3 reported experiencing a higher level of dormant than frustrated at the beginning of class (T1), in the middle of class (T2), and at the end of class (T3; see Table 6). This suggests that dormant is the more commonly occurring experience of the two. It is at least common enough that its prevalence, origins, and downstream implications on functioning need to

be acknowledged, understood, and explained by need-based models of motivation.

Acknowledging how prevalent need dormancy is highlights the need for practitioners to recognize and overcome "need indifference" in their instructional and mentoring practices to complement their already existing efforts to mitigate "need thwarting" practices (Aelterman et al., 2019; Bartholomew et al., 2018; Bhavsar et al., 2019). We therefore encourage future research on how those who motivate others (e.g., teachers, coaches, workplace managers) can provide activities, jobs, goals, environments, and relationships that nip the dormant state in the bud, presumably by the upfront offering of need-involving (rather than need-neglecting) activities, jobs, goals, environments, and relationships.

Necessity of including the dormant state

Self-Determination Theory's dual-process model (Bartholomew et al., 2011; Vansteenkiste & Ryan, 2013) has been a foundational framework for understanding psychological need states, focusing on the binary ("dual") distinction between satisfaction and frustration. However, our findings highlight the critical need to include a third state: dormant (Reeve et al., 2023) or unfulfilled (Ntoumanis, 2022).

The dormant state represents a somewhat distinct yet essential expression of a person's motivational state. In terms of its distinctiveness, documenting the discriminant validity between the dormant and frustrated states was classified as "no problem" in Study 1, as a "moderate problem" in Study 2, and as a "marginal problem" in Study 3. In terms of its essential status, the dormant state better explained indices of diminished functioning than did the frustrated state. Unlike frustration, which reflects the active experience of need thwarting, dormant captures a quieter, withdrawn state. As our data illustrate, this state better accounts for nuanced indicators of diminished functioning that does either high frustration or low satisfaction.

Furthermore, the inclusion of the dormant state significantly enhances the explanatory and predictive power of the tripartite model of psychological need states. As shown in Reeve and colleagues (2023), the tripartite framework explains a higher proportion of variance (*Adjusted R*2) in all measures of student functioning than does the dual-process model. For instance, the dual-process model explained 10% of the variance in behavioral disengagement (significant predictors were high frustrated and low satisfied), while the tripartite model explained 25% of the variance in behavioral disengagement (the single significant predictor was high dormant; see Reeve et al., 2023, Table 4, page 701). In the present study, dormant emerged as the primary predictor (largest *beta*) of behavioral disengagement, agentic disengagement, and dropout intentions, and it was an individually significant predictor in every index of student functioning in Figs. 1 and 2. These findings underscore the dormant state's theoretical and practical relevance, providing a more comprehensive understanding of human motivation and functioning (Reeve et al., 2023).

In sum, the dormant state is noteworthy for several reasons: it has a distinct capacity to account for multiple indicators of diminished functioning, explains additional variance in student outcomes even when controlling for the satisfied and frustrated states, and is a commonly experienced motivational condition.

Dual or tripartite model?

The central aim of the present study was to explore, both conceptually and methodologically, whether including the dormant state enhances our understanding of psychological need dynamics, as proposed in the tripartite model, in a way that is beyond the traditional dual-process framework.

The dual-process model primarily applies to contexts in which task engagement is required, such as following the teacher's instructions, participating in graded activities, completing scripted lab or workshop procedures, or completing homework assignments. In these settings, task characteristics and interpersonal environments either support or thwart basic psychological needs. Appealing, well-structured tasks and supportive teacher behaviors—such as offering choice within assignments, providing constructive feedback, or encouraging collaboration—foster need satisfaction and autonomous engagement. Conversely, aversive tasks, rigid instructions, or controlling teacher behaviors—such as threats of punishment, excessive monitoring, or public criticism—foster need frustration and externally pressured engagement. In required-task contexts, the emphasis is therefore on the quality of motivation (autonomous vs. controlled) rather than on the occurrence of the engagement (because the engagement is required or taken for granted).

By contrast, the tripartite model addresses contexts in which engagement is relatively optional or voluntary, such as deciding whether to pay attention to the lesson, participate in a class discussion, complete optional practice problems, or remain cognitively or behaviorally unengaged (e.g., daydreaming). In these situations, unappealing or personally irrelevant tasks and need-indifferent environments foster need dormancy, characterized by low psychological energy and minimal motivation to initiate or sustain engagement. In free-choice contexts, the emphasis is on the involvement vs. non-involvement (i.e., "dormancy") of one's psychological

needs, as one considers whether or not to engage in the activity.

Study 3 provides empirical support for these theoretical distinctions by examining how students' experiences of satisfaction, dormancy, and frustration unfolded across a classroom session. Initial dormancy was observed to progressively spill over into frustration under conditions of required classroom engagement, with the correlation between the two states increasing significantly from $r = .55$ at the beginning of class to $r = .65$ at the end (z-test = 3.02, $p = .002$). In the absence of external pressures to engage, the core motivational distinction actually lies between satisfaction and dormancy: personally interesting tasks and need-supportive environments foster engagement and satisfaction, whereas unappealing tasks and need-indifferent conditions foster dormancy and non-engagement. When engagement is mandated—defined as tasks explicitly assigned or expected by an authority—need frustration becomes more salient, shifting the motivational question from the dormancy-centric "Do I want to engage?" to the frustration-centric "Will my engagement be required/coerced?".

Additionally, Study 3 revealed the relative stability of satisfaction and dormancy across the session, as indicated by strong autoregressive effects, whereas frustration was more episodic, emerging in response to salient need-thwarting events such as negative feedback or controlling language (see Fig. 5 and Appendix B). While satisfaction and frustration remained distinct, dormancy and frustration overlapped, illustrating how task requirements can blur the boundary between these states. This partial overlap is reflected in the relatively high positive correlation between dormancy and frustration, highlighting the need for careful conceptualization and precise measurement to differentiate these related but distinct motivational states.

Together, these findings both support but also raise some concern as to the theoretical and practical significance of recognizing dormancy as a distinct psychological need state. In terms of theoretical support, dormancy illuminates motivational dynamics that the dual-process model cannot fully account for—especially predictive validity and percent variance explained in key outcomes. In terms of theoretical caution, a constant discriminant validity concern between the dormant and frustrated states persisted throughout each study. This suggest that these two states are meaningfully distinct under some conditions yet may merge toward a single experience under other conditions. In terms of practical significance, incorporating dormancy offers practical guidance in applied settings, such as sports, health care, and work organizations—namely, that supporting motivation involves not only fostering satisfaction and reducing frustration, but also preventing and minimizing dormancy. Recognizing dormancy in applied settings is an excellent first step to prevent, overcome, and reverse disengagement. By identifying this low-salience need state and by creating conditions in which it is unlikely to occur, educators, managers, coaches, therapists, and peers can design tasks, interactions, and environments that involve and satisfy the person's psychological needs, and hence energize their volitional and willing engagement.

Limitations

Three study limitations warrant consideration. First, each study relied only on self-reported data. Second, we examined our research questions only within an educational context, as participants in each study were high school students. Thus, it remains an open question as to how well the current findings might generalize or apply to additional contexts, such as adult employees working in an organizational context. Third, our reliance on correlational research designs leaves open the possibility that unmeasured third variables might explain the results and thus provide a viable alternative interpretation of our findings. For instance, the three need states include not only motivational processes, but affective processes as well (Thayer, 1989). That is, a satisfied need is both an energy-mobilizing motivational state and a positively-activated affect state (e.g., energetic, alert, comfortable), while a dormant need is both an energy-deflating motivational state and a deactivated (e.g., dull, sleepy) and a negatively-activated affect state (e.g., stressed, anxious) (Reeve et al., 2023).

Conclusion

Dormant—a motivational state marked by a quiet sense of disconnection from one's desire for personal causation, environmental effectance, and interpersonal connection—emerged from our investigation as an important yet under-explored aspect of human functioning. It was found to be an essential predictor of diminished functioning outcomes, such as disengagement and dropout. It also accounted for unique variance in both adaptive and defiant functioning, pointing to its broader and more nuanced role in motivational dynamics. The present study also provided the means to assess this essential but overlooked need state. When taken as a whole, these findings underscore the value of integrating dormancy into the SDT framework, essentially expanding the traditional dual-process model into the new tripartite model. As research continues to deepen our understanding of motivational functioning, the dormant state underscores the need to attend not only to the loud cries of frustration and protest, but also to the quiet signals of withdrawal and retreat—and,

in doing so, foster more responsive and empowering environments for human growth and flourishing.

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Declarations

Competing Interests The authors declare no competing interests.

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