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The development of the relationship between professional identity tensions and teacher identity

a quantitative longitudinal study among Dutch primary student teachers

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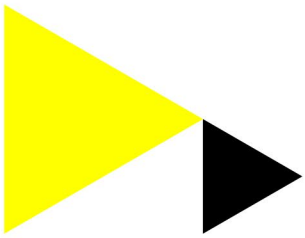

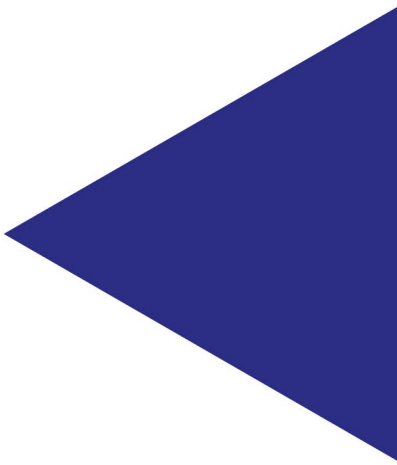

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The development of the relationship between professional identity tensions and teacher identity: A quantitative longitudinal study among Dutch primary student teachers☆

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ABSTRACT

This longitudinal study investigated reciprocal associations among various professional identity tensions and Dutch primary student teachers' teacher identity. Students ($N = 201$, 82.9% female) completed the professional identity tensions scale and the teacher identity measurement scale across three waves. Random intercept cross-lagged panel models showed that five out of nine investigated professional identity tensions were negatively associated with teacher identity at the inter-individual level. At the intra-individual level, no significant cross-lagged relationships were detected. Our findings imply that the development of professional identity tensions and teacher identity are not automatically interrelated and should, therefore, be both explicitly addressed in teacher education. The development of the relationship between professional identity tensions and teacher identity: A quantitative longitudinal study among Dutch primary student teachers.

1. Introduction

Teacher identity is considered the part of primary student teachers' identity that takes on, becomes, and preserves their role as a teacher (Beijaard et al., 2004). Supporting the development of teacher identity is crucial in the process of becoming a teacher (Bullough & Baughman, 1997). This is especially essential because teacher identity is linked to the quality of teaching, student-teacher relationship quality, and degree of commitment to the profession. Given the important role of teacher identity for teachers' career and well-being, it is valuable to explore the factors and processes that account for its development.

Recent studies emphasized the importance of supporting student teachers in learning how to deal with professional identity tensions they may encounter (Anspal et al., 2019). Professional identity tensions is defined as a feeling of conflict between one's own concepts and frameworks about teaching and education and actual experiences during fieldwork (Pillen et al., 2013). By means of reflective practices about one's professional role and perceptions regarding teaching, students can be supported in dealing with experienced tensions (van der Wal et al., 2019). Dealing with professional identity tensions lies at the heart of forming a 'strong' and 'stable' teacher identity (Nias, 2002).

Studies investigating the relation between various professional identity tensions and teacher identity are scarce and mainly based on theoretical reasoning and/or small-scale qualitative research (Anspal et al., 2019). For example, a qualitative study among two English language student teachers revealed that tensions caused by conflicting expectations about teaching held by themselves and their teacher mentor influenced these teachers' teacher identity (Graham, 1997). Other studies indicate that specific teacher identity profiles provoke professional identity tensions (e.g., O'Connor, 2008). Specifically, 'strong' teacher identities evoke fewer and less severe professional identity tensions than weak teacher identities (Alsup, 2006). Consequently, little is known about whether and how both constructs are related to each other. For instance, there could be no relation between both concepts at all or the relationship may in fact be the other way around or more complex than assumed. Our study represents a small empirical step towards understanding the link between various professional identity tensions and teacher identity across three time points.

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Furthermore, most studies are focused upon beginning teachers in secondary schools—those who are in their final year of the program or in their first year as a professional teacher (e.g., Schaap et al., 2021; Xu, 2013). However, as secondary student teachers are prepared within and for other teaching contexts compared to primary student teachers, researchers argue that both groups might develop teacher identities in a different way and experience distinguished professional identity tensions during teacher training (Nias, 2002). Existing results on the relation between teacher identity and various professional identity tensions in secondary education might be less applicable to the context of primary teacher education (Anspal et al., 2019). Hence, a focus on this particular population would enable primary teacher education programs to more easily translate the results of this study to their specific training context.

Quantitative studies have predominantly focused on measuring inter-individual differences in teacher identity (e.g., Schepens et al., 2009; Zhang et al., 2016). These studies describe the link at the inter-individual level (e.g., correlations) and do not separate the stable differences between individuals from the processes within individuals. Accordingly, it has been assumed that teachers' identity is relatively stable over time and can be seen as a trait-like (student) teacher characteristic that might fluctuate across various teaching contexts (e.g., primary and secondary school contexts and urban versus rural school contexts). Aside from its more static aspects teacher identity has at the same time been framed as a highly dynamic construct that fluctuates within student teachers themselves across time, depending on the tensions they experience on a day-to-day basis (Pillen et al., 2013). The complexity of such inter- and intra-individual differences in teacher identity in relation to various professional identity tensions, still needs to be tested longitudinally among the group of student teachers. The nature and design of available research preclude any conclusions about the presence, strength, and direction of the relationship between professional identity tensions and teacher identity among primary student teachers during teacher training.

In the present three-wave quantitative study among a sample of Dutch primary student teachers, we investigated the relationship between various professional identity tensions and teacher identity. In particular, we used random-intercept cross-lagged panel modeling (RI-CLPM; Hamaker et al., 2015) to examine the relationship among various tensions and teacher identity over time. This data-analytical procedure is considered particularly suitable to examine reciprocal effects between constructs (Becht et al., 2016). Unlike the traditional cross-lagged panel (CLPM) model, this data-analytic procedure separates the inter-individual variance (i.e. state-like variance) from the intra-individual variance (i.e. trait-like variance). Distinguishing the variance into state-like and trait-like properties in both constructs results in more reliable and nuanced overall conclusions regarding the relationship between professional identity tensions and teacher identity (Berry & Willoughby, 2017).

2. Professional identity tensions and teacher identity

2.1. Professional identity tensions

In order to come to an in-depth elaboration of professional identity tensions, which can be considered as a relative new concept, we use ideas from dissonance theory (cf. Cooper, 2007; Harmon-Jones and Mills, 2019). This more general theory may help highlight more easily characteristics of professional identity tensions (Güngör, 2017). This is essential to generate valid hypothesis about relations with other concepts, including teacher identity (cf. Hox, 1997). Other researchers used also elements from dissonance theory to explain the concept of professional identity tensions, since in both cases it concerns an internal struggle that are accompanied with unpleasant, irritating, an/or uncomfortable emotions and/or feelings, especially when not resolved (e.g., Delaney, 2015; Pillen et al., 2013; Warner, 2016). In this study, the pioneering work of Festinger (1957), specifically is used as input for understanding the concept of professional identity tensions. Ideas from his groundbreaking work are still used in a vast majority of studies on dissonance (Harmon-Jones and Mills, 2019). Drawing on Festingers' (1957) ideas about dissonance, professional identity tensions arise when two or more *elements* are inconsistent with each other. The elements can be any type of elements (Cooper, 2007), including feelings and attitudes. Furthermore, these elements can be of the same type (e.g., feeling versus feeling) or different from each other (e.g., feeling versus attitude). In the context of student teachers', professional identity tensions may emerge when there are internal conflicts between what they personally perceive as important and meaningful regarding the profession and what professionally is depicted as important and meaningful (Pillen et al., 2013). From this viewpoint, professional identity tensions arise when student teachers are required to perform mental and/or behavioral actions as opposed to things they find important about teaching and the profession (e.g., personal beliefs, emotions, ideals and/or values). Tensions often remain hidden and last for a longer time, especially when they are felt as very personal (Schellings et al., 2021). A mental discomfort, and thus an unpleasant psychological state, is the result of experienced professional identity tensions. Dissonance theory posits that the discomfort leads to actions to avoid, resolve, and/or reduce this unpleasant psychological state and solve the dissonance.

There are various tensions that can be experienced and the number and types of tensions may vary across educational contexts and populations (O'Connor, 2008; Schaap et al., 2021). For instance, in one study (Anspal et al., 2019) three types of tensions were identified as relevant for student teachers' identity development: 1) Tensions related to conceptions of oneself as a person versus the professional role, 2) tensions related to teachers' role during university training and the role as a teacher in the classroom, and 3) tensions related to multiple professional role expectations (e.g., being both a subject and a didactic expert). Another study (Pillen et al., 2013), however, found evidence for 13 professional identity tensions among student and novice teachers (e.g., feeling like a student versus being expected to act like an adult teacher, wanting to treat pupils as persons as a whole versus feeling the need to treat them as learners). In our previous study (Hanna et al.,

Table 1
Professional identity tensions and a brief explanation.

Professional Identity Tension (PIT)	Brief explanation
Wanting to care for students versus being expected to be tough (PIT 1).	Balancing between being strict with their students and being liked by students.
Feeling treated like a student versus wanting to take responsibility as a teacher (PIT 2).	Balancing between role as student teacher and role as teacher.
Feeling like a peer versus wanting to take responsibility as a teacher (PIT 3).	Balancing between having fun with students and maintaining authority role.
Experiencing difficulties in maintaining an emotional distance (PIT 4).	Balancing between being concerned about students well-being and maintaining professional distance to students.
Experiencing conflicts between one's and others' orientations (PIT 5).	Balancing between demands regarding teaching between teacher education program and practice school.
Feeling dependent on a mentor versus wanting to go one's own way in teaching (PIT 6).	Balancing between one' own teaching style and that of a mentor-teacher.
Wanting to invest in a private life versus feeling pressured to spend time and energy on work (PIT 7).	Balancing time between private life and professionally.
Teaching in urban classrooms (PIT 8).	Balancing between treating the class as a homogenous group versus treat the class as a heterogeneous group.
Leaving training versus becoming a teacher (PIT 9).	Balancing between becoming a teacher and pursuing other professions.

2019b), we observed various professional identity tensions among primary student teachers (shortly explained in Table 1) that are included in this study. One of these professional identity tensions among primary student teachers is 'Wanting to invest in a private life versus feeling pressured to spend time and energy on work' (Pillen et al., 2013). This tension highlights the pressure between wanting to perform teaching well and also spend sufficient time with family and friends. Choosing one option can go at the expense of the other and therefore this might lead to an uneasy feeling. When such a feeling is not resolved, it may be negatively associated with the development of becoming and staying a teacher (Pillen et al., 2013).

Before we discuss the relation between professional identity tensions and teacher identity, we present our understanding of the concept of teacher identity.

2.2. Teacher identity

In line with previous studies (e.g., Romel et al., 2021; Tsang & Jiang, 2018; van der Want et al., 2018), ideas from identity theory (Burke & Stets, 2009) are used to understand the premises of teacher identity. In contrast to other theories that have been applied to understand this ambiguous construct (e.g., Erikson's theory of identity in Friesen & Besley, 2013; Bourdieu's theory of social capital in Hasinoff & Mandzuk, 2005; and the possible self-theory in Chong & Low, 2009), identity theory is specifically suited to understanding *profession-related* identities instead of identity across the life span.

Moreover, it explicitly supports the quantitative measurement of teachers' identities (Burke & Stets, 2009). According to identity theory individuals have the ability of looking at their identity as an 'object' and define, classify, and understand it. This is also known as the 'reflexive' ability of an individual. Central to this lies the relation between identity and 'the self'. The latter is the sum of all identities an individual holds in life. This means that besides having a teacher identity, student teachers' also hold other identities (e.g., basketball player identity, farther identity). The number of identities individuals hold depends on the number of positions and roles they have in life. The self, which is the consciousness of the individual, organizes and manages the identities individuals hold. The reflexive ability of an individual makes it possible to question various identities, including the teacher identity. Additionally, different triggers can activate a particular identity to function as a basis for interaction. These triggers are manifested in the 'natural context' (e.g., student teachers in school), but also if individuals are physically located outside the 'natural context' of particular identity (e.g., talking about being a teacher with peers during a party). In this vein, questions about teaching and the profession are considered as triggers that can activate the teacher identity of student teachers.

Teacher identity, from an identity theory point of view, pre-exists long before a student teacher develops such an identity (Burke & Stets, 2009). In other words, student teachers form a teacher identity that is partly self-generated and to some extent new (Beijaard et al., 2004). This is because forming a teacher identity may be the result of engaging in an "ongoing and organized context and learn[ing] about the organization through socialization" (Burke & Stets, 2009, p. 34). During the socialization process, student teachers learn socially about what it means to be a teacher. Considering the importance of the social structure, indicating that teacher identity is not entirely produced by student teachers' individual meanings about teaching and learning (Lamote & Engels, 2010), it is generally assumed that teacher identity is learned through experiences as a learner in the past, actions of significant others (e.g., parents and teachers), mainstream discourse about the profession represented in movies and newspapers, and their actual training as a teacher (Swennen et al., 2004). Teacher identity can be defined as the result of an ongoing process of how student teachers understand themselves as teachers based on their perceptions of their interactions with the teaching context in which they are active (Canrinus et al., 2012; Kelchtermans, 2009). It is suggested that these ongoing interactions ultimately lead to a socially accepted and coherent set of meanings, which together represent the professional role of teachers (i.e., teacher identity; Canrinus et al., 2011; Day, 2002; Tsang & Jiang, 2018). Hence, each meaning within this set of meanings represents a small part of teacher identity that can be "distinguished analytically, but all are intertwined and refer to each other" (cf. Kelchtermans, 2009, p. 263). Generally, these meanings can be any psychological construct (e.g., beliefs, attitudes) as long as they have the potential to guide teachers' behavior, thoughts, or emotions (Burke & Stets, 2009; Karaolis & Philippou, 2019).

During the past decades, researchers using quantitative measures have explored which relevant meanings of teacher identity can be considered. Following different methodological approaches and frameworks, this has led to a wealth of identified meanings for teacher identity (see Hanna et al., 2019a for review). For example, some researchers (Beijaard et al., 2000) have argued that teacher identity consists of subject matter expertise, didactical expertise, and pedagogical expertise. Additionally, others (Cheung, 2008) have suggested that teacher identity is made up of a school issues domain, student needs, and personal growth and development domain.

Recently, our review study, including 20 quantitative instruments of teacher identity developed between 2000 and 2018, investigated which of the existing meanings have most generally been used to conceptualize teacher identity (Hanna et al., 2019a). Thus, which meanings reflect society's and researchers' views about what it means to be a teacher (cf. Burke & Stets, 2009; Cheung, 2008)? After analyzing the definitions of components and, in some cases, the items of the components, substantive overlap was found between the various meanings (Hanna et al., 2019a). Accordingly, all identified components were categorized into inductively derived meanings. In the context of primary education, findings indicated that teacher identity is most likely to be constructed on the basis of four meanings, including teachers' motivation to teach, self-image as teacher, self-efficacy beliefs, and their task perceptions regarding what a teacher considers to be good teaching (ibid.).

To determine the significance of each of these meanings for teacher identity, an empirical follow-up study subsequently explored the dimensionality of a new instrument, which included these four meanings (Hanna et al., 2020). Evidence was found for a second-order factor model, in which a general teacher identity factor appeared at the apex and was followed by the four meanings (motivation, self-image, self-efficacy, and task perception) at the next level. Second-order factor loadings, ranging from.45 to.91, indicated that these four concepts are likely to represent a coherent set of meanings that together reflect teacher identity. Others have also highlighted relatively strong links of teacher identity with motivation (e.g., Zhang et al., 2016), self-image (Nias, 2002), self-efficacy (Canrinus et al., 2012), and task perception (Lamote & Engels, 2010).

Additionally, studies focusing on various combinations of these meanings (motivation, self-image, self-efficacy, and task perception) also point to relations between them. For example, results from Canrinus et al. (2012), Granjo et al. (2021), and Schepens et al., 2009 reveal that self-efficacy beliefs are positively related with motivation to teach. Hence, when individuals evaluate themselves as self-efficacious regarding teaching they also are more motived to teach. Other researchers (e.g., Moghal et al., 2019; Settlage et al., 2009), however, suggest that low levels of self-efficacy can also fuel a strong motivation to change to adapt to expectations from the environment. Perhaps this is because low levels of self-efficacy beliefs about teaching result in self-doubt, which in turn supports the motivation to grow and learn in teaching.

The relation between task perception, self-efficacy beliefs about teaching, and motivation to teach has also been explored (e.g., Kagan, 1992; Kelchtermans, 2009; Maaranen & Stenberg, 2020). Based on the findings of these studies it can be argued that ambiguity regarding task perception can confuse student teachers' feelings that they are doing well as teachers. This in turn can hinder the level of self-efficacy beliefs

about teaching and motivation to teach. Moreover, the more student teachers struggle to align their expectations of the teaching task with what is expected of them, the more likely this struggle can hinder the motivation to stay as a teacher (e.g., Finson, 2001; Wilson & Deaney, 2010; Xu, 2013). Richter et al. (2021) comes to a similar finding as their results show that a clear task perception is related to stronger levels of self-efficacy beliefs about teaching and motivation to teach.

Finally, some researchers have recognized a positive link between individuals' self-image as a teacher and the motivation to stay in the profession. For example, Al Zadjali et al. (2016) found that teachers with a positive self-image generally enjoyed and derived satisfaction from their teaching roles. Mutlu and Ortaçtepe (2016) suggest a similar relation. They found that due to positive reactions of pupils, student teachers developed a self-image, which in turn encouraged student teachers to work more. Additionally, Beijaard (2019) proposed that individuals with a strong self-image are better prepared for the multifaceted teaching profession which seems to be translated to higher level of motivation to teach and stay in teaching. Given the separate relations with teacher identity and relations between the meanings, in the current research, teacher identity (i.e. the understanding that student teachers have of themselves at a certain moment in time) is conceptualized by these four meanings (motivation, self-image, self-efficacy, and task perception), and examined in relation to professional identity tensions over time.

Teacher identity, which consist of motivation, self-image, self-efficacy, and task perception, develops as a result of personal and contextual factors (Burke & Stets, 2009). Results show that the time span within which changes in teacher identity become visible can vary considerably (Rodrigues & Mogarro, 2019). Findings from a study in which 23 student teachers had to draw their teacher identity (Runhaar et al., 2016) as well as an intervention study among six student teachers discussing their professional identity (Stappers et al., 2016) indicate that change in teacher identity is observable after six months of formal teacher training. A single-case study concludes that change in identity could take place even at a shorter time period (Henry, 2016). Conversely, data from an interview study among 24 teachers over a two-year period suggest that teacher identity does not necessarily changes over time (van der Want et al., 2018).

Clearly these conflicting results about when change in teacher identity is noticeable may be explained by the differences in the method of measuring teacher identity, data collection, research context and study time (cf. Burke & Stets, 2009). Perhaps less clear is the difference in how the concept of change has been conceptualized in studies, which may explain the conflicting results (cf. Carter, 2017). For example, Henry (2016) sees change as a shift between identities that are part of the self, while derWantet al., 2018 understand identity change as the degree to which teachers' characteristics are perceived the first and second time. In the current study, change in teacher identity is understood as the magnitude of change (Carter & Marony, 2018). The magnitude represents the strength of the change, which can range on a 5-point Likert scale between none (score difference of 0) to severe (score difference of 4) changes in teacher identity.

2.3. Professional identity tensions and teacher identity

Based on our theoretical understanding of professional identity tensions (Festinger, 1957) and teacher identity (Burke & Stets, 2009), and the scarce available empirical literature about the relation between both concepts, it is assumed that professional identity tensions are negatively related to teacher identity over time. Specifically, if scores on a tension increases over time teacher identity scores may decrease or vice versa. Although this negative relation may be in contrast with the suggestion of some researchers (e.g., Graham, 1997), who view a tension as a catalyst for change of teacher identity, it is in line with the majority of the literature assuming that not dealing with tensions in a proper way will limit teacher identity development, which in turn can erode enthusiasm for the profession (Pillen et al., 2013).

Experiencing a tension evokes a mental discomfort and intuitively forces to reduce, resolve or avoid the dissonance (Festinger, 1957). When a tension cannot be resolved or increase exponentially student teachers may experience feelings of insecurity and exhaustion. In time, this can result in dropout during training or shortly after graduating (Pillen et al., 2013). An example can be derived from Smagorinsky et al. (2004). In their study a student teacher experienced tensions as a result of her preference for a constructivist teaching approach, which was in contrast of her mentor's traditional teaching approach. Because this student teacher did not know how to handle this situation meaningfully, she became frustrated and was afraid to become like her mentor.

The negative relationship between various professional identity tensions and teacher identity may become less strong in time because student teachers grow more familiar with the context they are trained in and/or gain more experience and knowledge in efficiently and effectively resolving situations, such that professional identity tensions have less consequences for changes in the strength of teacher identity (Smagorinsky et al., 2004). So far, only Pillen et al. (2013) explored whether tensions become less apparent over time. Using cluster analysis and analysis of variance, they found that 42 beginning teachers experienced 26.5% less tensions in their first-year-in-practice than their last-year-in-training.

2.4. Present study

In this study, we aimed to investigate the longitudinal relationships between various professional identity tensions and teacher identity. Based on the literature on secondary education, firstly, we hypothesized that on average, primary student teachers who experience higher levels of professional identity tensions tend to have a weaker teacher identity than those who experience lower levels of professional identity tensions (H1 at inter-individual level). Secondly, we hypothesized that an increase in a professional identity tension relative to one's own average level at one time point predicts a negative change in one's teacher identity score at a later time point (H2 at intra-individual level). Finally, we hypothesized that the negative relationship between a professional identity tension and teacher identity becomes less strong over time (H3 at intra-individual level).

3. Method

3.1. Procedure

After receiving approval from the institutional Ethics Review Board (file number 2017-CDE-8109), we invited the program managers of four Dutch primary teacher education institutions to participate in this study. With their permission, we requested teacher educators responsible for the coordination of the 2017-2018 cohort of first year primary student teachers to assist us with collecting data. Next, all student teachers were invited to participate in a study on their professional development from the moment they enter teacher training education into their second year of formal training.

Student teachers who agreed to participate were provided with an explanatory statement and active consent form that could be signed digitally. After reading and signing the informed consent form, the questionnaires were administered online during scheduled meetings at student teachers' institutions. The first session was in the fall of 2017, the second session in the early spring of 2018, and the final session was in the fall of 2018. The half-year time interval is based on findings from previous studies suggesting that change in teacher identity is visible after six months of preparation (Runhaar et al., 2016). The questionnaires, which took approximately 25 minutes to complete, had a forced response format (i.e. students have to answer a question in order to advance to the next question). All sessions were under the supervision of the first author of this study and all student teachers participated on a

voluntary basis.

3.2. Participants

At Time 1, 492 students were invited to participate, 415 (84,3%; average age 18,2) of whom completed the questionnaires. At Time 2, 402 students were invited and 351 (87,3%; average age 18,9) completed the questionnaires, and at Time 3, 376 students were invited and 288 (76,6%; average age 19,4) completed the questionnaires. Only those who completed the questionnaires three times were included in the final sample. Of the initial sample, 201 (41%) student teachers met this criterion and were included.

Table 2 presents the characteristics of the analytical sample compared to the initial sample and the national average in terms of gender and educational background. Using analysis of variance and t-tests, we found no significant differences ($p > .05$) between respondents that completed the questionnaire three times and those who did not. In 73% of the cases, absence was mainly due to student teachers being unwilling to participate, illness, or overlapping appointments. Based on official registration and deregistration figures of the participating institutions, a small number of all student teachers ($n = 66$) that completed the questionnaire only the first time, left the program before the start of the second semester of the first academic year. This attrition rate is what might be expected according to the percentages presented by the Dutch Ministry of Education, Culture and Science (2017), which is between 20% and 25%. Moreover, similar to the national average, 82.9% of participants were women (Geerdink & de Beer, 2013). Notably, the share of pre-university graduates in this study was 1.5 times higher than the national average of 10% (Educational Council, 2013). This is due to one of the four institutions being an academic primary teacher education program which is only accessible for those with a pre-university education (see Baan et al., 2018 for detailed description). Markedly, the percentages of pre-vocational graduates were almost a third times lower than the national average of 40% (Educational Council, 2013). A reason for this difference were governmental policies making teacher institution less easily accessible for those with a pre-vocational education diploma (for detailed explanation of Dutch training programs see Snoek et al., 2015; Baan et al., 2018).

3.3. Measures

3.3.1. Professional identity tensions

To measure the professional identity tensions we used the professional identity tensions scale (Hanna et al., 2019b), because the items are formulated based on dissonance theory and it is specifically designed and validated for the context of primary student teachers. The instrument includes nine separate professional identity tensions (as presented earlier in Table 1). The number of items per subscale range from two (PIT 4; 'Experiencing difficulties in maintaining an emotional distance') to five (PIT 5; 'Experiencing conflicts between one's and others' orientations'). Student teachers were asked about the extent to which they recognized their own experiences regarding nine professional identity tensions. The items were rated on a 5-point scale ranging from 1 (*not at all)* to 5 (*very much*). In our previous study (Hanna et al., 2019b), we reported adequate reliability scores for the professional identity tensions scale, ranging between.66 and.93. As reported in Table 3, reliability scores for the professional identity tensions at Time 1 ranged from Cronbach's alpha 0.63 (PIT 7; 'Wanting to invest in a private life versus feeling pressured to spend time and energy on work') to 0.92 (PIT 9; 'Leaving training versus becoming a teacher'), at Time 2 from Cronbach's alpha 0.69 (PIT 3; 'Feeling like a peer versus wanting to take responsibility as a teacher') to 0.93 (PIT 9; 'Leaving training versus becoming a teacher'), and at Time 3 from Cronbach's alpha 0.66 (PIT 3: 'Feeling like a peer versus wanting to take responsibility as a teacher') to 0.94 (PIT 9; 'Leaving training versus becoming a teacher').

Table 2
Descriptives of the sample ($N = 201$).

	Initial sample	Analytical sample	National average
Sex			
Women	368 (75%)	162 (81%)	82%
Men	124 (25%)	39 (20%)	18%
Educational Background			
Pre-university education	79 (16%)	37 (18%)	10%
Higher prevocational education	285 (58%)	113 (58%)	50%
Pre-vocational education	128 (26%)	50 (25%)	40%

*Note. Within the Netherlands students are assigned to one of these three educational tracks after primary school. Pre-*vocational education takes four years, and prepares for vocational education; Higher prevocational education takes five years and prepares for higher professional education; and pre-university education takes six years and prepares for academic education at universities.

3.3.2. Teacher identity

We used the Teacher Identity Measurement Scale to measure teacher identity, which was developed on the basis of identity theory. It has shown to have good psychometric properties (Hanna et al., 2020). This resulted in decomposing teacher identity in four first-order constructs: motivation, self-image, self-efficacy, and task perception.

The first-order motivation factor consists of eight statements in which teachers are asked to rate their reasons for choosing to become a teacher (e.g., Because I like being an elementary teacher) on a 7-point Likert scale (1 = not important; 7 = extremely important). Self-image consists of eight statements about the extent student teachers perceive themselves as a teacher (e.g., I see myself as an elementary teacher) to be rated on a 5-point Likert scale (1 = strongly disagree; 5 = strongly agree). Self-efficacy consists of 12 items rated on a 5-point Likert scale (1 = not at all; 5 = very much) measuring the extent to which teachers believe in their capability to organize and execute daily teaching tasks (e.g., To what extent can you gauge students' comprehension of what you have taught?). Finally, task perception was measured by 18 items assessing the beliefs of individuals about teaching and education (e.g., I think it is important to take into account the wishes of my students) on a 5-point Likert scale (1 = totally disagree; 5 = totally agree). The first-order factors representing teacher identity showed acceptable reliability, with Cronbach's alpha ranging between 0.84 and 0.74 (Hanna et al., 2020). In the present study, Cronbach's alpha coefficients were 0.75, 0.77, and 0.74 for teacher identity (TI) at Time 1, Time 2, and Time 3, respectively.

3.4. Statistical analysis

First, in SPSS version 24 (IBM Corp. Released, 2016) subscale scores were calculated by summing the item scores and dividing them by the total number of items forming each subscale. Because we aimed to examine the intra-individual relations, we calculated intra-class correlations (ICC; Berry & Willoughby, 2017) for each variable in this study. Previous studies have indicated that when at least 28% variance in a variable is due to intra-individual variance over time is sufficient to distinguish the within from the between variance (te Poel et al., 2016).

To assess the three hypotheses about the associations between professional identity tensions and teacher identity, random intercept cross-lagged modeling (RI-CLPM; Hamaker et al., 2015) was used. A schematic representation of the RI-CLPM of the associations between professional identity tensions and teacher identity across three waves is depicted in Fig. 1. A key feature of RI-CLPM is that the intra-individual level can be separated from the inter-individual level. This approach involves including random intercepts to the model (from Between PIT (K) to $PIT_{t1\text{-}t3}$ and Between TI (ω) to $TI_{t1\text{-}t3}$) with factor loadings constrained at one, which reduces the likelihood that stable inter-individual differences affect intra-individual cross-lagged effects. The correlation

Table 3
Means, standard deviations, and Chronebach's alpha's for professional identity tensions and teacher identity at each time point.

	PIT1 T1	PIT1 T2	PIT1 T3	PIT2 T1	PIT2 T2	PIT2 T3	PIT3 T1	PIT3 T2	PIT3 T3	PIT4 T1	PIT4 T2	PIT4 T3	PIT5 T1	PIT5 T2	PIT5 T3	PIT6 T1	PIT6 T2	PIT6 T3	PIT7 T1	PIT7 T2	PIT7 T3	PIT8 T1	PIT8 T2	PIT8 T3	PIT9 T1	PIT9 T2	PIT9 T3	TI T1	TI T2	TI T3
α	.69	.77	.81	.84	.81	.87	.63	.69	.66	.83	.78	.83	.81	.82	.85	.73	.78	.79	.84	.85	.86	.70	.77	.80	.92	.93	.94	.75	.77	.74
M	.51	.49	.47	.44	.45	.47	.42	.42	.39	.50	.51	.52	.47	.51	.54	.45	.49	.49	.52	.54	.53	.40	.40	.41	.27	.30	.33	.78	.79	.80
S.D.	.12	.14	.13	.17	.16	.17	.14	.14	.13	.18	.17	.17	.14	.14	.14	.14	.16	.17	.18	.19	.19	.12	.12	.13	.13	.14	.18	.06	.06	.06

Notes. Italic $p < 0.01$, Underlined $p < 0.001$; T1 = Time 1 (fall 2017), T2 = Time 2 (early spring 2018), T3 = Time 3 (fall 2018); α = Chronebach's alpha, M = Mean, S.D. = Standard deviation; PIT 1 = Wanting to care for students versus being expected to be tough, PIT 2 = Feeling treated like a student versus wanting to take responsibility as a teacher, PIT 3 = Feeling like a peer versus wanting to take responsibility as a teacher, PIT 4 = Experiencing difficulties in maintaining an emotional distance, PIT 5 = Experiencing conflicts between one's and others orientations, PIT 6 = Feeling dependent on a mentor versus wanting to go one' own way in teaching, PIT 7 = Wanting to invest in a private life versus feeling pressured to spend time and energy on work, PIT 8 = Teaching in urban classrooms, PIT 9 = Leaving training versus becoming a teacher, TI = Teacher identity.

Fig. 1. Random intercept cross-lagged panel model (RI-CLPM) of professional identity tensions and teacher identity based on the work of Hamaker et al. (2015). Note. PIT = Professional identity tension, TI = Teacher identity, $_{tx}$ = TIME, α_2 and α_3 represent the autoregressive paths for professional identity tension, δ_2, and δ_3 represent the autoregressive paths for teacher identity, β_2 represents the cross-lagged path between professional identity tension and teacher identity from T1 to T2, β_3 represents the cross-lagged path between professional identity tension and teacher identity from T2 to T3, γ_2, represents the cross-lagged path between teacher identity and professional identity tension from T1 to T2, and γ_3 represents the cross-lagged path between teacher identity and professional identity tension from T2 to T3. U_2, U_3, V_2, and V3 represent the covariances between professional identity tensions and teacher identity for intra-person deviations at particular time points.

between the random intercepts reflects how inter-individual differences in a particular professional identity tension (PIT_{t1}- PIT_{t3}) is associated with inter-individual differences in teacher identity (TI_1- TI_{t3}).

In this study, we are particularly interested in the coefficients K and ω, and β_2, β_3, γ_2, and γ_3. The correlations between the coefficients K and ω are used to test the first hypothesis at the inter-individual level that student teachers who experience a higher level of a professional identity tension tend to have a less strong teacher identity. The cross-lagged paths β_2, β_3, γ_2, and γ_3 are used to test the second and third hypothesis at the intra-individual level that increases in a professional identity tension at one time point predicts a negative change in one's teacher identity score at a later time point and that the negative relationship

between a tension and teacher identity becomes less strong over time.

The other coefficients α_2, α_3, δ_2, and δ_3 in Fig. 1 represent the autoregressive paths of latent factors, which reflect the amount of intra-individual carry-over effects. When an autoregressive path is positive, this suggests that a student who scored above his/her expected score at a certain moment in time is more likely to score above the expected score at later time points, and vice versa (Hamaker et al., 2015). U_2, U_3, V_2, and V_3, represent the covariances between professional identity tensions and teacher identity for intra-person deviations at particular time points. Finally, this model consists of six-within person latent factors (Within PIT_{t1}-Within PIT_{t3}, Within TI_{t1}- Within TI_{t3}), reflecting the variance within student teachers' tensions and teacher identity, respectively.

We used R (version 1.1.453; R Core Team, 2015), the lavaan package (version 0.6-4; Rosseel, 2012), and RI-CLPM guidelines and syntax for R (Hamaker et al., 2015) to estimate the model in Fig. 1. All factor loadings (PIT_{t1}- PIT_{t3} and TI_1- TI_{t3}) and random intercepts (PIT and TI) were fixed to 1 to reflect consistency in their trait-like factors. For reasons of parsimony, we compared the unconstrained model with the constrained model in which cross-lagged (U_2-V_2, U_3-V_3) paths were held equal across intervals. Imposing constraints is possible because the intervals between the observations were equal over time (Hamaker et al., 2015). Because the correlations among the professional identity tensions are generally weak and non-significant (Hanna et al., 2019b), nine separate models were built, where each model reflected the relation of a particular tension and teacher identity across time.Model fit was evaluated by examining the overall model fit. In addition to the chi-square test (χ^2), Root Mean Square Error of Approximation (RMSEA), and its 95% confidence interval (CI) were evaluated, with values $\leq$.05 reflecting a close fit, between .05 and .08 a satisfactory fit, and between .08–.10 a mediocre fit (MacCallum et al., 1996). Also, the comparative fit index (CFI) was used, with values $\geq$.95 indicating close fit, and values $\geq$.90 indicating acceptable fit (Bentler, 2007). The unconstrained model and the constrained model were compared using the χ^2. Adequacy of the parsimonious model was confirmed if $\Delta\chi^2$ is nonsignificant (Hamaker et al., 2015).

Table 4
Intra-class correlations for professional identity tensions and teacher identity across three time points.

	ICC sample	Inter-individual variance	Intra-individual variance
PIT 1	0.601	60,1%	39,9%
PIT 2	0.670	67,7%	32,3%
PIT 3	0.468	46,8%	53,2%
PIT 4	0.626	62,6%	37,4%
PIT 5	0.531	53,1%	46,9%
PIT 6	0.226	22,6%	77,4%
PIT 7	0.551	55,1%	44,9%
PIT 8	0.592	59,2%	40,8%
PIT 9	0.621	62,1%	37,9%
TI	0.653	65,3%	34,7%

ICC = Intra-class correlation, PIT 1 = Wanting to care for students versus being expected to be tough, PIT 2 = Feeling treated like a student versus wanting to take responsibility as a teacher, PIT 3 = Feeling like a peer versus wanting to take responsibility as a teacher, PIT 4 = Experiencing difficulties in maintaining an emotional distance, PIT 5 = Experiencing conflicts between one's and others orientations, PIT 6 = Feeling dependent on a mentor versus wanting to go one' own way in teaching, PIT 7 = Wanting to invest in a private life versus feeling pressured to spend time and energy on work, PIT 8 = Teaching in urban classrooms, PIT 9 = Leaving training versus becoming a teacher, and TI = Teacher identity

4. Results

4.1. Descriptive statistics of professional identity tensions and teacher identity

Table 3 displays the means and standard deviations for professional identity tensions and teacher identity at Time 1, Time 2, and Time 3. Table 4 displays the ICCs for both constructs. As can been seen in this table, for instance, TI has an ICC of 0.653. This means that 65,3% of the variance in the three measures of TI is explained by differences between student teachers (inter-individual level) and that 34,7% is explained by fluctuations within a student teacher (intra-individual level). Of all tensions, PIT 6 ('feeling dependent on a mentor versus wanting to go one's own way in teaching') has the lowest inter-individual variance. All other professional identity tensions consist for a substantial part of variance that is due to the stable differences between student teachers (ranging between 46,8% and 67,7%). This means that 32,3% and 53,2% of the variance is due to fluctuations over time professional identity tensions and teacher identity. This supports the need to examine intra-individual relationships between professional identity tensions and teacher identity over time (van der Schuur et al., 2019).

4.2. Cross-lagged associations between professional identity tensions and teacher identity

To examine the cross-lagged association between professional identity tensions and teacher identity, we estimated for each tension the RI-CLPM shown in Fig. 1. The model fit indices in Table 5 indicate all RI-CLPM's reached a close to mediocre fit. Building on these RI-CLPM's, constraints were imposed on the cross-lagged and autoregressive paths of the professional identity tensions with teacher identity. This step did not significantly change the model fit for PIT 1-PIT 9 (Table 5). The results of these final models are therefore provided in Table 6, which contains the compressed overview of the findings. *Hypothesis 1.* We hypothesized that student teachers' professional identity tensions would be negatively related to their teacher identity at the inter-individual level. Table 6 indicates there was a significant negative correlation between the random intercepts of some, but not all professional identity tensions and teacher identity. Specifically, the strongest correlation with teacher identity is PIT 9 ('Leaving training versus becoming a teacher'), followed by PIT 1 ('Wanting to care for students versus being expected to be tough'), PIT 3 ('Feeling like a peer versus wanting to take responsibility as a teacher'), PIT 5 ('Experiencing conflicts between one's and others' orientation'), and PIT 7 ('Wanting to invest in a private life versus feeling pressured to spend time and energy on work'). This negative correlation indicates that student teachers, whose level of that particular tension is higher than the average group level, also report a less strong teacher identity. This correlation illustrates the "trait-like" stability of those specific tensions and teacher identity for the duration of this study.

Hypothesis 2 and 3. We predicted that, at the intra-individual level, a tension would be negatively associated with teacher identity over time and that the strength of this relationship decreases over time. Yet, we found no statistically significant cross-lagged paths between a tension and teacher identity. This indicates that a student teacher's deviation from his or her own score on a tension at one point in time is not related to his or her own perception of teacher identity half a year earlier, and vice versa. There were statistically significant intra-individual autoregressive paths for PIT 2 ('Feeling treated like a student versus wanting to take responsibility as a teacher'), PIT 5 ('Experiencing conflicts between one's and others' orientation'), PIT 7 (Wanting to invest in a private life versus feeling pressured to spend time and energy on work'), and PIT 9 ('Leaving training versus becoming a teacher'). These small to moderate autoregressive paths suggest that these professional identity tensions have an effect on the next measurement occasion. For instance, in the case of PIT 2 ('Feeling treated like a student versus wanting to take

Table 5
RI-CLPM's model fit.

Model[a]	X^2 (df)	RMSEA (90% CI)	CFI	X^2 (df)	RMSEA (90% CI)	CFI	ΔX^2 (df)	ΔRMSEA	ΔCFI
PIT 1	0.318 (1)	0.000 (0.000-0.154)	1.000	5.379 (7)	0.000 (0.000-0.070)	1.000	6.575 (6)	0.000	0.000
PIT 2	0.412 (1)	0.000 (0.000-0.160)	1.000	5.379 (7)	0.000 (0.000-0.073)	1.000	4.968 (6)	0.000	0.000
PIT 3	0.507 (1)	0.000 (0.000-0.166)	1.000	9.210 (7)	0.040 (0.000-0.101)	0.995	8.703 (6)	0.040	0.005
PIT 4	2.398 (1)	0.083 (0.000-0.225)	0.997	6.169 (7)	0.000 (0.000-0.080)	1.000	3.742 (6)	0.083	0.013
PIT 5	5.476 (1)	0.095 (0.031-0.179)	0.992	9.845 (7)	0.045 (0.000-0.104)	0.994	4.154 (6)	0.050	0.002
PIT 6	0.570 (1)	0.000 (0.000-0.169)	1.000	2.056 (7)	0.000 (0.000-0.000)	1.000	1.319 (6)	0.000	0.000
PIT 7	0.636 (1)	0.000 (0.000-0.172)	1.000	7.556 (7)	0.020 (0.000-0.091)	0.999	6.952 (6)	0.020	0.001
PIT 8	1.701 (1)	0.059 (0.000-0.208)	0.998	4.085 (7)	0.000 (0.000-0.059)	1.000	2.385 (6)	0.059	0.002
PIT 9	0.283 (1)	0.000 (0.000-0.151)	1.000	5.110 (7)	0.063 (0.051-0.149)	0.988	4.827 (6)	0.063	0.012

PIT 1 = Wanting to care for students versus being expected to be tough, PIT 2 = Feeling treated like a student versus wanting to take responsibility as a teacher, PIT 3 = Feeling like a peer versus wanting to take responsibility as a teacher, PIT 4 = Experiencing difficulties in maintaining an emotional distance, PIT 5 = Experiencing conflicts between one's and others orientations, PIT 6 = Feeling dependent on a mentor versus wanting to go one' own way in teaching, PIT 7 = Wanting to invest in a private life versus feeling pressured to spend time and energy on work, PIT 8 = Teaching in urban classrooms, PIT 9 = Leaving training versus becoming a teacher; a = Model type.

Table 6
Cross-lagged association between professional identity tensions and teacher identity.

	Within								Between
	AP PIT time 1 to 2	AP PIT time 2 to 3	AP TI time 1 to 2	AP TI time 2 to 3	CLP PIT to TI time 1 to 2	CLP PIT to TI time 2 to 3	CLP TI to PIT time 1 to 2	CLP TI to PIT time 2 to 3	PIT & TI
Model	α_2	α_3	δ_2	δ_3	β_2	β_3	γ_2	γ_3	K & ω
PIT 1	0.09	0.10	0.11	0.12	-0.07	-0.08	0.09	0.11	-0.38***
PIT 2	0.24*	0.23*	0.10	0.11	0.02	0.02	-0.08	-0.07	-0.07
PIT 3	0.02	0.02	0.09	0.11	-0.02	-0.02	-0.01	-0.01	-0.37***
PIT 4	-0.02	-0.02	0.14	0.12	0.10	-0.03	0.09	0.08	0.10
PIT 5	0.38***	0.34***	0.11	0.12	0.07	0.07	-0.03	-0.04	-0.34***
PIT 6	0.04	0.06	0.07	0.09	0.01	0.01	-0.14	-0.18	-0.03
PIT 7	0.28**	0.29**	0.07	0.08	0.14	0.15	0.10	0.11	-0.29**
PIT 8	0.036	0.133	0.025	0.075	0.036	0.011	-0.101	0.007	-0.168
PIT 9	0.26**	0.43***	0.04	0.05	0.07	0.08	-0.14	-0.24	-0.51***

Note: AP = Autoregressive path and CLP = Cross-lagged path. *significance is at $p < .05$. **significance is at $p < .01$. ***significance is at $p < .001$. PIT 1 = Wanting to care for students versus being expected to be tough, PIT 2 = Feeling treated like a student versus wanting to take responsibility as a teacher, PIT 3 = Feeling like a peer versus wanting to take responsibility as a teacher, PIT 4 = Experiencing difficulties in maintaining an emotional distance, PIT 5 = Experiencing conflicts between one's and others orientations, PIT 6 = Feeling dependent on a mentor versus wanting to go one' own way in teaching, PIT 7 = Wanting to invest in a private life versus feeling pressured to spend time and energy on work, PIT 8 = Teaching in urban classrooms, PIT 9 = Leaving training versus becoming a teacher.

responsibility as a teacher'), only 5% of the within variance at time point 2 can be explained by time point 1 and almost 6% of the within variance at time point 3 can be explained by time point 2. Finally, no statistically significant autoregressive paths were detected for teacher identity over time. This means that deviations in teacher identity at one time point cannot be predicted by deviations from their own expected scores on teacher identity.

5. Discussion

This longitudinal study aimed to provide insight into the inter- and intra-individual relationship between professional identity tensions and teacher identity. Following ideas from identity theory and dissonance theory as well as results from qualitative studies, we expected that professional identity tensions were negatively related to teacher identity over time. Using RI-CLPM, we tested three hypotheses in a sample of 201 Dutch primary student teachers across three time points during their first two years of undergraduate school.

5.1. The relation between professional identity tensions and teacher identity

Generally, our results indicate that, at the inter-individual level, five out of nine professional identity tensions were negatively related to teacher identity. Specifically, we found that primary student teachers who experienced tensions regarding 'leaving training versus becoming a teacher', 'wanting to care for students versus being expected to be tough', 'feeling treated like a peer versus wanting to take responsibility as a teacher', 'experiencing conflicts between one's and others' orientations', and 'wanting to invest in a private life versus feeling pressured to spend time and energy on work', were likely to perceive their teacher identity as less strong than those who experienced those tensions to a lesser extent. Or, interpreting the other way around, students with a strong teacher identity, seem to experience these tensions to a lesser extent. However, at the intra-individual level, we did not find evidence for longitudinal associations between professional identity tensions and teacher identity, and, consequently, we did not observe that this relationship becomes less strong over time. This implies that over the time span of this study, an increase in tensions, does not lead to a less strong teacher identity and vice versa.

Our findings on the inter-individual level show that among all professional identity tensions, 'leaving training versus becoming a teacher' has the strongest negative association with teacher identity. This tension may be more closely tied to teacher identity than other tensions. Specifically, statements of this tension directly address whether a primary student teacher wants to become a teacher (e.g., 'although I think I teach reasonably, I doubt to continue to become a teacher' and 'although I like to teach, I doubt whether I should continue to become a teacher'). In contrast, statements of the other tensions are more likely to take interactions with mentors, peers, and students as a starting point (e.g., 'I find it difficult to be tough against students because I want them to like me at the same time' and 'I am treated as a student teacher at my practices school, but I actually want to be seen as a fellow teacher'). This distinction between the cause of the factors may explain the difference in the strength of the relation between professional identity tensions and teacher identity. Furthermore, our finding that not all professional

identity tensions are related to teacher identity suggests that this study's hypothesis with regard to the link between both concepts cannot be fully confirmed. The partially absent empirical link is not entirely consistent with the theoretical assumption that both by definition impact each other (cf. van der Wal et al., 2019). Judging from the hidden, long-lasting, and contextual nature of professional identity tensions, these findings might be due to the time frame of this study. Specifically, this study was conducted during the first 1,5 years of the teacher training program. It is well possible, however, that some tensions, such as 'feeling like a student versus wanting to take responsibility as a teacher' becomes more prominent later in the training, which might explain why we could not find the presumed associations at the start of this program.

Another explanation might be that the unrelated professional identity tensions evoked so called negative deactivating emotions rather than negative activating emotions (cf. Pekrun et al., 2002). Negative deactivating emotions are thought to result in reduced attention and the use of more superficial, shallow processing and learning strategies, whereas negative activating emotions seem to result in the use of more rigid, shallow processing and learning strategies (Artino & Jones, 2012). Studies about the relation between emotions and learning show that students experiencing negative deactivating emotions are less likely to employ learning strategies such as reflection and metacognition (e.g., Artino & Jones, 2012; Tze et al., 2016). Following this, it could be that the unrelated professional identity tensions deactivated one of the behavioral responses that are important for the development of teacher identity, including reflection, seeking support, seeking help, or directive action (van der Wal et al., 2019).

Our results that the professional identity tensions and teacher identity are not related with each other at the intra-individual level contradicts our second and third hypothesis. As we are the first to disentangle both levels and directly investigate the relation, there is little research providing explanations for our findings. Therefore, given the current state of research, we can only make a well-educated guess about what these results mean. First, it is possible that solely experiencing a tension does not evoke a change in teacher identity among primary student teachers. The weight a student teacher attributes to a tension is affected by intrapersonal (e.g., personal characteristics), interpersonal (e.g., relationships with mentors), and contextual factors (e.g., social discourse, political; cf. Schutz et al., 2018). Given that student teachers may differ on these aspects it is plausible that change in teacher identity is caused by other time-variant-non-modeled intrapersonal, interpersonal, and/or contextual factors (cf. te Poel et al., 2016). For instance, recent studies have shown that contextual factors such as online social discourse platforms can stimulate the professional identity development of student teachers (Prince, 2019) and interpersonal factors such as the quality of the relationship between teachers and their students is associated with change in teacher identity (van der Want et al., 2018).

Second, at the early stage of their professional career, student teachers might (un)consciously consider their teacher identity as less important in comparison to other identities they also possess. According to identity theory (Burke & Stets, 2009) and in line with van der Want et al.'s (2018) reasoning, students possess different identities that are hierarchically structured around 'the self' that constitutes the 'whole' individual. Clearly, for student teachers, teacher identity is one of those identities they occupy, but not the only one. They can identify with their ethnicity, race or personal characteristics. Additionally, per student, teacher identity might have a different place in relation to the self. The place of teacher identity in the hierarchical structure influences the behaviors and emotions student teachers have when confronted with a tension (Burke & Stets, 2009). At the same time, based on the work of several developmental psychologists such as Erikson (1982), it seems that most students at that stage of their career are in the transition from adolescence to early adulthood. This is also an important period for the formation of sexual and gender identities (e.g., Waterman, 1982). Hence, theoretically, it might be that student teachers who are in the transition from adolescence to young adulthood find gender and sexual identities more urgent and fundamental for themselves in comparison to their teacher identity (cf. Steensma et al., 2013).

Third, the primary school differs from the secondary school context on which we mainly based our hypotheses. Three of these differences (see Hargreaves, 1998), are (1) age differences between students and student teachers (the age difference between primary students and primary student teachers is greater than between secondary students and their secondary students), (2) educational structure (teaching a fixed group in primary school versus teaching different groups in secondary school), and (3) school organization (a smaller group of colleagues in primary school than in secondary school). Because the perceived degree of tension and the level of teacher identity are context dependent, it is possible that tensions in the context of primary education in relation to secondary education are experienced less and/or differently in relation to the teacher identity and vice versa. For example, the tension 'wanting to care for students versus being expected to be tough' may play a more important role in secondary student teachers professional identity than among primary student teachers' as teachers' in secondary school only teach the same class for two or four hours in the same week instead of teaching the same class during the whole week.

Two reasons may account for the contrasting findings between the inter- and the intra-individual level. Theoretically, at the inter- and intra-individual level, the same construct can represent different meanings (Hoffman & Stawski, 2009). At the inter-individual level, how student teachers perceive their teacher identity can be the result of a stable accumulation of a tension over time. At the intra-individual level, different aspects can explain why teacher identity is less strong at some moments than others, such as individual "temporally specific deviations from normal routines of study, family, or lifestyle" (Hoffman & Stawski, 2009, p.106). As the inter-individual and intra-individual variation reflect different theoretical constructs, their relation can also differ. Methodologically, inter- and intra-individual coefficients operate on separate scales, contain different levels of statistical power, and therefore provide different regression parameters and standard errors, which results in different findings at the inter- and intra-individual level (Berry & Willoughby, 2017).

5.2. *Limitations and future studies*

The design and methodology of our study posed certain limitations that require attention in future investigations. First, our study suffered from attrition. We are aware that student teachers who completed the questionnaire three times might differ from those who did not. For instance, it is conceivable that the former group of student teachers had more opportunities during their courses to discuss issues regarding their professional development than the latter group. Although we did not find significant differences in the study variables between the student teachers who completed the questionnaire three times and those who did not, it is possible that our sample resulted in biased findings. Future longitudinal research can try to maximize the retention of the pool of student teachers by using various follow-up strategies, such as incentives to encourage student teachers to participate.Second, little is known about the stability of professional identity tensions and teacher identity over time (Pillen et al., 2013; Rodrigues & Mogarro, 2019). Therefore, it remains difficult to examine whether the six-month interval was sufficient to capture the relationship at intra-individual level. Based on a recent longitudinal study about identity change among adolescents (Becht et al., 2016), it may be that the relation between professional identity tensions and teacher identity is best captured when measured throughout training. In the future, investigating the relationship over a longer time series can provide new insights between professional identity tensions and the development of teacher identity.

Finally, we followed primary student teachers during their first two years of undergraduate school. As such, it is likely that student teachers

experienced certain situations related to their teacher identity and professional identity tensions differently than when they would be in their third or final undergraduate year. For example, a student teacher may gradually want to take more responsibility in class but could still be treated too much as a student at the practice school. Studies that map which specific situations and interactions that influence professional identity tensions and teacher identity are needed to build and expand our knowledge base on which, when, where, and how professional identity tensions and teacher identity are interrelated over time.

5.3. Practical implications

Our study has some practical implications. The absence of evidence of negative longitudinal relations between professional identity tensions and teacher identity among primary student teachers suggests that educators need to address both concepts explicitly during the early stages of teacher training. This implies that teacher educators need to design course materials that helps student teachers understand and cope with professional identity tensions and design course content that helps them to explore their teacher identity. Reflective practices considering professional tensions and teacher identity during training can support the professional development of student teachers (Korthagen, 2004).

Furthermore, our results at the intra-individual level seem to indicate that a one size fits all approach during teacher training programs may not be sufficient. Following the basic tenets of the stage environment fit theory (cf. Eccles et al., 1993), primary teacher training education could strive to provide the appropriate resources and supports that fit the needs of individual students during the early phases of training. In addition, it is conceivable that the needs of student teachers may differ globally as well locally. Countries can substantially differ in their orientation toward developing appropriate teaching skills among their student teachers, but also between teacher training programs within the same country differences exist (Karademir & Saatçioğlu, 2021).

One way teacher educators can identify the indiviudal needs of their primary student teachers is by using reflective diaries. Various studies have shown that reflective diaries are a useful tool to enable reflection and development among students (e.g., Ramli et al., 2013). This tool requires students to reflect on the teaching and learning activities that have taken place, providing an opportunity for them to search for and express their emotions and developmental path (Durmuş, 2020). Such information can be used by teacher educators to distill the individual needs of primary school teachers, regardless of the educational context or training program.

Regarding professional identity tensions, our findings on the inter-individual level underscore the importance of paying attention to the professional identity tensions ‘leaving training versus becoming a teacher’, ‘wanting to care for students versus being expected to be tough’, ‘feeling treated like a peer versus wanting to take responsibility as a teacher’, ‘experiencing conflicts between one’s and others’ orientations’, and ‘wanting to invest in a private life versus feeling pressured to spend time and energy on work’. Based on the strong inter-individual relation with teacher identity, we believe that ‘leaving training versus becoming a teacher’ in particular needs to be discussed by teacher educators during training because this tension is directly related to leaving teacher training. Teacher educators discussing this tension might advance understanding of why primary student teachers consider leaving training and/or the profession. Gaining understanding in this thinking process could help to design explicit support and thus prevent drop-out among student teachers. Moreover, discussing professional identity tensions might avoid spillover effects due to negative interpersonal interactions between students about becoming a teacher, given that young adults can be sensitive to interpersonal dynamics and their environment (Poteat et al., 2015).

6. Conclusion

Our longitudinal study investigated the reciprocal associations among various professional identity tensions and Dutch primary student teachers’ teacher identity. Student teachers completed the professional identity tensions scale and the teacher identity measurement scale three times each. Random intercept cross-lagged panel models showed that five out of nine investigated professional identity tensions were negatively associated with teacher identity at the inter-individual level. At the intra-individual level, no significant cross-lagged relationships were detected. Our findings imply that the development of professional identity tensions and teacher identity are not automatically interrelated and should, therefore, both be explicitly addressed in teacher education. Consequently, primary teacher education programs should strive to provide the appropriate resources and supports that fit the needs of individual student teachers during the early phases of training.

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