Teachers' Intrinsic Orientation, Self-Efficacy, Background Characteristics, and Effective Teaching

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Chapter 24
Teachers' Intrinsic Orientation, Self-Efficacy, Background Characteristics, and Effective Teaching: A Multilevel Moderated Mediation Modeling

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Abstract Teachers' intrinsic orientation for the profession (TIOP) refers to a compound trait derived from the meaningfulness and positive affect teachers attribute to the profession. It can be validly measured by three conceptually correlated yet empirically separable factors of autonomous motivation, enthusiasm for teaching, and enthusiasm for the subject. Grounded in the previous findings of non-significant direct relationships between TIOP and effective teaching, the present study further tested the hypothesized indirect relationships between the two constructs. To better understand the underlying relational mechanisms, the potential mediating role of self-efficacy and the moderating effects of both teacher- and school-level background factors were addressed in single- and multi-level models. A total of 239 beginning teachers from 32 Dutch secondary schools responded to the questionnaires at the beginning of the first career year. Actual teaching behaviour was observed by means of classroom observations. The results of lower-level mediation analysis confirm the mediating effect of self-efficacy on the relationship between TIOP and activating teaching behaviour at career entry. The results of single- and cross-level moderated mediation analysis show that self-efficacy significantly mediates the links between TIOP and three specific teaching behaviour domains: providing safe and stimulating learning climate, classroom management, and clarity of instruction. These effects were respectively moderated by teachers' qualification, age, and gender. The present study makes a unique contribution to understanding the importance of TIOP for beginning teachers' well-being and effective teaching, providing insights for both teacher educators and mentors.

Keywords Teacher intrinsic orientation · Self-efficacy · Background variables · Effective teaching

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1 Introduction

Teachers' psychological characteristics have long been considered to influence teaching effectiveness (e.g., Barr, 1952). A growing body of literature has highlighted the predictive value of teachers' motivational-affective factors for their teaching quality. Past studies have shown that teachers exhibit more adaptive and operative behaviours at work if they possess higher levels of intrinsically-oriented motivation (e.g., Hein et al., 2012; Hong et al., 2009; Malmberg, 2008; Pelletier et al., 2002; Roth et al., 2007) and positive affect (e.g., Kunter et al., 2008; Moè et al., 2010; Retelsdorf et al., 2010). Based on these findings, Kunter and Holzberger (2014) proposed the compound trait of teachers' intrinsic orientations (TIOs) and extended plausible processes through which TIOs may affect teaching effectiveness. In addition to the direct links, TIOs are claimed to indirectly affect occupational performance via increased classroom effort (de Jesus & Lens, 2005; Feldon, 2007), long-term persistence in professional development (Watt & Richardson, 2008; Lohman, 2006), and well-being (Klusmann et al., 2008). Moreover, Kunter (2013) postulates that these motivational and affective factors may also interact with individual characteristics and situational contexts to determine the types and quality of teaching behaviours.

However, compared to the quantity of empirical studies on the respective role teacher motivation, emotion, or well-being plays in effective teaching, links between the compound construct of TIOs and teaching behaviour are underexplored. To date, only one study was found that explores the influence of teachers' intrinsic orientation for the profession (TIOP), as a compound teacher trait that reflects the general meaningfulness and buoyancy teachers experience from teaching activities and subject matters they teach, on specific and general teaching behaviours (Feng et al., 2021). The results suggested no direct effects, which warrants the necessity for further testing the potential indirect relationships. With this end in view, the present study makes an initial attempt to explore the mediating role of self-efficacy (i.e., teachers' beliefs in their ability to work effectively), one element of teacher well-being (van Horn et al., 2004), in TIOP-teaching behaviour links, by taking into account the specificity of contexts and the hierarchical structure of data. The present study aims to enrich the knowledge base of teacher motivation and teaching effectiveness in two ways. Firstly, the exploration of the indirect TIOP-teaching behaviour links brings new insights into the plausible complex mechanisms underlying the transformation of internal psychological traits into actual teaching behaviour. Secondly, the involvement of multilevel boundary conditions addresses the contextual specificity of TIOP-teaching behaviour link, with regard not only to the relationship strength but also to its direction. Specifically, examining the effects at both lower and higher levels simultaneously may prevent an overestimation of the main effect of teacher-level variables that is typical in hierarchical data.

2 Literature Review

2.1 Teacher Motivation and Effective Teaching Behaviour

It has long been acknowledged in educational research that teacher motivation plays a key role in nurturing teaching effectiveness (de Jesus & Lens, 2005; Miller et al., 2008). Studies employing self-determination theory (SDT; Deci & Ryan, 1985, 2000) have established strong associations between teaching practice, student learning, and teacher's autonomous motivation (i.e., deep-rooted or fully internalized endorsement of task value, for example, teachers' believe that teaching is meaningful for self's gratification and students' growth) (for a review, see Slemp et al., 2020). Activated by a full sense of meaningfulness for self and others (Deci et al., 2017; Ryan & Deci, 2017), autonomous motivation is assumed to be associated with higher levels of functional behaviors (Ryan & Deci, 2000). Specifically, Pelletier et al. (2002) identified a positive relationship between Canadian teachers' autonomous motivation and self-reported provision of autonomy support for students. Built upon this finding, Taylor and Ntoumanis (2007) and Taylor et al. (2008) found multiple benefits of autonomous motivation on the use of three motivational strategies (i.e., autonomy support, structure, and involvement) reported by physical education (PE) teachers in the U.K. Similarly, Roth et al. (2007) concluded from their investigation in Israeli elementary schools that teachers' reported autonomous motivation positively predicted student-perceived autonomy-supportive activities, which in turn yielded increased student motivation for learning. Consistent findings were also documented in research across a range of contexts such as Hong Kong secondary schools (Lam et al., 2009), Spanish EFL classrooms (Bernaus et al., 2009), Indonesian junior high schools (Abbas, 2013), and Flemish PE teachers across educational levels (Van den Berghe et al., 2014).

In addition to the consequence of motivational strategies, Hein et al. (2012) also concluded in a cross-national study including Estonia, Hungary, Latvia, Lithuania, and Spain that intrinsically motivated teachers exhibited more student-centered and productive styles of teaching. In the Indonesian secondary school context, teachers' autonomous motivation was positively related to classroom management skills and clarity of instruction (Irnidayanti et al., 2020). In sum, the cumulative evidence reveals a clear relevance of teacher-perceived autonomous motivation with certain aspects of effective teaching. It can be concluded that, in general, teachers who perceive their work as intrinsically worthwhile and meaningful are likely to exhibit higher levels of effective teaching behaviours.

2.2 Teacher Enthusiasm and Effective Teaching Behaviour

The topic of teacher enthusiasm in general has captured the interest of educational practitioners and researchers in the past decades for multiple reasons (Keller et al., 2016). Initially characterized in teaching effectiveness research as an indicator of

effective teachers, teaching strategies, and course quality (e.g., Gentry et al., 2011; Moulding, 2010; Walberg & Paik, 2000), teacher enthusiasm manifests itself in a set of outward teacher behaviours perceivable to the observers and students in large scale evaluations. Under a process-product paradigm of this research strand, teacher enthusiasm is characterized by energetic and humorous teaching, sustained student interest (post-hoc analysis without a proactive underlying theory of enthusiasm; e.g., Marsh, 1982, 1994; Marsh & Ware, 1982), student-teacher rapport, and safe and stimulating teaching (Jackson et al., 1999).

Later, Kunter et al. (2008) reconceptualized teacher enthusiasm by shifting the focus of interest from visible "enthusiastic expressiveness" to the relatively hidden "enthusiastic experience" of teachers. Deviating from the cumulative studies on displayed teacher enthusiasm, they proposed the concept of *experienced enthusiasm* and referred to it as "the degree of enjoyment, excitement, and pleasure that teachers typically experience in their professional activities" (Kunter et al., 2008, p. 470). In doing so, these scholars theoretically differentiated the affective and behavioral approaches of teacher enthusiasm and suggested the former as the antecedent to prompt the latter (Frenzel et al., 2009; Kunter et al., 2008, 2011). Furthermore, they recognized two conceptually different, yet correlated sub-dimensions of experienced teacher enthusiasm, one for the subject being taught (i.e., enthusiasm for the subject) and the other for the teaching activity itself (i.e., enthusiasm for teaching) (Kunter et al., 2008, 2011).

The reconceptualization of teacher enthusiasm as an affective trait is also mirrored by the instrument to measure it. Kunter et al. (2008, 2011) put aside the high/low-inference instruments for student perceptions (Frenzel et al., 2009; Patrick et al., 2000; Wheeless et al., 2011) or observer ratings (e.g., Brigham et al., 1992; Natof & Romanczyk, 2009) frequently used in the teaching effectiveness research. Instead, they developed and refined self-reports measures to assess teachers' experienced enthusiasm in forms of their general impression and evaluation for the enjoyment and pleasure they experience at work (one teaching-specific subscale and one subject-specific subscale). Self-reported enthusiasm for teaching, but not that for the subject, was found to be associated with secondary school teachers' higher levels of classroom management skills and cognitively activating and supportive teaching, which subsequently benefited students' motivation and academic achievement (Kunter, 2013; Kunter et al., 2008). In a nutshell, studies generally suggest that teachers who perceive teaching as intrinsically pleasant are more likely to excel in certain teaching behaviour domains.

2.3 Teachers' Intrinsic Orientation and Effective Teaching Behaviour

Grounded in SDT and teaching effectiveness perspectives, Kunter and Holzberger (2014) encapsulates the conceptually close, yet separable, intrinsic factors of teachers' orientations into the compound trait TIOs. They refer to TIOs as "the habitual

inter-individual differences between teachers in the degree to which they experience positive emotions and high meaningfulness in their profession" (Kunter & Holzberger, 2014, p. 86). In the theory-led model constructed by Kunter and Holzberger (2014), TIOs is hypothesized as an essential correlate of teacher well-being (e.g., self-efficacy, job satisfaction, burnout) and professional effort at workplace (e.g., engagement and persistence in professional learning, classroom efforts). These teacher factors in turn benefit instructional quality and subsequent student outcomes. More specifically, it is assumed that the positive influence of TIOs on effective teaching behaviour can be explained by both direct psychology-behavior links and indirect relationships mediated by teachers' situational classroom effort (de Jesus & Lens, 2005; Feldon, 2007), well-being (Klusmann et al., 2008), and long-term persistence in professional development (Watt & Richardson, 2008; Lohman, 2006) (see Fig. 24.1). Additionally, teachers' motivational and affective traits are postulated to interact with individual characteristics and situational contexts to determine the types and quality of teaching behaviour (Kunter, 2013). The innovative value of this model lies in its additional explanation for the underlying process where various psychological and behavioral traits of teachers interplay for better functioning across contexts.

IN LIGHT OF KUNTER AND Holzberger (2014)'s theory, TIOs have been further crystallized by being rephrased into teachers' intrinsic orientation for the profession (TIOP) (Feng et al., 2021). The construct validity of TIOP was empirically tested in terms of its dimensionality via teachers' self-reported autonomous motivation (i.e., a cognitive-evaluative factor reflecting the meaningfulness teachers ascribe to the profession) and experienced enthusiasm for teaching and for the subject (i.e., affective-evaluative factors to elicit teachers' positive emotional experience) (Feng et al., 2021) (see Fig. 24.1). The results concluded that TIOP can be constructed as a compound trait of teachers with three subdimensions. However, the empirical testing of TIOP's predictive validity for the quality of the general as well as specific observed teaching behavior (i.e., providing safe and stimulating learning environment, classroom management, clarity of instruction, intensive and activating

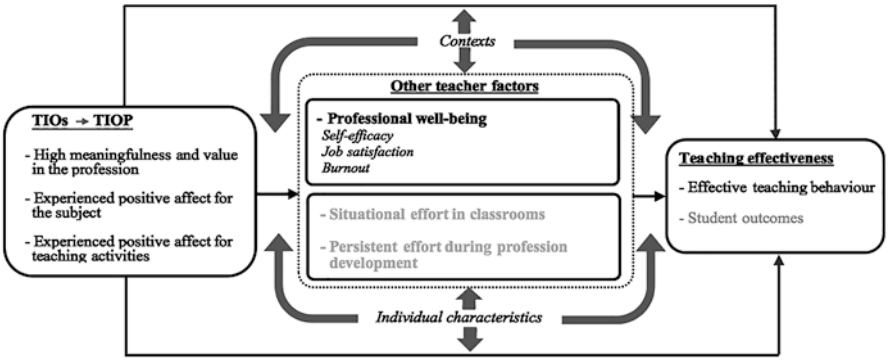

Fig. 24.1 A model of the relationships between TIOs/TIOP and effective teaching adapted from Kunter and Holzberger's (2014) theory (concepts not included in the present study are blurred)

teaching, differentiated instruction, teaching learning strategies) indicated that there was no significant direct relationship between TIOP and the six teaching behaviour domains (Feng et al., 2021). Consequently, it is hypothesized that the effects of TIOP on displayed teaching behaviors may be indirect and may potentially be influenced by certain teacher characteristics in different boundary conditions.

In other words, instead of functioning as a direct facilitator, TIOP may indirectly profit the quality of displayed teaching behaviour through its positive effects on teachers' psychological well-being and the subsequent intentional efforts they invest in the profession. However, the strength of these direct and indirect effects may vary across teachers with different personal characteristics (e.g., age, gender, academic qualification) and working contexts (e.g., class size, school culture, principal leadership). Unfolding such complex interplay of teacher factors is therefore considered of great value to understand the process of successfully transforming (student) teachers' inner power into the actual profits for themselves (i.e., well-being and professionalization) and the students (i.e., teaching and learning effectiveness). As an initial step of this exploration, the present study examines the role of teacher self-efficacy in mediating the links between TIOP and different domains of teaching behavior, while considering the influence of the relevant background factors at teacher and school levels.

2.4 Mediators and Moderators of the Relationship Between TIOP and Effective Teaching Behaviour

2.4.1 Self-Efficacy as a Mediator

As illustrated in Fig. 24.1, TIOP can function as either a direct or an indirect resource for instructional quality through teachers' increased well-being. While a rigorous analysis of all possible mediators is beyond the scope of the present study, the focus is on the mediating role of self-efficacy as a representative factor of teachers' occupational well-being (Van Horn et al., 2004). Since the concept of TIOP is relatively novel and empirical research on TIOP is scarce, existing literature on the sequential connections among TIOP-related concepts such as autonomous motivation, enthusiasm, self-efficacy, and teaching behaviors are elaborated for reference.

A large body of empirical literature has documented the benefits of autonomous motivation for teachers' psychological well-being and functioning in diverse contexts (e.g., Fernet et al., 2017; Ryan & Deci, 2000, 2017). More specifically, autonomously motivated teachers are more likely to experience higher levels of self-efficacy (Gagné et al., 2015), sense of accomplishment (Ryan & Deci, 2000), job satisfaction (Collie et al., 2016), and overall satisfaction of life (Pauli et al., 2018). In addition to intrinsically-orientated motivation, experienced enthusiasm also bears a close link to enhanced well-being of teachers (Keller et al., 2016). Enthusiastic teachers were found to be more self-efficacious (Kunter et al., 2011), and satisfied with their work and life (Kunter, 2013; Kunter et al., 2008, 2011). In sum,

autonomous motivation and experienced enthusiasm of teachers seems to go hand in hand with self-efficacy and other factors of well-being.

Self-efficacy as a primary indicator of teachers' well-being has been both theoretically and empirically supported to predict teachers' beliefs about instructional behaviors (Ross, 1992; Skaalvik & Skaalvik, 2007; Tschannen-Moran & Hoy, 2001). Teachers with lower levels of self-efficacy are more likely to experience setbacks in teaching (Betoret, 2006). A meta-analysis of 43 self-efficacy studies done by Klassen and Tze (2014) reveals a significant medium effect size ($r = .28$) of self-efficacy on evaluated teaching performance (via principal, supervisor, student ratings), which is consistent with the prior self-efficacy studies outside the education discipline (e.g., $r = .38$; Stajkovic & Luthans, 1998). This conclusion was further clarified in another review study (Zee & Koomen, 2016) which identified the consequence of in-service teacher self-efficacy on teaching behaviors such as process-oriented instruction and differentiation, activating teaching strategies, inclusive practices and referral decisions, classroom management skills (both instructional and behavioral), classroom goal structures, and emotional support. In sum, more efficacious teachers are likely to exhibit a learner-centered constructivist style of teaching (Temiz & Topcu, 2013). However, the role of self-efficacy as a mediator of teacher motivation and teaching behaviour is unclear.

2.4.2 Teacher Characteristics and Contexts as Moderators

Moderators are considered very informative in social science research since they underline the boundary conditions of a theory's generalizability (Whetten, 1989). Informed by the empirical evidence on how certain contextual and personal factors influence teaching behaviors, the present study aims to test the contextualized relationship between self-efficacy and teaching behaviour. Considering that teachers are naturally embedded in hierarchical school structures, the contextual factors that may impact their professional practices should be considered in a multi-level design (e.g., school, classroom, teacher). The regional or school level factors such as the dynamics and size of student population, the student-teacher (employment size) ratio, financial distribution for school management and teacher professionalism may influence the attraction, retention, and growth of high-quality beginning teachers (for a review, see van der Pers & Helms-Lorenz, 2019). Specifically in the context of Dutch secondary schools, 11% to 22% of the variance in beginning teachers' observed teaching behaviour was attributed to school-level characteristics (van der Pers & Helms-Lorenz, 2019). Among them, effects of urbanization degree and student population decline were found on stimulating teaching, classroom management, and adaptive instruction, respectively. Furthermore, many schools provide novices and veterans with different degrees of learning opportunities and infrastructures. For instance, professional development schools (PDSs) in the Netherlands collaborate with education institutes to support teachers by means of sustainable and collaborative activities, which in turn fosters beginning teachers' general teaching behaviour during their first career year (Helms-Lorenz et al., 2018).

Apart from the contextual factors at higher levels, personal characteristics at the teacher level such as *gender* (e.g., Opdenakker et al., 2012; Opdenakker & Van Damme, 2007; Van Petegem et al., 2007), *age* and *teaching experience* (e.g., Kini & Podolsky, 2016; Ladd & Sorensen, 2015; Maulana et al., 2015), *educational background* and *certification* (see Tatto et al., 2012; van der Pers & Helms-Lorenz, 2019) are, in varying degrees, related to teachers' instructional quality. Amongst these factors, cumulative training and practical experience predominantly avail teachers improved instructional skills (e.g., van der Pers & Helms-Lorenz, 2019), and male teachers are found to exhibit better instructional (Maulana et al., 2015) and relational skills (e.g., classroom management, student interaction, cooperativeness) (e.g., Opdenakker et al., 2012). Furthermore, since the process of teaching and learning is inherently interactive and reciprocal, *student factors* (at class, school, regional levels) have been revealed to affect teachers' professional well-being and teaching effectiveness (Kunter & Holzberger, 2014). For example, schools with a predominant proportion of low socioeconomic-status (SES) students were found to hinder beginning teachers' workplace learning (Ronfeldt, 2012) and inhibit peer/colleague cooperation (Opdenakker & Van Damme, 2007). Comparatively, smaller classes may engender more individualized teaching and teacher-student interaction, after controlling for prior pupil attainment, gender, and special education needs (Blatchford et al., 2011). Nevertheless, the moderating effect of certain personal and contextual background factors on the link between teacher motivation and teaching behaviour requires further investigation.

3 The Current Study

Whereas novices in most occupations generally begin with minor duties and progressively receive more challenging assignments along their trajectory of professionalization, beginning teachers tend to receive full pedagogical and organization responsibilities immediately after career entry (Tynjälä & Heikkinen, 2011). Increasingly strained by instructional challenges (e.g., heavy workload, students' low engagement and misbehavior, differentiated teaching) and a discrepancy between professional efficacy and preparedness, beginning teachers experience prevalent praxis shock (Ashby et al., 2008; Hoy & Spero, 2005). This problem seems to subsequently jeopardize professional well-being and motivation, leading to rising teacher attrition and shortages in the longer term (e.g., Helms-Lorenz et al., 2016). In view of such concerns, the present study assigned research priority to the assessment of beginning teachers' TIOP and delved into the relationships between teachers' self-perception (i.e., TIOP and self-efficacy) and preparedness (i.e., general and specific teaching behaviour) at career entry.

Since the strengths of these relationships might vary across contexts (Blömeke et al., 2016), no prior assumption was made regarding the moderating effects of one

particular background variable on the link between TIOP and teaching behaviour. Instead, a general hypothesis was developed only on the existence of personal or contextual factors as moderators in the efficacy-teaching behavior link. By employing an exploratory approach, the influence of TIOP on the specific and general teaching behaviour via self-efficacy were scrutinized for its context-(in)dependency. To achieve this purpose, the following research questions were to be answered:

1 Does teachers' self-efficacy mediate the relationships between TIOP and the specific and general observed teaching behaviour?
2 Do teachers' demographics (i.e., age, gender, education degree, qualification types) and contextual characteristics at teacher-level (i.e., class size, students' gender, age, prior academic scores) moderate the mediating effect of self-efficacy in the relationship between TIOP and teaching behaviour?
3 Do school characteristics (i.e., school size, school type, student teacher ratio, employment size, gender and age distribution of teacher population; student SES) moderate the mediating effect of self-efficacy in the relationship between TIOP and teaching behavior?

4 Methods

4.1 Participants and Procedure

The present study was a part of a 3-year research project on the teacher induction program implemented in the northern Netherlands (in Dutch: *Inductie in het Noorden* (*INO*)), which was subsidized by the Dutch government. After the research objectives and protocols were developed, 239 beginning teachers (N_{female} = 144, M_{age} = 28.74), ranging from 21 to 61 years of age and of all subject matters, voluntarily participated in the project at career entry. They were unevenly distributed among 32 Dutch secondary schools ($N_{teachers\ per\ school}$ = 1–21). Specifically, three cohorts of teachers were included. Cohort 1 (N = 73) were surveyed with the questionnaires of TIOP and self-efficacy between November and December in 2014, cohort 2 (N = 78) between October and November in 2015, and cohort 3 (N = 88) between October and November in 2016. In addition to self-reports, beginning teachers were observed by well-trained observers and rated on the quality of the six domains of teaching behavior displayed in the classroom. The Dutch version of these instruments was employed in this study after translation and back translation procedure was conducted (Hambleton, 1994). School contextual factors and personal characteristics were collected from secondary sources or public databases. In order to increase response rates, teachers who participated throughout the INO project were provided with a €30 gift voucher and annual feedback.

4.2 Measures

TIOP. Dutch beginning teachers' TIOP was measured using a validated TIOP scale, which consists of the sub-dimensions of experienced enthusiasm for teaching (4 items), experienced enthusiasm for subject (4 items), and autonomous motivation (3 items) (Feng et al., 2021) (see Appendix Table 24.A1). Teachers' responses were scored using four-point Likert scales ranging from 1 (completely disagree) to 4 (completely/strongly agree). Considering the multidimensional second-order structure of TIOP, omega (0.91, 0.92) and omega hierarchical (0.79, 0.78), instead of alpha, were selected as the reliability coefficients. The estimates of omega (hierarchical) indicated that the total score of the compound TIOP scale primarily reflects the characteristics of the general factor TIOP while also leaving space to capture the specificity of sub-factors in the lower order constructs. However, the low internal consistency of the autonomous motivation subscale (alpha = .436) is most probably due to the limited number and heterogeneity of items (see Appendix Table 24.A1). This finding suggests that this subscale be better used as part of the TIOP measure rather than an independent scale.

Self-efficacy. We used the Teachers' Sense of Efficacy Scales (TSES; Tschannen-Moran & Hoy, 2001) to measure teachers' perceived self-efficacy (see Appendix Table 24.A1). Consisting of 24 items, the scale covers three domains of teacher efficacy: efficacy for instruction (8 items), efficacy for classroom management (8 items) and efficacy for student engagement (8 items) (see Appendix Table 24.A1). Teachers responded on a five-point Likert scale, ranging from 1 (nothing) to 5 (a great deal). Acceptable to high reliability coefficients of alpha (0.62–0.94) of both the general and sub-scales were reported across contexts and over time (Duffin et al., 2012; Feng et al., 2021; Helms-Lorenz et al., 2018; Tschannen-Moran & Hoy, 2001). In the present study, TSES was employed to measure beginning teachers' general teaching self-efficacy. In addition, raw scores rated on the 5-point scale were converted to 4-point scale, using the linear transformation equation: $(Max_{new}\text{-}Min_{new}) \times (X\text{-}Min_{old})/(Max_{old}\text{-}Min_{old}) + Min_{new}$.

Observed teaching behaviors. Six domains of observable teaching behavior (i.e., providing safe and stimulating learning environment, classroom management, clarity of instruction, intensive and activating teaching, differentiated instruction, teaching learning strategies) were assessed by well-trained observers using the validated Dutch version of International Comparative Analysis of Learning and Teaching (ICALT) instrument (Maulana et al., 2017; Van de Grift et al., 2014). The instrument consists of 120 low-inferential items specifying observable teaching behaviours, which are categorized into 32 high-inferential items as indicators of the aforementioned six behavioral domains. Each indicator was rated on a four-response category (1 = "mostly weak, 4 = "mostly strong"). These generic behavioral domains have been identified as essential for supporting and maximizing students' learning, thus reliably manifesting the effectiveness of teaching in classrooms. The validity and reliability of the measure have been proven good across various national contexts (alpha from 0.74 to 0.92) (Maulana et al., 2017, 2020).

Background variables. The multilevel background factors included in this study are teachers' demographics (i.e., age, gender, education degree, and qualification types) and contextual characteristics at teacher-level (i.e., class size, students' gender, age, and prior academic scores), and school-level (i.e., school size, school type, student teacher ratio, employment size, gender and age distribution of teacher population; student SES). Among them, teacher and class characteristics were recorded together with the questionnaires on teaching behaviour or the supervision monitor. Professional development school status (VORaad), school sizes (DUO, 2015, 2016; VOION, Arbeidsmarkt en Opleidingsfonds Voortgezet Onderwijs, 2016), and SES of neighbourhoods (Sociaal en Cultureel Planbureau [SCP], 2014) are all secondary data from mentioned sources. These background factors were included in the models as moderators of the relationships between self-efficacy and teaching behaviour.

4.3 Data Analysis

4.3.1 Preliminary Analysis

The proportion, patterns, and mechanisms of data missingness were scrutinized for the sake of unbiased estimates of parameters, statistical power, and generalizability of findings (Dong & Peng, 2013). Initial analysis results indicate a missing rate of 0% to 16.3% on key variables (i.e., TIOP-related factors, self-efficacy, observed teaching behaviors) (see Table 24.1). Although about 15%–20% data missingness is common in educational and psychological studies (Enders, 2003), missingness above 10% is considered consequential to statistical inferences (Bennett, 2001). Therefore, all key variables were further assessed in terms of the mechanisms of missingness using Little's Test of Missing Completely at Random (MCAR) (Little, 1988).

Table 24.1 Proportion of missingness in all variables

Focal factors	Valid N	Missing
TIOP-related factors	239	0
Self-efficacy	239	0
Teaching behaviors	200	39 (16.3%)
Background factors		
Age	238	1 (0.4%)
Gender	239	0 (0.4%)
Qualification type	237	2 (0.8%)
Degree type	236	3 (1.3%)
Class size	193	46 (19.2%)
Student mean age	193	46 (19.2%)
Student gender distribution	129	110 (46.0%)
Student prior score	185	54 (22.6%)
School contexts	168–237	2–71 (0.4–29.7%)

The construct validity of focal latent variables (i.e., second-order TIOP, second-order self-efficacy, correlated teaching behavior domains) was subject to confirmatory factor analyses (CFAs) using Mplus 8.3, on condition that the plausibility of MCAR or MAR was justified in the evaluation of cross-sectional missingness. Factors scores were thereby calculated and used for the following structural equation modeling (SEM). Furthermore, by modeling TIOP and self-efficacy in the same model (with their correlation set free), the average variance extracted (AVE) and composite reliability (CR) were estimated so as to examine the discriminant and convergent validity of the individual-level self-report data (see Appendix Table 24.A2).

4.3.2 Single and Multilevel Mediation Analysis

To test the mediating effects of self-efficacy, simple mediation models were first constructed, where the quality of general and specific teaching behavior was regressed on TIOP via self-efficacy. Goodness-of-fit indices were estimated. Preacher et al.'s (2010) Monte Carlo bootstrap method was applied to generate 95% confidence intervals (IC) that assists in making conclusions on the significance of the indirect effects. Then, on condition that the rationality of performing multilevel mediation analysis was justified through the intra-class correlations (ICC) of teaching behavior domains (ICCs = [0.100, 0.178]), lower level mediation models were constructed (see Fig. 24.2). In these random effect models, all causal paths were

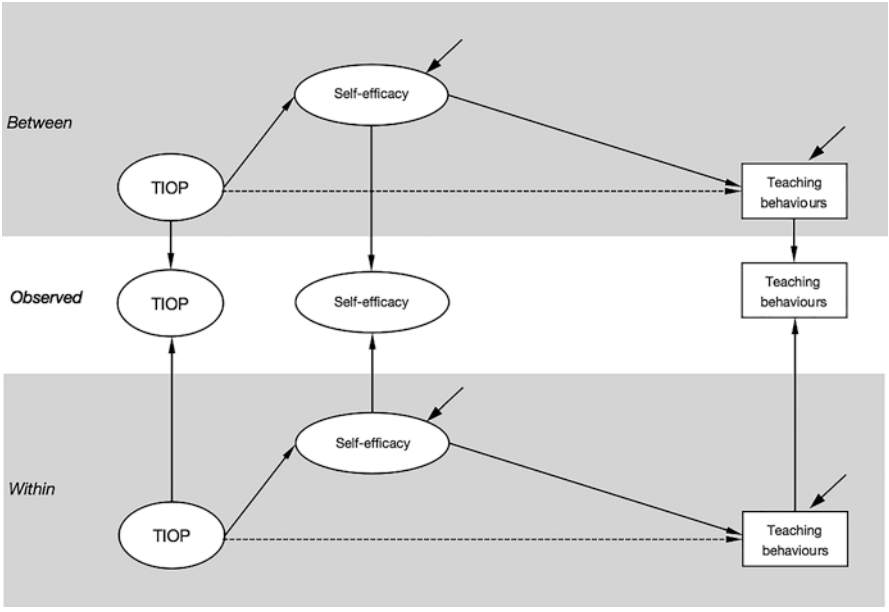

Fig. 24.2 Lower level mediation model between TIOP, self-efficacy, and teaching behavior

allowed to vary between school units. We compared their related fit indices of Akaike Information Criterion (AIC), Bayesian Information Criterion (BIC), and sample size adjusted BIC (ssaBIC) and then estimated the multilevel mediating effects (see Preacher et al., 2011; teacher-level mediation = $a_{L1} \times b_{L1}$ + L2 covariance of a_{L1} and b_{L1}; school-level mediation = $(a_{L1}+ a_{L2}) \times (b_{L1}+ b_{L2})$). Markov chain Monte Carlo (MCMC) estimation method was applied to assess the significance of school-level mediation at 95% IC. However, given that there are 7 clusters with only one member, these clusters contribute to the estimation of school-level parameters rather than individual-level ones, resulting in less individual-level power. Consequently, path estimates and confidence intervals calculated by MCMC were only reported for school-level mediation effects.

4.3.3 Single and Multilevel Moderated Mediation Analysis

After the testing of simple and lower level mediation models, background factors from two levels (i.e., teacher, school) were added to the model (see Fig. 24.3). It is presumed that school contextual characteristics are identical and thus function in a uniform manner towards individual teachers in the same schools. Therefore, a set of simple and cross-level models (i.e., teacher-school levels) were formulated, in which independent (i.e., TIOP) and dependent variables (i.e., specific and general teaching behaviors), mediator (i.e., self-efficacy), and teacher characteristics are level 1 (L1) variables, whereas school contexts are level 2 (L2) variables (see Fig. 24.3). Due to the limited sample size, the moderating effect of each factor was explored successively. The software Mplus 8.3 was used since it allows the examination of mediation and moderation in one single model and enables correct estimation of parameters and errors. In these models, the effects of L2 moderators were specified as random.

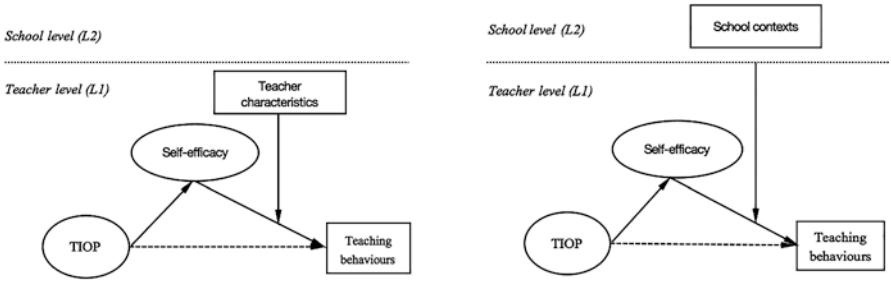

Fig. 24.3 Successive mediation models moderated by background or contextual factors at different levels

5 Results

5.1 Preliminary Results

Preliminary analysis was conducted to examine the possible consequences of missing values in data and to test the measurement validity of established instruments in the target context. The results of Little's tests ($X^2 = 28.271$, $df = 35$, $p = .783$) suggest that missing values on key variables (i.e., TIOP-related factors, observed teaching behaviors) were randomly distributed and did not depend on any other measured or non-measured variable (Graham, 2009). Consequently, cases can be dropped listwise or pairwise during factor analysis and SEM, and implementation of the maximum likelihood approach for handling missingness is also supported. The descriptive statistics of the raw scores of self-reports, observation, and teacher characteristics, along with their bivariate correlations are shown in Table 24.2, with the scale scores of self-efficacy converted to 4-point scaling. The reliability coefficients of alpha for each sub-scale were also estimated.

Based on the above findings, CFAs of teacher-level observation and self-reports were legitimate, which yielded good model fits: (1) X^2_{TIOP} (41, $N = 239$) = 83.841, $CFI_{TIOP} = 0.986$, $TLI_{TIOP} = 0.981$, $RMSEA_{TIOP} = 0.066$, and $SRMR_{TIOP} = 0.055$, λs = [0.446, 0.949]; (2) X^2_{SE} (0, $N = 239$) = 0.000, $CFI_{SE} = 1.000$, $TLI_{SE} = 1.000$, $RMSEA_{SE} = 0.000$, and $SRMR_{SE} = 0.000$, λs = [0.620, 0.829]; (3) X^2_{TB} (0, $N = 200$) = 0.000, $CFI_{TB} = 1.000$, $TLI_{TB} = 1.000$, $RMSEA_{TB} = 0.000$, and $SRMR_{TB} = 0.000$, $r = [0.113, 0.706]$. In general, all item loadings and factor correlations are significant and range from moderate to high, except the link between stimulating teaching and teaching learning strategies ($r = 0.113$, $p = 0.086$). The calculation of factor scores instead of means was warranted due to the heterogeneous loadings among three sub-domains of TIOP ($\lambda_{ET} = 0.949$, $\lambda_{ES} = 0.812$, $\lambda_{AM} = 0.446$, $ps < .001$) and self-efficacy ($\lambda_{SE1} = 0.829$, $\lambda_{SE2} = 0.620$, $\lambda_{SE3} = 0.753$, $ps < .001$).

To examine the discriminant and convergent validity of the teacher-level self-report data, TIOP and self-efficacy were estimated in a single model (see Appendix Fig. 24.A1). Goodness-of-fit indices indicated good fit, X^2 (73, $N = 239$) = 124.250, CFI = 0.983, TLI = 0.979, RMSEA = 0.054, and SRMR = 0.056. Based on the reported standardized factor loadings and residual variances, AVEs and CRs were calculated, showing acceptable to satisfactory results ($AVE_{TIOP} = 0.59$; $CR_{TIOP} = 0.80$; $AVE_{SE} = 0.54$; $CR_{SE} = 0.78$). Since the AVE values of the higher-order TIOP and multidimensional self-efficacy are above 0.5 and those of CR above 0.7, convergent validity was supported (Fornell & Larcker, 1981). Besides, given that the amount of the variance captured by TIOP or self-efficacy ($\sqrt{AVE} = 0.74$–0.77) were greater than their correlation ($r = 0.613$), discriminant validity was supported (Fornell & Larcker, 1981). In general, the CFA results prove that the established instruments applied in this study are valid measures of beginning teachers' TIOP, self-efficacy, and teaching behavior, respectively, in the Dutch context.

Table 24.2 Descriptive statistics, bivariate correlations, and reliability coefficients of alpha

	Mean (SD)	Skewness	Kurtosis	Correlation													alpha
Focal factors				F1	F2	F3	F4	$F5_1$	$F5_2$	$F5_3$	$F5_4$	$F5_5$	$F5_6$	F6	F7	F8	
F1: Enthusiasm for teaching	3.53 (0.40)	−0.25	−1.29														.761
F2: Enthusiasm for subject	3.30 (0.49)	−0.09	−0.59	.586**													.843
F3: Autonomous motivation	2.86 (0.51)	−0.32	0.44	.179**	.192**												.436
F4: Self-efficacy	2.73 (0.29)	0.40	1.15	.421**	.380**	.189**											.898
$F5_1$: Stimulating teaching	3.38 (0.52)	−1.01	2.17	.111	.000	.033	.060										.809
$F5_2$: Classroom management	3.16 (0.58)	−0.51	0.08	.136	.078	−.066	.073	.549**									
$F5_3$: Instruction clarity	3.00 (0.55)	−0.18	−0.60	.073	.038	−.053	.068	.597**	.642**								
$F5_4$: Activating teaching	2.49 (0.59)	−0.15	−0.24	.096	.069	.014	.120	.469**	.478**	.706**							
$F5_5$: Differentiated teaching	1.81 (0.68)	0.68	−0.11	.063	.089	.006	.107	.162*	.318**	.276**	.508**						
$F5_6$: Teaching learning strat	1.81 (0.69)	0.64	−0.23	−.016	.008	.004	.083	.113	.202**	.294**	.585**	.494**					

(continued)

Table 24.2 (continued)

	Mean (SD)	Skewness	Kurtosis	Correlation													alpha
Background factors																	
F6: Age	28.74 (7.61)	2.06	3.76	.019	.123	−.126	.053	−.258**	−.182*	−.162*	−.142*	−.076	−.065				
F7: Gender (male = 1; female = 2)	1.60 (0.49)	−0.42	−1.84	−.031	−.075	.086	−.142*	.000	.054	.001	.036	.125	.065	−.142*			
F8: Qualification type	1.90 (0.36)	−1.24	3.52	−.043	−.043	−.180**	−.007	−.035	.035	.029	.054	.067	.074	−.007	.048		
F9: Degree type	2.19 (2.00)	2.39	4.36	.076	.081	.171**	.070	−.029	−.076	−.077	−.113	−.052	−.159*	.077	−.053	−.823**	

* $p < .05$, ** $p < .001$

5.2 Self-Efficacy as the Mediator

The analysis of within- and cross-cluster mediation examines the multi-level relationship between TIOP and effective teaching that is mediated by self-efficacy (research question 1: single- and lower-level mediation models). Firstly, every simple mediation model showed acceptable model fit (CFI > .977; TLI > .942; RMSEA < .080; SRMR < .038) (see Appendix Table 24.A2). However, no significant mediating effect of self-efficacy was found on the relationship between TIOP and teaching behaviour. Secondly, all lower level mediation models except TIOP-activating teaching (TB4) showed non-significant indirect effects (unstandardized $\beta_{mediation\_TB4} = -2.300$, $p = .065$; $IC_{MCMC} = [-5.19, -0.23]$) (see Appendix Table 24.A2). In this model, TIOP significantly predicted self-efficacy (unstandardized $\beta = -1.447$, $p = .023$, IC = [−2.696, −0.199]), which, in turn, predicted TB4 (unstandardized $\beta = 1.589$, $p < .001$, IC = [1.129, 2.049]). After controlling for the mediator, TIOP was regressed on TB4 with unstandardized $\beta = 16.745$ ($p < .001$, IC = [16.157, 17.333]). Combining the direct and indirect effects results in a positive and significant total effect (unstandardized $\beta_{total} = 14.446$, $p < .001$).

Compared to the non-significant positive mediation (unstandardized $\beta_{mediation\_TB4} = 0.204$, $p > .05$, IC = [−0.112, 0.529]) in the corresponding single-level model, self-efficacy's mediating effect was negative and significant in the lower level model. This is caused by the stronger between-school links of TIOP-efficacy (unstandardized $\beta_{TIOP\text{-}SE} = -2.315$, $p < .001$; IC = [−3.443, −1.187]) and of efficacy-TB4 (unstandardized $\beta_{SE\text{-}TB4} = 1.286$, $p < .001$; IC = [1.101, 1.471]), as illustrated in Fig. 24.4. In the same vein, the direct effect of TIOP on TB4 turned significant in the lower level model due to the stronger between-school effect (unstandardized $\beta_{TIOP\text{-}TB4} = 17.025$, $p < .001$; IC = [16.882, 17.167]). In general, self-efficacy seemed to partially suppress the effect of TIOP on the quality of intensive and activating teaching at the outset of teaching career. However, such effect is mainly caused by between-school differences, leaving the teacher-level direct and indirect links not statistically significant.

5.3 Background Variables as Moderators

The analysis then moved to the estimation of moderated mediation. Whether the mediation effects of self-efficacy were strengthened or weakened by personal (research question 2: single-level models) and school characteristics (research question 3: cross-level models) was examined. In total, four single-level models but no cross-level models were found with significant moderated mediation (see Table 24.3). All models showed similar related fit indices when compared to simple mediation models ($\Delta_{AICs} = [-14.555, -1.006]$, $\Delta_{BICs} = [-7.736, 5.946]$, $\Delta ssa_{B\text{-}ICs} = [-14.074, 0.394]$). As illustrated in Fig. 24.5, teachers' TIOP positively predicted self-efficacy with $\beta = [0.515, 0.523]$, $p < .05$, while self-efficacy in turn (1)

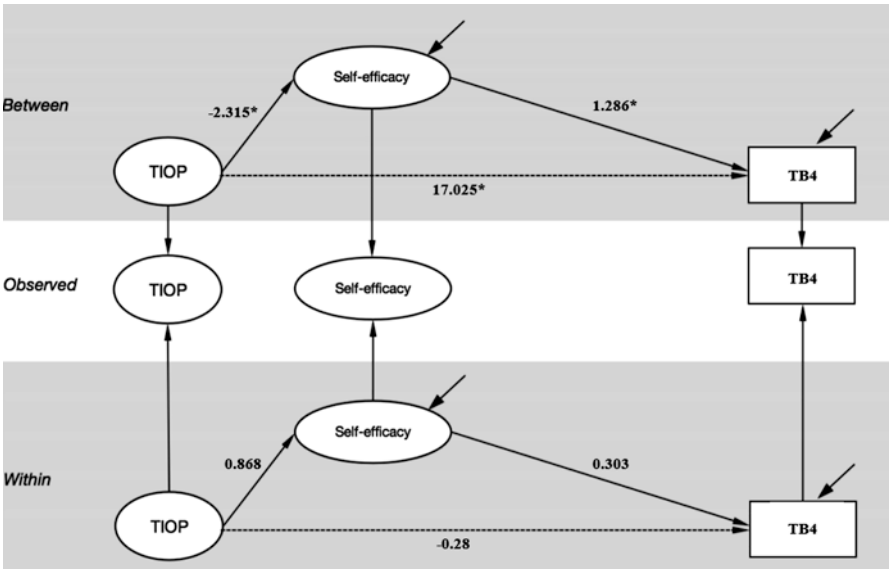

Fig. 24.4 Lowe-level model with the significant mediating effect of self-efficacy
* $p < .05$

Table 24.3 Fit indices of simple mediation models

	Related fit indices			Mediation		Moderated mediation	
Model	AIC	BIC	ssaBIC	p	IC_{MCMC}	p	IC_{MCMC}
Model 1_qualification_TB1	996.510	1051.999	1001.285	.012	[−1.203, −0.172]	.003	[0.149, 0.678]
Model 2_qualification_TB2	1042.156	1097.645	1046.931	.036	[−1.630, −0.113]	.034	[0.060, 0.815]
Model 3_age_TB2	1038.156	1093.712	1042.997	.017	[−3.000, −0.365]	.016	[0.013, 0.103]
Model 4_gender_TB3	1034.776	1090.399	1039.683	.043	[0.093, 2.169]	.027	[−1.236, −0.108]

negatively predicted stimulating teaching (TB1) and classroom management (TB2) ($\beta = [-0.843, -0.404]$, $p < .05$), with the latter slopes positively predicted by the interference moderators of qualification or age ($\beta_{interaction} = [0.168, 0.222]$, $p < .05$), or (2) positively predicted clarity of instruction (TB3) ($\beta = [0.604, 0.796]$, $p < .05$), with negative interference moderators of gender or age ($\beta_{interaction} = [-0.194, -0.178]$, $p < .05$).

Specifically, after involving the hypothesized mediators and moderators, the influence of TIOP on TB1 and TB2 was fully suppressed by self-efficacy ($\beta_{mediation\_model1} = -0.657$; $p = .012$; $IC_{MCMC} = [-1.203, -0.172]$; $\beta_{mediation\_model2} = -0.807$; $p = .036$; $IC_{MCMC} = [-1.630,-0.113]$; $\beta_{mediation\_model3} = -1.582$; $p = .017$;

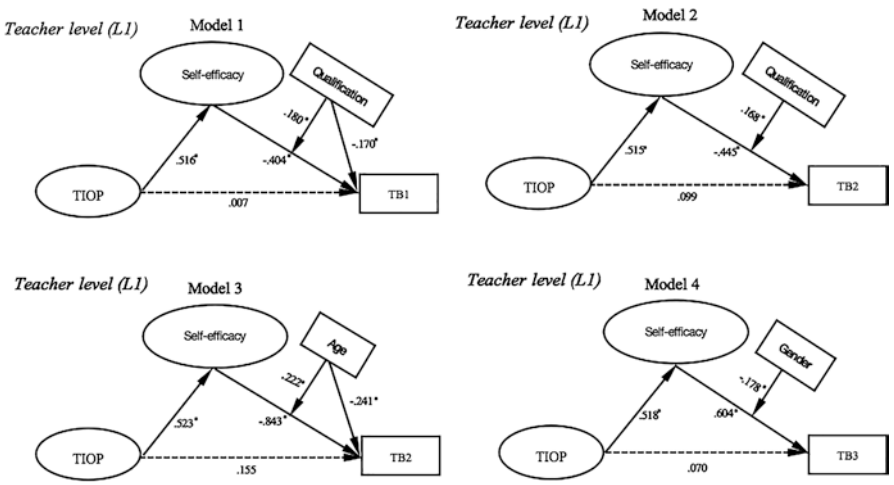

Fig. 24.5 Models with significant effects of moderated mediation
* $p < .05$.

IC_{MCMC} = [−3.000, −0.365]). The suppression effects on TB1 decrease with qualification ($\beta_{moderated\ mediation\_model1}$ = 0.394; p = .003; IC_{MCMC} = [0.149, 0.678]). The effects on TB2 also decrease with qualification ($\beta_{moderatedmediation\_model2}$ = 0.409; p = .034; IC_{MCMC} = [0.060, 0.815]) and age ($\beta_{moderatedmediation\_model3}$ = 0.055; p = .016; IC_{MCMC} = [0.013, 0.103]). Comparatively, self-efficacy was also found to fully mediate the positive effects of TIOP on TB3 ($\beta_{mediation\_model4}$ = 1.061, p = .043; IC_{MCMC} = [0.093, 2.169]), and this mediating effect was stronger for males ($\beta_{moderatedmediation\_model4}$ = −0.639; p = .027; IC_{MCMCs} = [−1.236, −0.108]). In general, teacher characteristics such as qualification, age, and gender, rather than contextual factors at both teacher and school levels, significantly moderate the indirect links between TIOP and relatively basic and teacher-centered teaching behavior.

6 Discussion and Conclusion

The main purpose of this study was to test the indirect links between TIOP and teaching behaviour built upon the previous work of Kunter and Holzberger (2014). Since the concept of TIOP is relatively novel and relevant empirical research is scarce, the knowledge base of TIOP is still in development. The present study is one of the first to address the theoretical and empirical implication of TIOP, as a compound teacher trait, in teaching effectiveness research.

The first research question was: *Does teachers' self-efficacy mediate the relationships between TIOP and the specific and general observed teaching behaviour?* The findings of simple and lower-level mediation analysis answered this question by providing such evidence that, after considering the naturally nested structure of

teacher workforce, self-efficacy is found to partially suppress the positive relationship between TIOP and activating teaching at the outset of teaching career. This is in line with the findings of Ryan and Deci (2000, 2017), Kunter (2013), and Kunter et al. (2008) about teachers' positive psychological factors (i.e., TIOs, well-being) benefiting effective teaching behaviour, whereas partly inconsistent with Kunter and Holzberger's (2014) hypothesis on self-efficacy as a facilitating mediator. A closer look at the relationships at both levels reveals that self-efficacy does serve as a facilitator at the teacher level, which confirms the empirical findings of Gagné et al. (2015), Kunter et al. (2011), Klassen and Tze (2014), and Zee and Koomen (2016). However, the stronger suppressing effect of self-efficacy found at the school level, caused by the negative TIOP-efficacy link, completely overwhelmed the aforementioned teacher-level effect. Most likely, it is caused by the external school-level factors which have not been internalized by beginning teachers, such as recruitment policies to attract and retain teachers with qualities that are aligned to the school culture.

It seems that the school-teacher mutual selection somehow leads to the gathering of teachers with a discrepancy between TIOP and self-efficacy. One possible explanation of this could be some schools' tendency to attract and recruit enthusiastic teachers who are experiencing praxis shock. Beginning teachers who rate themselves high on TIOP-related scales are more likely to hold higher expectations towards the teaching profession (Ashby et al., 2008) and sometimes more vulnerable to role shock and disillusion. As a consequence, these intrinsically motivated beginning teachers may possess better activating teaching skills to maximize learning outcomes but their actual performance is slightly interfered by the loss of self-confidence in implementing them in classrooms. Comparatively, some other schools may find a majority of their beginning teachers with relatively lower enthusiasm or intrinsic motives yet higher self-efficacy. In their cases, self-efficacy can serve as a buffer to offset the influence of low TIOP on activating teaching skills.

Considering that the strengths of TIOP-efficacy-behavior links might vary across different boundary conditions, the second and third questions were raised: *Do teacher characteristics and school contexts moderate the mediating effect of self-efficacy in the relationship between TIOP and teaching behavior?* Results of single-level moderated mediations answered the second research question, suggesting that personal factors such as qualification, age, and gender significantly moderate certain indirect TIOP-teaching behavior links. However, cross-level model results do not provide any empirical evidence for the moderating effects of school-level characteristics. As a complement of the first conclusion that self-efficacy partially mediates the TIOP-activating teaching link at the school level, moderated mediation results reveal that self-efficacy also fully mediates the relationships between TIOP and three other teaching behaviours (i.e., providing safe and stimulating learning environment, classroom management, clarity of instruction) at the teacher level. Such findings provide further evidence supporting the positive links between TIOs and teacher well-being (e.g., Gagné et al., 2015; Kunter et al., 2011) as well as the

gender effect (e.g., Maulana et al., 2015; Opdenakker et al., 2012) and benefits of teacher experience on effective teaching (e.g., van der Pers & Helms-Lorenz, 2019). Nevertheless, it is noteworthy that there are two findings that seem inconsistent with the previous studies.

Firstly, self-efficacy is found to negatively relate to beginning teachers' behaviours in terms of providing safe and stimulating learning climates and managing classrooms. But these negative links may weaken and finally turn positive after teachers accumulate certain years of teaching experience. In this case, the finding enriches the previous self-efficacy theories (for a review, see Klassen & Tze, 2014; Zee & Koomen, 2016) by revealing the prevalence of beginning teachers' imprecise perception of their actual capacity in these two domains and by identifying the importance of accumulated experience in lessening such misconception. Comparatively, beginning teachers' evaluation of their actual instructional clarity is relatively more accurate. This may be due to the more tangible indicators (e.g., clear lesson structure, regular checking students' understanding, structured explanation) (Maulana et al., 2020).

Secondly, no evidence was found to uphold the (in)direct relationships between TIOP and differentiated instruction and teaching learning strategies, two behaviour domains that are relatively complex and student-centered. One possible explanation for this could be the measurement instrument used in this study for teachers' self-efficacy, as a higher-order factor, reflecting the general evaluation of their own competence in stimulating and activating teaching, classroom management, and instruction clarity. The lack of domain specificity, particularly in terms of the more complex domains of differentiated instruction and metacognition teaching, may lead to less correspondence between beginning teachers' perception of and actual competence in particular skills. Nevertheless, the empirical validity of the above and additional plausible explanations requires future research.

7 Implication and Limitations

Teaching effectiveness research is not merely concerned with student-centered outcomes. The past decades have witnessed an increasing trend towards paying attention to the significance of teachers in the profession (Keller et al., 2016). Teachers' motivation and well-being as well as the complex mechanisms underlying whether and how they transform such internal qualities into effective teaching behaviour matters. Therefore, this study can serve as a threshold for a fresh view of the inner world of teachers by pointing out a consolidated direction for future research on teachers' psychology-behavior links. Specifically, this empirical study provides some preliminary evidence on the potential benefit TIOP can bring to beginning teachers' well-being and effective teaching behaviour. It is thereby suggested that the theory of TIOP be embedded into the design of initial teacher education (ITE)

and induction arrangements. Nevertheless, findings of the school-level discrepancy between TIOP and self-efficacy that emerge during the recruitment process as well as the teacher-level imprecise perception of actual capacity in certain domains call our attention to a more malleable and differentiated design of such interventions.

During pre-service education, value construction and positive experiencing should be arranged to further nurture student teachers' high meaningfulness and affection for their future career, which is hopefully linked to higher self-efficacy and improved skills in stimulating and activating teaching, classroom management, and clarity of instruction at the individual level. Comparatively, after career entry, schools and mentors are recommended to differentiate their training by providing self-efficacious teachers with TIOP-facilitating intervention (e.g., school visit and enculturation, value construction seminars and workshops) and self-determined teachers with confidence-raising activities (e.g., collaborative lesson planning, peer assessment and communication). It is assumed that such balanced development can not only fashion a more vigorous team of beginning teachers but also advantage their actual teaching behaviour to maximize student learning.

In addition to the school-wide differentiation, teacher education and induction should also offer training that is tailored to teachers' personal characteristics and individual needs (Decker & Rimm-Kaufman, 2008; Joerger & Bremer, 2001). In light of the present research findings, it is suggested that not only teachers' psychological and behaviour profiles (e.g., TIOP, self-efficacy, domain-specific teaching skills) but also personal characteristics (e.g., age, qualification, gender) should be taken into consideration during the design of interventions. Acknowledging the complex interplay of multiple personal factors and how they may influence teachers' well-being and performance in the workplace matters, especially when educators and mentors try to maximize the effectiveness of training and the professional potentials of teachers. In our case, in order to optimize beginning teachers' resiliency to reality shock caused by the discrepancies that emerge among TIOP, well-being, and effective teaching behaviour, additional personalized training and mentoring are recommended.

It is noted that the present study has several limitations. Firstly, this study assessed self-efficacy as a general concept instead of domain-specific self-efficacies (efficacy for instruction, classroom management and student engagement), which to some extent coincides with certain domains of teaching behaviors (e.g., instructional clarity, intensive and activating teaching, classroom management). Therefore, it would be intriguing to further explore the influence of different types of self-efficacy on the related specific domains of teaching behaviour and how such effects mediate the relationships between TIOP and teaching effectiveness. Secondly, the mediation analysis confirmed the assumptions that TIOP constitutes a resource factor and that self-efficacy operates as a mediator between TIOP and basic teaching skills under certain boundary conditions. However, the absence of longitudinal data

makes it impossible to further examine the causality of the relationships. Accordingly, longitudinal or intervention data are needed in future studies to confirm the direction of the effects. Despite the above limitations, the findings support the importance of TIOP for beginning teachers' well-being and effective teaching and demonstrate the moderating effects of teacher-centered background factors. To better understand the complex mechanisms underlying the transformation of TIOP to teaching effectiveness, additional research needs to be conducted. After the hypothesized links are empirically tested in and beyond the current context, the theory-led model constructed in this paper can be validated and applied, as a systematic and generalizable guide, in initial teacher education and teacher induction programs.

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Appendix

Table 24.A1 English version of three self-reported scales

Sub-scales			Items
TIOP	**Professional affection** (Adapted from Kunter et al., 2011)	Affection for teaching	ET01. I teach [this subject] with great enthusiasm. ET02. I always enjoy teaching students new things. ET03. I enjoy interacting with students. ET04. It's a pleasure to teach.
		Affection for subject	ES05. I find my subject exciting and try to convey my enthusiasm to the students. ES06. Engaging in my subject is one of my favorite activities. ES07. I engage in my subject because I enjoy it. ES08. Because engaging in my subject is fun, I wouldn't want to give it up.
	Professional meaningfulness (Adapted from Opdenakker and Maulana 2008)		AM09. ... Because through this work I can achieve my career goals. AM10. ... Because I think it is important for the academic success of my students
			AM11. ... Because work with interesting challenges gives me satisfaction.

(continued)

Table 24.A1 (continued)

Sub-scales		Items
Perceived self-efficacy (Tschannen-Moran & Hoy, 2001)	Instruction	EIS01. To what extent can you use a variety of assessment strategies? EIS02. To what extent can you provide an alternative explanation or example when students are confused? EIS03. To what extent can you craft good questions for your students? EIS04. How well can you implement alternative strategies in your classroom? EIS05. How well can you respond to difficult questions from your students? EIS06. How much can you do to adjust your lessons to the proper level for individual students? EIS07. To what extent can you gauge student comprehension of what you have taught? EIS08. How well can you provide appropriate challenges for very capable students?
	Classroom management	ECM01. How much can you do to control disruptive behavior in the classroom? ECM02. How much can you do to get children to follow classroom rules? ECM03. How much can you do to calm a student who is disruptive or noisy? ECM04. How well can you establish a classroom management system with each group of students? ECM05. How well can you keep a few problem students from ruining an entire lesson? ECM06. How well can you respond to defiant students? ECM07. To what extent can you make your expectation clear about student behavior? ECM08. How well can you establish routines to keep activities running smoothly?
	Student engagement	ESE01. How much can you do to get students to believe they can do well in schoolwork? ESE02. How much can you do to help your students value learning? ESE03. How much can you do to motivate students who show low interest in schoolwork? ESE04. How much can you assist families in helping their children do well in school? ESE05. How much can you do to help your students think critically? ESE06. How much can you do to foster student creativity? ESE07. How much can you do to get through to the most difficult students? ESE08. How much can you do to improve the understanding of a student who is failing?

Table 24.A2 Fit indices for simple and lower-level mediation models

One-level Model	Robust χ^2 goodness-of-fit						Indirect effect	
	Value	df	CFI	TLI	RMSEA	SRMR	*p*	95% CI
TIOP on TB1	2.448	4	1.000	1.015	0.000	0.016	.819	[−0.279, 0.337]
TIOP on TB2	10.047*	4	0.977	0.942	0.080	0.038	.724	[−0.385, 0.281]
TIOP on TB3	4.721	4	0.997	0.993	0.027	0.025	.795	[−0.264, 0.382]
TIOP on TB4	2.053	4	1.000	1.019	0.000	0.014	.263	[−0.112, 0.607]
TIOP on TB5	3.696	4	1.000	1.003	0.000	0.019	.204	[−0.107, 0.794]
TIOP on TB6	4.320	4	0.999	0.997	0.018	0.024	.105	[−0.034, 0.865]
TIOP on general TB	2.358	4	1.000	1.016	0.000	0.015	.146	[−0.464, 6.906]

Two-level model	AIC	BIC	Adjusted BIC	Between indirect effect		
				p	95% CI	95% CI (MCMC)
TIOP on TB1	123.834	217.731	122.742	0.274	[−11.378, 40.090]	[−125.80, 18.24]
TIOP on TB2	143.664	237.561	142.572	0.971	[−11.583, 11.167]	[−16.07, 7.68]
TIOP on TB3	147.926	241.823	146.834	0.454	[−3.311, 7.402]	[−4.31, 8.59]
TIOP on TB4	173.133	267.030	172.041	0.065	[−4.738, 0.139]	[−5.19, −0.23]
TIOP on TB5	206.568	300.465	205.477	0.696	[−6.693, 10.023]	[−8.43, 8.51]
TIOP on TB6	226.775	320.672	225.683	0.868	[−27.267, 23.009]	[−6.29, 183.10]
TIOP on general TB	838.215	932.112	837.123	0.742	[−155.930, 111.059]	[−294.50, 241.30]

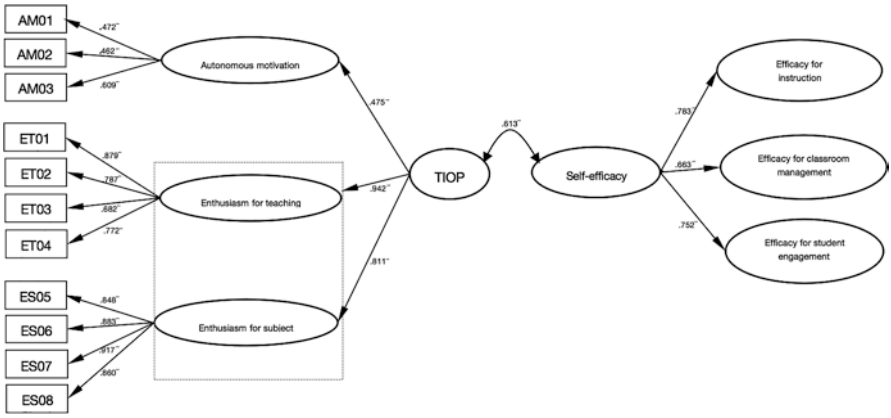

Fig. 24.A1 A model of two focal constructs measured by self-reports for convergent and divergent validity
* $p < .05$

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