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DOI

[10.1016/j.tate.2023.104382](https://doi.org/10.1016/j.tate.2023.104382)

Publication date

2023

Document Version

Final published version

Published in

Teaching and Teacher Education

License

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Citation for published version (APA):

Hanna, F., Andre, L., & Zee, M. (2023). Student teachers' future time perspective and teacher identity: A longitudinal study about students who will become primary school teachers. *Teaching and Teacher Education*, 136, Article 104382. Advance online publication. <https://doi.org/10.1016/j.tate.2023.104382>

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Research paper

Student teachers' future time perspective and teacher identity: A longitudinal study about students who will become primary school teachers[☆]

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ARTICLE INFO

Keywords:

Teacher identity
 Future time perspective
 Random intercept cross-lagged panel modelling
 Longitudinal
 Dutch student teachers

ABSTRACT

This three-wave study examined associations between a motivational construct future time perspective (FTP) and teachers' identity (TI) in a sample of Dutch student teachers ($N = 368$). Additionally, gender and educational level were included as factors affecting FTP and TI. Random intercept cross-lagged panel models indicated that FTP and TI were moderately and positively correlated at the between-person level. At the within-person level, positive cross-lagged effects from wave 2 FTP on wave 3 TI were uncovered. Male student teachers and those that are academically educated reported weaker FTP and TI relations compared to their counterparts. Implications for practice are discussed.

Over the past couple of decades, increasing attention has focused on the concept of teachers' teacher identity, which can be understood as a multidimensional construct encompassing the level of motivation to teach, self-image as teacher, sense of efficacy in teaching, and endorsement of strong teaching practices (e.g., Canrinus et al., 2012; Starr et al., 2006). This increased attention can be largely ascribed to the idea that teachers' professional identity serves as an important guide for their observed actions and behaviours in class (Beauchamp & Thomas, 2009; Beijaard et al., 2004; Izadinia, 2013). Indeed, several researchers have theorized that teachers with a strong teacher identity provide higher-quality instruction, are better able to meet the needs of their students, and remain longer in the profession than those with a weaker teacher identity (e.g., Alsup, 2006). Given such assumed benefits of teachers' teacher identity for a host of outcomes in class, it seems vital to advance understanding of how teachers' professional identity unfolds and which factors are associated with this development (Anspal et al., 2019). This seems especially true for student teachers (i.e., students who follow education to become teachers), 30% of whom has been shown to leave the field within five years after graduation (Cunningham, 2019).

One factor that may play a role in the development of teachers' identity is student teachers' future time perspective (FTP) about their career as teacher (cf. Eren, 2012). FTP is a motivational concept that is

defined as teachers' attitude toward the long-term future goal of becoming a teacher (Andre et al., 2018). Consequently, FTP reflects the extent to which teachers hold positive attitudes toward their long-term future in study and professional career, including future thoughts, positive feelings, and behaviours related to their valued future goal.

By providing student teachers with explicit opportunities to anticipate and evaluate their future as teachers, they can be supported in future planning and maintaining optimism about their future (Kooij et al., 2017). This is important for the formation of a strong teacher identity (cf. Husman et al., 2014).

Although the link between (student) teachers' FTP and teacher identity has often been assumed (e.g., Eren, 2012; Mahmoudi-Gahruei et al., 2016; Shoyer & Leshem, 2016), virtually no empirical research to date has actually addressed this association in a longitudinal design (Erdem, 2020; Sharp & Coatsworth, 2012; Hanna et al., 2022). Of the few longitudinal studies that have been conducted, the majority have used a two-wave design in which interviews and/or questionnaires were administered at the beginning and end of a brief teacher training course and in which unidirectional flows of influence were explored (Babanoğlu, 2017; Dabback, 2018; Dalioğlu & Adiguzel, 2016; Hamman et al., 2013; Yavuz Tabak et al., 2021). As such, less is known about the temporal and potential bidirectional processes between student teachers'

[☆] Author Note: This research received a grant from Stichting Kenniscentrum Ongelijkheid Amsterdam, the Netherlands

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FTP and teacher identity across a longer period of time. Additionally, research on FTP and student teachers' identity has mainly been conducted in the context of secondary education (Hanna et al., 2019a). However, given that student teachers' training for secondary education are prepared within and for other teaching contexts than student teachers' training for primary education, both groups might differ in the development of their FTP and teacher identity during training (Gleeson et al., 2015; März & Kelchtermans, 2013; Nias, 2002). One difference is that, unlike in secondary education, student teachers spend almost all of their time with one group of children throughout their internship, thereby creating deeper and more meaningful relationships (cf. Nias, 2002). Another difference with students that are preparing for secondary education is that, at least in the Netherlands and Belgium, students preparing for primary education are educated on pedagogical theories and skills rather than on subject-knowledge (Beijaard et al., 2004). Therefore, further research on the association between student teachers' FTP and their teacher identity in the context of primary education is needed.

To address these issues, this study examined the temporal and bidirectional processes between student teachers' FTP and their teacher identity in a sample of student teachers in primary teacher training programs. Given that student teachers' background characteristics might play a role in the development of their FTP and teacher identity, we additionally explored whether their gender and educational level were associated with their FTP and teacher identity across time.

1. Teacher identity from an identity perspective

Over the years, a vast number of theoretical frameworks have been used to describe teachers' teacher identity, resulting in various conceptualizations and measures (see Beauchamp & Thomas, 2009; Beijaard et al., 2004; Hanna et al., 2019a, for overviews). Yet, an emerging strand of research on teacher identity (e.g., Tsang & Jiang, 2018; van der Want et al., 2018) has recently pinpointed the relevance of applying identity theory (Burke & Stets, 2009) to understand the nature of this concept and its relation to other relevant constructs, including FTP. Following this theory, identity can be represented as a hierarchically organized system in which *the self* appears at the apex and is further divided into multiple role identities at the next levels. Whereas the *self* functions as individuals' consciousness that organizes and manages their multiple identities, role identities can be considered a part of the self that takes on, becomes, and preserves a specific role (Burke & Stets, 2009). How many role identities individuals actually possess depends on the number of roles they occupy in life and groups they identify with. For instance, individuals might have children and self-identify as male, and therefore hold both parent and male identities (cf. Tsang & Jiang, 2018). The closer such identities are to the self, the more prominent role they play in daily interactions with others. Thereby, they may initiate specific values and beliefs—or *sets of meanings*—that guide behaviours and emotions in a particular context (Carter & Marony, 2018).

Following identity theory, student teachers' teacher identity can thus be understood as a particular role identity that reflects a socially shared and coherent *set of meanings* sketching the silhouettes of 'how to be' and 'how to act', and 'how to understand' the profession and place in society (cf. Sachs, 2005). Each meaning of this set of meanings is a small part of what the entire teacher identity entails, which can be any psychological construct (values and beliefs) as long as it can initiate teachers' behaviours, thoughts, or emotions. A recent review study on the different meanings used in defining teachers' identity resulted into the identification of a large number of meanings researchers used between 2000 and 2018 (Hanna et al., 2019a). For example, some researchers (Cheung, 2008) suggested that teachers' teacher identity consists of a school issues domain, students' needs, and personal growth and development domain. Others (Chong & Low, 2009) viewed teacher identity in terms of how respondents felt about teaching, which were essentially statements about perceptions/beliefs about the teaching profession.

However, after a content analysis of the definitions of identified meanings and, in some situations, the items of the meanings, a large overlap was found between the different meanings (Hanna et al., 2019a). Accordingly, all meanings were grouped into inductively derived meanings. In the context of primary education, the review findings indicated that teachers' identity is most likely constructed on the basis of four meanings, including teachers' motivation to teach, their self-image as a teacher, self-efficacy beliefs, and their task perceptions regarding what they think is good teaching.

The importance of each of these meanings for teachers' teacher identity was determined through a follow-up empirical study exploring the dimensionality and hierarchical structure of a new instrument for teachers' identity (Hanna et al., 2020). By using different validation approaches including expert validation and confirmatory factor analysis, evidence was found for a second-order model, in which an overall teacher identity factor appeared at the centre followed by the four meanings (motivation, self-image, self-efficacy, and task perceptions) at the next level. Specifically, second-order factor loadings, ranging between 0.45 and 0.91 and Cronbach's alpha's ranging from 0.74 to 0.84, indicated that these four meanings represent a set of meanings that together reflect teachers' teacher identity. Several researchers have also suggested similar links of teachers' identity with motivation (e.g., Kelchtermans, 2009), self-image (e.g., Nias, 2002), self-efficacy (e.g., Day et al., 2006), and task perception (e.g., Bullough & Baughman, 1993).

These results indicate that the strength of student teachers' professional identity depends on the extent to which they feel motivated to become a teacher (*motivation*), view themselves as teachers (*self-image*), believe in their capability to effectively organize and perform their teaching activities (*self-efficacy*), and beliefs about the function of teaching and education (*task perception*). In this study, we conceptualize teachers' teacher identity by these four meanings.

2. Links between FTP and student teachers' teacher identity

Researchers in the field of teacher identity have proposed various factors that might strengthen student teachers' teacher identity over time (see Hanna et al., 2019a; for an overview). In this study, we explore FTP as a potential factor that can be linked to student teachers' teacher identity (cf. Eren, 2012; Hamman et al., 2013; Nias, 2002).

FTP has been defined and conceptualized differently across research traditions and life domains (for a review see Andre et al., 2018). Departing from the time perspective research tradition (e.g., Lewin, 1951) and the study and professional career domain, we define FTP as a positive attitude that encompasses personal cognitions, feelings, and behavioural intentions with respect to the long-term future in the domain of study and professional career (Andre et al., 2018; Peetsma, 1992). This definition is deeply rooted in the motivational nature of FTP, which is explained by three human qualities: The ability to anticipate events and behavioural outcomes in the distant future (*cognitive component*), the ability to attribute valence to goals in the distant future (*dynamic component*), and the ability to attach certain feelings (i.e., optimistic or pessimistic) to the distant future (*affective component*; Andre et al., 2018). Based on these three qualities, student teachers' FTP has been shown to encompass three components relevant for teachers' future thinking and planning (cf. Peetsma, 1992): *Cognition* (teachers' ideas or expectations), *behavioural intention/behaviour* (teachers' effort and planning), and *affect* (teacher's expression of specific positive feelings, such as hope). Consequently, a student teacher with a high score on FTP would think more about the long-term future related to the study and professional career, ascribe positive feelings and value to these future thoughts, and intentionally engage in present actions that would lead to the realization of these future goals. This attitude-like and domain-specific conceptualization of FTP has shown the strongest relationship with educational and work outcomes in prior meta-analytic work (Andre et al., 2018).

Generally, FTP is regarded as “the building site of constructive behaviour and human progress” (Nuttin & Lens, 1985, p. 40). Across FTP theory and research, FTP is established as a powerful driver of individuals’ attitudes and behaviours in such crucial life domains as education, and across different samples of teachers in several stages of their career (Andre et al., 2018). It has been unanimously confirmed that thinking about the future and the way individuals think about their future motivates them to pursue activities in the present that help them attain distant goals in the future (Andre et al., 2018; Kooij et al., 2018). When young adults think about their future consequences more frequently and in a positive way, they have been shown, for instance, to put more effort in their learning, achievement, and career planning in the present than adults with a weaker FTP (Andre et al., 2019; Peetsma, 2000). Specific to the context of teaching, it has furthermore been assumed that having clear future-oriented expectations about future interests and goals serves as a catalyst for action toward the future profession (Eren, 2012; Hamman et al., 2013). For instance, student teachers may discover joy, interest in, and talent for, teaching children during their internships, leading to positive feelings and beliefs about teaching and taking care of children in the future. Such a strong FTP may help student teachers to give meaning to their present learning activities, and thereby serve as a basis for a strong teacher identity as well.

Although FTP and teacher identity both convey processes related to becoming a teacher, it is important to note that they are two different constructs. First, FTP and teacher identity depart from two different theoretical frameworks, namely, future time perspective (Peetsma, 1992, 2000) and identity theory (Burke & Stets, 2009) that imply clear differences between FTP and TI operationalization and nature. Consequently, whereas TI is operationalized by a set of specific meanings and different roles tied to teachers’ self, FTP is about teachers’ positive attitude that may drive the formation of these meanings and roles, or vice versa. Moreover, while the definition of TI reflects both social and personal construction (e.g., socially shared roles and meanings), FTP mainly relates to the personal construction of one’s future (Andre et al., 2018). Second, in the literature, FTP and identity development of teachers and young adults were considered to be two separate, yet interrelated constructs that were suggested to be explored separately in different populations and settings (Bound et al., 2022; Luyckx et al., 2010).

Nowadays, there is a handful of empirical studies that have, to some extent, supported the merits of FTP for teachers’ education and professional development (e.g., Eren, 2012; Eren & Tezel, 2010). For instance, Husman et al. (2014) have argued that teachers’ FTP might contribute to their teaching quality and motivation to become a teacher, the latter of which can be considered an aspect of their teacher identity. Furthermore, it has been shown that teachers who were able to connect their professional learning experiences to the present showed increased self-efficacy and persistence in the future (Husman et al., 2014).

Despite the presumed link between student teachers’ FTP and their teacher identity, there is still a dearth of empirical research investigating the temporal and (bi)directional processes between these two constructs across time. Although it seems reasonable to assume that student teachers’ FTP might strengthen their teacher identity over time (Eren, 2012; Hamman et al., 2013; Husman et al., 2014; Çetin & Eren, 2019), it is also possible that a strong teacher identity results in positive anticipation of the future. More specifically, identities may facilitate reasons and directions for the future (cf. Burke & Stets, 2009). Indeed, a study by Luyckx et al. (2010) has showed reciprocal relations between college students’ FTP and their general identity formation, which may suggest a bidirectional link between FTP and teacher identity. A likely reason for this link is that identities function as filters through which experiences are interpreted and processed (Mommers et al., 2021). In this way identities elicit emotional responses relating to teaching, which form a basis for long-term planning in the future (Ebbs, 1997; Park & Schallert, 2020). Such aspects may impact what teachers find significant for themselves in the process of becoming a teacher. Hence, knowing ‘how

to be’, ‘how to act’, and ‘how to be understood’ can be an important driving force behind the process of becoming a teacher and the catalyst toward the future.

Another reason for a reverse link between the two concepts could be that student teachers with a strong teacher identity set long-term goals for the future that confirm that specific identity (cf. Kelchtermans, 2009). This means they will engage in activities related to the long-term future and value actions that support their teacher identity, overcome potential professional identity tensions that prevent them from being teachers more easily, and more easily set sub-goals that help them meet the future-related goals (cf. Avci, 2013; Schaap et al., 2021). It can be suggested that a FTP enables students to be successful in affirming their teacher identity. However, either way, due to a lack of research in this area, the link between student teachers’ teacher identity and FTP needs to be formally tested.

3. The role of gender and educational level within the Dutch context

One common assumption in both motivational and identity theories (e.g., Andre et al., 2018; Burke & Stets, 2009) is that teachers’ professional identity and FTP are likely to vary as a function of several personal and contextual related features. In this study, we consider student teachers’ gender and teacher educational level as features that may affect their teacher identity and FTP across time. Regarding gender, it can be assumed that male student teachers report a weaker teacher identity and FTP compared to their female counterparts. Specifically, prior research has suggested that male student teachers are more likely than females to leave primary teacher training and/or leave the workforce within the first couple of years after graduation (e.g., Heikkilä & Hellman, 2017; Skelton, 2009). Possibly, such a less favourable stance toward teaching may be due to male student teachers developing a weaker FTP and/or teacher identity during the teacher training program than female student teachers (cf. Hedlin & Åberg, 2013; Heikkilä & Hellman, 2017). Furthermore, it has previously been argued that teaching in primary school has become a highly feminized profession (Simpson, 2004; Zee et al., 2023). As a result of this feminization of education, male teachers may struggle to reconcile their work with their masculine identity (Erdem, 2020; Lupton, 2000). Thereby, male student teachers may develop a less strong teacher identity across time than females.

Regarding educational level, we assume that student teachers educated in an academic teaching program might develop a weaker teacher identity and FTP than students educated in a professional teaching program (cf. Baan et al., 2019; 2020). The context of this of this study is the Netherlands (for a more detailed explanation of the Dutch landscape of teacher education preparing for primary education, see Baan et al., 2020; Snoek et al., 2015). In the Netherlands two important routes that prepare student teachers to become a primary teacher are the professional training program and the academic teaching program. Both have, to some extent, a degree of freedom in creating their own curriculum as long as they ensure students achieve the end goals. Student teachers educated in an academic teaching program are prepared to become a teacher in primary education and a researcher at the same time. Students educated in a professional teaching program, on the other hand, are prepared to be a teacher only. So even though both are prepared to teach all children from approximately age 4 (pre-kindergarten) up to and including age 12 (grade 6), student teachers educated in an academic teaching program are likely to develop both a teacher and researcher identity. Possibly, these academically educated students may see themselves less as a teacher in the traditional sense than students that are educated in professional teaching programs, which may result in a weaker teacher identity and a different outlook on their career.

4. Present study

In the present study, we aimed to explore the temporal and bidirectional processes between FTP and teacher identity. We conducted our research among a group of student teachers who were enrolled in the initial stages of primary teacher education programs throughout the Netherlands. Furthermore, we explored whether gender and educational level were associated with their FTP and teacher identity across time.

Based on the handful of prior literature on this association, we first expected that an increase in student teachers' FTP would lead to an increase in their teacher identity across time. As an alternative hypothesis, we also expected that an increase in student teachers' teacher identity would lead to an increase in their FTP across time. Regarding student teachers' background characteristics, we expected that male student teachers and student teachers educated in an academic teaching program are likely to develop a weaker FTP and teacher identity than females and student teachers educated in a professional teaching program.

5. Method

5.1. Participants

The participants in the present study included student teachers preparing for primary education and were drawn from three professional teacher training programs and one academic teacher training program across the Netherlands. After institutional ethics review board (file number 2017-CDE-8109) approval was obtained, we requested the program directors of four large teacher education programs that prepare for primary education in the Netherlands to participate in this longitudinal study. With their agreement, all first-year student teachers ($N = 492$) were invited to take part. Of those students, 334 (67.8%) ultimately completed survey questions at Time 1. At Time 2, 402 students were invited and 326 (81.1%) completed the questionnaires, and at Time 3, 376 students were invited and 270 (71.8%) completed the questionnaires (see Table 1). Only those who completed the questionnaires at least two times were included in the final sample. Of the initial sample, 368 student teachers (74.8%) met this criterion and were included. Using analysis of variance and t -tests, we found no significant differences ($p > .05$) between respondents that completed the measures of interest (i.e., the Teacher Identity Measurement Scale and Future Time Perspective Scale) at least two times and those who completed the questionnaires one time. In most cases, absence during data collection was mainly due to student teachers being unwilling to participate, illness, or overlapping appointments. Additionally, based on official registration and deregistration figures of the participating institutions, a small number of all student teachers ($n = 66$) that completed the questionnaire the first time left the program before the start of the

Table 1
Student teachers' background characteristics.

	Initial sample	Analytical sample
<i>Gender</i>		
Women	369 (75%)	286 (80%)
Men	123 (25%)	82 (20%)
<i>Educational level</i>		
Academic teaching program	117 (24%)	58 (16%)
Professional teaching program	375 (67%)	310 (74%)

Note. In the Netherlands there are two main routes to become a primary teacher (see Baan et al., 2020 for more details). One way is by completing an academic teaching program and another way is by completing a professional teaching program. Both routes take four years to complete and are at the bachelor level. Please note that the academic programs are offered by universities and have a more research-oriented focus, whereas the professional programs are offered by institutes for higher professional education only. These institutes have a more practical orientation and their attention to research is limited.

second semester of the first study year. Students who left the teacher education program were not invited to participate again. The attrition rate in this study seems to align with the national attrition percentages (Geerdink & de Beer, 2013), which is between 20% and 25%.

Of the student teachers who participated, 286 (77.7%) were female and 82 (22.3%) were male. Regarding educational level, the majority of student teachers was educated in a professional teaching program. Both demographical characteristics are comparable to those of the larger population of student teachers preparing for primary education (e.g., Geerdink & de Beer, 2013; Snoek et al., 2015).

5.2. Procedure

Students who agreed to participate were given an explanation of the purposes of the study and an active consent form that had to be signed digitally. After reading and signing the informed consent form, questionnaires were administered digitally during scheduled meetings at student teachers' institutions. The first session was held in October 2017, the second session in early April 2018, and the final session was in October 2018. The six-month time interval was based on findings from studies indicating that development in teacher identity might be noticeable after six months of preparation (Runhaar & Gulikers, 2016). The questionnaires had a forced response format (i.e., students had to answer a question to advance to the next question) and took about 20 min to complete. All sessions were under the supervision of the first author of this study and all student teachers participated on a voluntary basis.

5.3. Measures

5.3.1. Student teachers' teacher identity

Student teachers' teacher identity was measured with the Teacher Identity Measurement Scale (TIMS; Hanna et al., 2020). This instrument approximates teachers' teacher identity as the sum of the four components Motivation, Self-Image, Self-Efficacy, and Task Perception. Motivation consists of eight statements in which student teachers were asked to briefly rate their main 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 to which 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 their daily teaching tasks (e.g., 'To what extent can you gauge students' comprehension of what you have taught?'). Finally, Task Perception is measured by 18 items assessing student teachers' beliefs about teaching and education (e.g., 'I think it is important to take the wishes of my students into account') on a 5-point Likert scale (1 = *totally disagree*; 5 = *totally agree*).

In prior research the psychometric properties of the four components of Teacher Identity have been found to be adequate, with Cronbach's alphas between .74 and .84. Using factor analytic techniques, the factorial validity of the TIMS has also been demonstrated, with factor loadings ranging between 0.45 and 0.91 (Hanna et al., 2020). In the present study, we first computed standardized scores for each of the four components and subsequently averaged these components to represent one overall score of Teacher Identity. Cronbach's alpha coefficients were 0.93, 0.95, and 0.95 for Teacher Identity at Time 1, Time 2, and Time 3, respectively (see Table 2).

5.3.2. Future time perspective

For FTP, we modified eight items regarding long-term study and professional career of the original Future Time Perspective Scale for evaluating secondary students' future time perspective (Peetsma, 1992, 2000) with the help of the developer of this instrument. To this end, we

Table 2
Zero-order correlations, means, and standard deviations.

	1.	2.	3.	4.	5.	6.	7.	8.
<i>Covariates</i>								
1. Gender	1.00							
2. Educational Level	-.05	1.00						
<i>Main Variables</i>								
3. Teacher Identity (T1)	-.17**	-.17**	1.00					
4. Teacher Identity (T2)	-.17**	-.06	.67**	1.00				
5. Teacher Identity (T3)	-.17**	-.07	.66**	.63***	1.00			
6. Future Time Perspective (T1)	-.15**	-.15**	.47**	.34***	.39***	1.00		
7. Future Time Perspective (T2)	-.16**	-.05	.39**	.57***	.43***	.60***	1.00	
8. Future Time Perspective (T3)	-.15*	-.00	.29**	.30***	.47***	.51***	.46***	1.00
<i>Descriptive Statistics</i>								
Cronbach's α	-	-	.93	.95	.95	.73	.77	.75
Mean	0.22	1.91	0.79	0.79	0.79	0.85	0.84	0.81
Standard Deviation	0.42	0.63	0.06	0.06	0.07	0.09	0.10	0.11

Note. T1 = Time 1 (fall 2017), T2 = Time 2 (early spring 2018), T3 = Time 3 (fall 2018). Continuous variables are standardized to ease interpretation. *** $p < .001$; ** $p < .01$; * $p < .05$.

reformulated sentences to the context of student teachers preparing for primary education and added words such as primary school/primary school teacher to the original items (e.g., the item ‘Later, after this school, I expect to have a lot of fun in my work or study’ was changed into ‘Later, after this training, I expect to enjoy my work as a teacher’). This resulted in an eight-item instrument measuring cognitive aspects (e.g. ‘I think that in my job as a teacher after this training I will benefit from a number of subjects’), affective aspects (e.g., ‘I like to think about working as a teacher after this training’), and behavioural aspects (e.g., ‘Whether I will start working as a teacher after this training is not so important to me’ [reverse coded]) of student teachers’ FTP. All items were measured on a five-point Likert scale (1 = *totally disagree*; 5 = *totally agree*). This scale was developed by using a facet design in which the three components (cognition, affect, and behavioral intention/behavior) relevant for the life domain were systematically altered (Peetsma, 1992; Stouthard & Peetsma, 1999). Consequently, a common and recommended approach in the literature was to use a composite FTP score. The psychometric, construct, and external validity properties of the FTP scale have been well established longitudinally, and across different groups (e.g., Andre et al., 2019; Schuitema et al., 2014). The reliability coefficients for the scale in this study were adequate and similar to previous studies (Cronbach’s alpha coefficients were 0.73, 0.77, and 0.75 for FTP at Time 1, Time 2, and Time 3, respectively (Table 2).

5.4. Data analysis

To explore longitudinal associations between student teachers’ teacher identity and FTP, we conducted random-intercept cross-lagged panel modelling (RI-CLPM; Hamaker et al., 2015).¹ In traditional CLPM, longitudinal associations of Teachers’ Identity at time 1 and time 2 with FTP at time 2 and time 3 are modelled, while simultaneously specifying the associations of FTP at time 1 and time 2 with Teachers’ Identity at time 2 and time 3. Additionally, the stability in each construct of interest is taken into account by specifying autoregressive paths for Teachers’ Identity and FTP from time point to time point. RI-CLPM includes the important features of standard cross-lagged panel modelling but also extends this approach by separating between-person variability from within-person variability in repeatedly observed variables (Hamaker et al., 2015). This allowed us to estimate stable differences between

¹ Prior to analyzing our data, we checked our data for basic assumptions, outliers, and issues regarding non-linearity and non-normality. Data were found to meet assumptions regarding multivariate normality and linearity and tests of skewness and kurtosis were nonsignificant for all variables included in this study.

student teachers’ Teacher Identity and FTP as well as time-varying changes in these constructs within student teachers (Keijsers, 2016). Missing data across the three waves ranged from 9.2% to 26.6%. Independent samples *t*-tests indicated no statistically significant differences in the Teacher Identity and FTP scores between student teachers with complete or incomplete data ($p > .05$). Additionally, Little’s MCAR test suggested that data at T2 and T3 were missing completely at random, $\chi^2(4) = 8.19, p = .085$. Therefore, missing data patterns were handled using full information maximum likelihood estimation (FIML). Under conditions of M(C)AR, FIML estimates a likelihood function for each student teacher based on all the available data that are present and has been shown to produce unbiased parameter estimates and standard errors (Enders & Bandalos, 2001). In our dataset, we did not find any differences in model fit and in direction and strength of model parameters between models that were estimated with and without FIML.

5.4.1. Modelling procedure

We estimated a series of RI-CLPMs to separate within-teacher from between-teacher differences in student teachers’ Teacher Identity and FTP across time. First, we fitted two baseline models in which only autoregressive paths were included (Model 1) and subsequently constrained (Model 2). Subsequently, in Model 3, cross-lagged associations among student teachers’ Teacher Identity and FTP were specified. In Model 4, we estimated a covariate model in which Gender and Educational Level were included as predictors of the observed scores of student teachers’ Teacher Identity and FTP across time. Because we did not have a priori hypotheses about whether our time-invariant predictors would have different effects on teachers’ Teacher Identity and FTP across time, we followed Mulder and Hamaker’s (2021) suggestion to start with a model in which Gender and Educational Level served as predictors of the observed scores of student teachers’ Teacher Identity and FTP across time. Subsequently, we fitted a more parsimonious fifth model, in which the effects of the two covariates on student teachers’ Teacher Identity and FTP were constrained across time. This allowed us to explore whether or not these effects are the same across time.

In all models, student teachers’ Teacher Identity (*x*) and FTP (*y*) were measured thrice during the teacher training program and were represented by both within-teacher latent factors (Cx_{1-3} and Cy_{1-3}) and random intercept factors (RI_x and RI_y), the latter of which capture trait-like differences between teachers across the three waves. We used the observed scores of teachers’ Teacher Identity and FTP as indicators of these factors (X_{1-3} and Y_{1-3}) and all factor loadings were fixed at one to identify the model. Measurement error variances were fixed at zero, such that the variation in teachers’ Teacher Identity and FTP was fully captured by the latent factors at the within- and between-teacher level (Keijsers, 2016).

In our RI-CLPMs, the autoregressive parameters (α and δ) indicate

how within-teacher deviations from the expected scores of student teachers' Teacher Identity and FTP at one wave are associated with deviations for those constructs at the next wave (i.e., carry-over effects). Cross-lagged coefficients (β and γ) indicate the extent to which changes in Teacher Identity are associated with changes in FTP and vice versa, controlling for the autoregression paths. Correlations among the residuals (u and v), or dynamic errors, indicate the extent to which within-teacher changes in Teacher Identity are associated with within-teacher changes in FTP (cf. Cohen, 1992). Last, a relationship between random intercepts reflects how stable between-teacher differences in Teacher Identity are linked with stable between-person differences in FTP.

5.4.2. Model goodness-of-fit

All models were fitted in Mplus 8.4, using maximum likelihood estimation (Muthén & Muthén, 1998-2012). In evaluating goodness of fit, we reported on the model's χ^2 , with nonsignificant values indicating a good model fit (Little, 2013). Given that trivial discrepancies between the expected and the observed model may lead to the model's rejection (Chen, 2007), other fit indices were calculated as well. These included the root mean square error of approximation (RMSEA) and standardized root-mean-square residual (SRMR), with values ≤ 0.08 reflecting reasonable fit (Browne & Cudeck, 1993; Kline, 2011), as well as the comparative fit index (CFI) with values ≥ 0.90 indicating satisfactory fit (Bentler, 1992).

6. Results

6.1. Descriptive statistics

Means, standard deviations, and zero-order correlations among the variables are displayed in Table 2. Correlations suggested moderate stability of both student teachers' Teacher Identity (r s between 0.63 and 0.67) and FTP (r s between 0.46 and 0.60) across the three waves. Associations between student teachers' Teacher Identity and FTP were also statistically significant across time, ranging from .29 to .57. Student teachers' Gender was significantly and negatively correlated with Teacher Identity and FTP at all time points (r s between -0.15 and -0.17), suggesting that males hold weaker teacher identities and FTPs. Educational Level was less consistently associated with both constructs of interest, with correlations ranging from 0 to -0.17 (see Table 2).

6.2. Random intercept cross-lagged panel analysis

Fit indices of all models are displayed in Table 3. The baseline model with unconstrained autoregressive paths only (Model 1) reflected a good fit to the data. Constraining the autoregressive paths to be equal did not deteriorate the model's fit. Therefore, we took this second constrained model as the final baseline model and added cross-lagged paths in Model 3. This model also reflected an excellent fit to the data. The positive and statistically significant between-teacher correlation indicates that student teachers with a strong Teacher Identity also report a stronger FTP and vice versa, $\sigma_{\text{between}}^2 = 0.60, p < .001$. At the within-teacher level, the positive correlations between the residuals of student teachers' Teacher

Identity and FTP were also statistically significant, except for Time 1 (Time 1: $r = 0.16, p = .241$; Time 2: $r = 0.67, p < .001$; Time 3: $r = 0.42, p < .001$). The small and mostly non-significant autoregressive paths indicated that there was great variability within student teachers' Teaching Identity ($\alpha_2 = -0.35, p = .083$; $\alpha_3 = -0.20, p < .05$) and their FTP ($\sigma_2 = -0.03, p = .891$; $\sigma_3 = 0.03, p = .890$). Of the cross-lagged associations, only the path from FTP at wave 2 to Teacher Identity at wave 3 was statistically significant, $\gamma_3 = 0.35, p < .01$, after controlling for the stability in these constructs.

In the fourth model, we included student teachers' Gender and Educational Level as predictors of the model's observed variables, thereby allowing the effects of Gender and Educational Level on student teachers' Teacher Identity and FTP to be different at each wave (cf. Hamaker et al., 2020). This model reached a good fit to the data, $\chi^2(3) = 1.13, p = .770, RMSEA = 0.000$ (90% CI [0.000–0.059]), CFI = 1.00, SRMR = 0.027. Additionally, in Model 5, we constrained the effects of the two covariates on student teachers' Teacher Identity and FTP to evaluate whether these effects are the same across time. This model had a satisfactory fit, $\chi^2(11) = 7.45, p = .762, RMSEA = 0.000$ (90% CI [0.000–0.038]), CFI = 1.00, SRMR = 0.035 and did not fit the data significantly worse than the unconstrained model, $\Delta\chi^2(8) = 6.32, p = .611$. Fig. 1 represents a graphical representation of the paths and coefficients of the final model. This model implies that the associations of Gender and Educational Level with teachers' Teacher Identity and FTP are time-invariant. In general, males reported a weaker student teachers' Teacher Identity ($\beta = -.20, p < .001$) and FTP ($\beta = -0.21, p < .001$) than their female counterparts. Additionally, student teachers who were academically educated were more likely to experience a weaker Teacher Identity ($\beta = -0.16, p < .01$) and FTP ($\beta = -0.14, p < .05$) than those with a (higher) prevocational educational background.

7. Discussion

The purpose of the present study was to provide insight into the temporal and (bi)directional processes between teacher identity and future time perspective (FTP) over time. Specifically, we longitudinally explored whether an increase in student teachers' attitude towards the long-term future, namely FTP, led to an increase in their teacher identity, or whether an increase in teacher identity led to an increase in FTP, all within the framework of the first 18 month of teacher training program. To explore this temporal and (bi)directional associations, we used random intercept cross-lagged panel modelling (RI-CLPM; Hamaker et al., 2015). This method helped us to disentangle the variation between student teachers (i.e., stable between-person differences) from variation within student teachers through the inclusion of a random intercept.

Prior studies (cf. Oerlemans et al., 2018) have suggested that change processes between FTP and teachers' teacher identity are more likely to operate within student teachers rather than between teachers. In our study, involving a cohort of students in the initial 18 months of their program, this assumption, however, was only partly confirmed. Specifically, our results at the between-person level indicated that FTP and student teachers' teacher identity were moderately and positively related across the three waves. This suggests that student teachers who

Table 3
Model fit Statistics for Random Intercept Cross-Lagged Panel Models of Teachers' Identity and Future Time Perspective.

Model	χ^2 (df)	CFI	TLI	RMSEA (90% CI)	SRMR	$\Delta\chi^2$ (df)	Δ CFI	Δ TLI
Model 1: Autoregressive model	10.61 (5)	.993	.978	.055 (.000, .102)	.064	–	–	–
Model 2: Autoregressive model (constrained)	12.26 (7)	.993	.985	.045 (.000, .086)	.079	1.65 (2)	.000	.007
Model 3: Basic RI-CLPM	1.33 (3)	1.00	1.00	.000 (.000, .063)	.038	10.92 (4)*	.045	.015
Model 4: RI-CLPM with time-invariant covariates	1.13 (3)	1.00	1.00	.000 (.000, .059)	.027	–	–	–
Model 5: RI-CLPM with time-invariant covariates (constrained)	7.45 (11)	1.00	1.00	.000 (.000, .038)	.035	6.32 (8)	.000	.000

Note. RI-CLPM = Random Intercept Cross-Lagged Panel Model; χ^2 = chi-Square; CFI = comparative fit index; TLI = Tucker Lewis Index. RMSEA = root mean square error of approximation; CI = confidence interval.

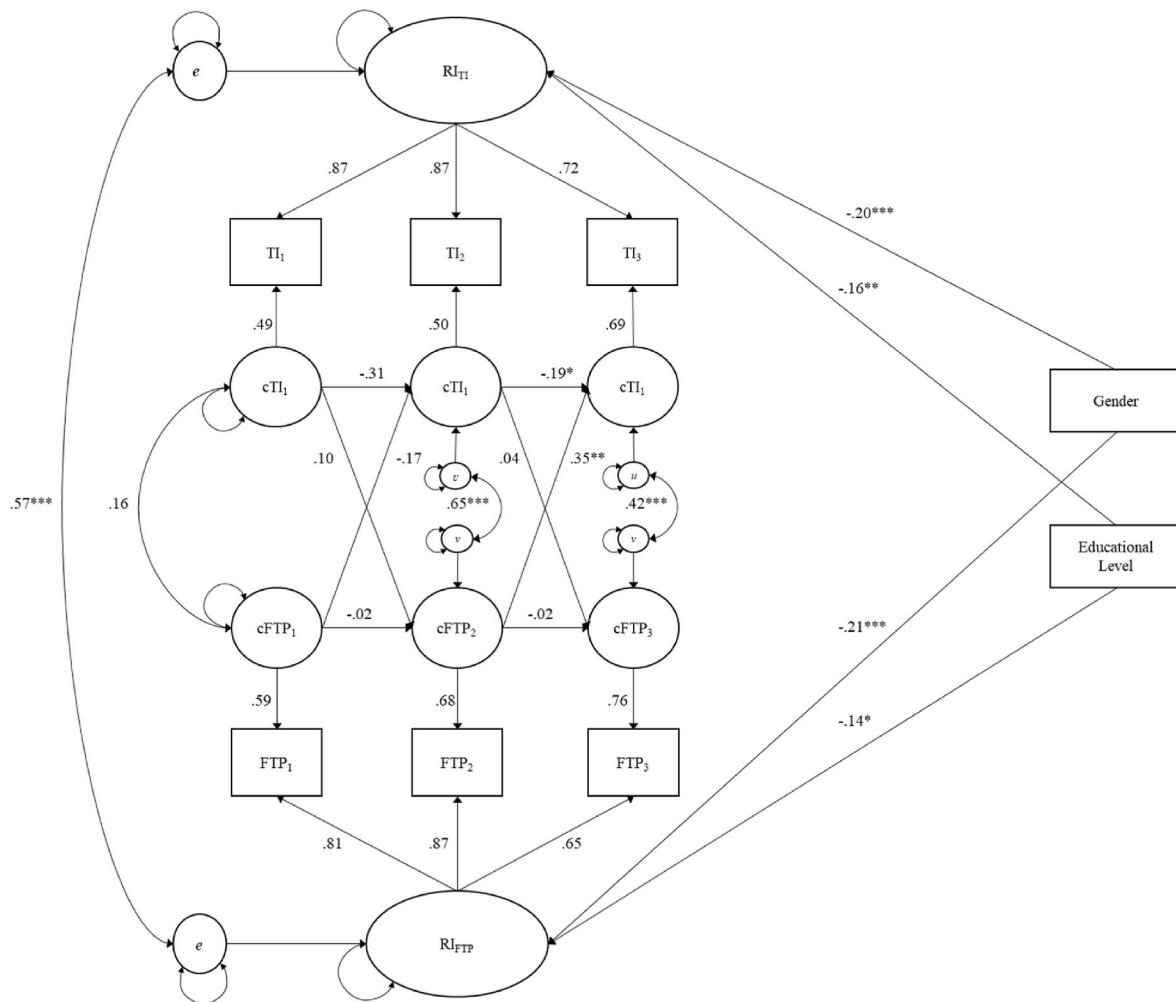


Fig. 1. Random Intercept Cross-Lagged Panel Model of Teacher Identity and Future Time Perspective. *Note.* Student teachers’ Teacher Identity and their Future Time Perspective (FTP) are represented by within-teacher latent factors (cTi_{1-3} and $cFTP_{1-3}$) and random intercept factors (RI_{Ti} and RI_{FTP}), which capture trait-like differences between student teachers across waves. Observed scores as indicators of these factors are denoted by Ti_{1-3} and FTP_{1-3} . Correlations among the residuals (dynamic errors u and v) indicate the extent to which within-teacher changes in Teacher Identity are associated with within-teacher changes in FTP. Associations between random intercepts reflect how stable between-teacher differences in Teacher Identity are linked with stable between-person differences in FTP. Factor loadings were fixed at one to identify the model. Measurement error variances were fixed at zero, such that the variation in student teachers’ Teacher Identity and FTP was fully captured by the latent factors at the within- and between-teacher level. FTP = Future time perspective, TI = Teacher identity, t_x = TIME, RI_{ti} = Teacher identity on the between level, RI_{ftp} = Future time perspective on the between level. *** $p < .001$; ** $p < .01$; * $p < .05$.

contemplated more about their future and ascribed positive feelings to it, also reported a stronger teacher identity (or vice versa) across the three measurement periods, compared with other student teachers. This result aligns with previous theoretical and two-wave studies (e.g., Hamman et al., 2013; Yavuz Tabak et al., 2021), in which roughly similar results between teachers have been found. Yet, our study adds to this prior body of work by showing that this positive relation also exists among student teachers in the early stages of their teacher education program for primary education. Studies so far have mainly used samples of almost graduated student teachers outside primary education (cf. Babanoğlu, 2017; Dabback, 2018).

At the within-teacher level, however, we found that student teachers’ teacher identity in the earliest phase of the teacher training program is subject to some change under the influence of within-person variability in FTP at an earlier point in time. More precisely, we observed that student teachers with a strong FTP at the end of their first year of training also tended to have a stronger teacher identity at the start of their second year of teacher training. This is in line with our hypothesis that an increase in FTP may lead to a subsequent improvement in student teachers’ teacher identities. Using a random intercept cross-lagged

panel design, this finding confirms prior results that have reported with correlational and qualitative methods among student teachers (e.g., Hamman et al., 2013) and suggests that FTP may provide student teachers a direction and impetus for action, change, and development regarding their teacher identity (cf. Markus & Nurius, 1986). In other words, envisioning one’s positive future related to study and professional career and planning for it, may be a necessary driving force behind student teachers’ identity formation over time (cf. Sharp & Coatsworth, 2012).

Interestingly, our RI-CLPMs could not establish the positive temporal association between student teachers’ FTP and their teacher identity at the within-teacher level in the earliest phase of the teacher training program. This finding seems to indicate that the influence that student teachers’ FTP may exert on their teacher identity seems relatively stable across student teachers, but fluctuate strongly within student teachers, possibly depending on particular contexts in which they operate, background characteristics, and phase of the teacher training program (cf. Husman et al., 2014). One plausible explanation for this finding is that it may take some time before teachers’ FTP may exert influence on the development of their teaching identity. This is in line with

theoretical suppositions of Simons and colleagues (2014), suggesting that student teachers' FTP needs time to become fully crystallized and only gains in specificity and concreteness during their first year in teacher training. For instance, over time student teachers may further discover their interests in, and talents for a particular subject or area of teaching, which may sharpen their perspectives of their future careers as teachers. This in turn helps them to better capture the meaning of teaching and to identify with it (Simons et al., 2004).

The finding that FTP becomes more important for student teachers' teacher identity later in time, also suggests that, due to their clearer FTP, student teachers are able to set goals in the distant future and thereby create long-term projects to achieve those goals (Simons et al., 2004). This so-called extended FTP is associated with deep learning and professional development (Kooij & Zacher, 2016). Extended FTP-related goals may be valued more highly by student teachers and the present learning activities are viewed as more important in relation to their teacher identity (cf. Burns et al., 2021).

Last, at the end of the first year, extended FTP might arise due to the type of activities student teachers perform during their teacher education route (cf. Sharp & Coatsworth, 2012). In the Dutch context, student teachers preparing for primary education mostly start their teacher education program with classroom observations and give short lessons for individual pupils and small groups of up to four pupils. From there, they slowly transition to teaching larger groups and give longer lessons across the school day. So far, the connection between activity involvement and FTP has received limited attention in the literature (Burns et al., 2021). Future researchers are therefore encouraged to further explore the role that the actual teaching activities student teachers perform play in stimulating FTP about teaching over time.

Next to studying the temporal associations between teachers' FTP and teacher identity, a second goal of this study was to explore how gender and educational level may affect FTP and teacher identity across time during the first 18 months of the teacher training program. As expected, we found that male student teachers and student teachers educated in an academic teaching program were likely to develop a weaker FTP and teacher identity than females and student teachers educated in a professional teaching program. This result matches with studies in which teachers were interviewed about gender differences between teachers (e.g., Skelton, 2009) and with studies surveying teachers about differences in educational level (e.g., Harisman et al., 2019).

Overall, these findings seem to indicate that male student teachers, compared to female students, may identify less with the courses of action they encounter during teacher training and possibly with the profession in general. Theoretically, engaging in self-identifying activities can provide a setting for male teachers to discover their future goals as well as their teacher identity (cf. Burke & Stets, 2009; Sharp & Coatsworth, 2012). Indeed, previous studies suggest that many activities during the teacher training program, including extensive reflection and teaching the lowest grades in school, are likely to disconfirm cisgender male identity, especially early on in teacher education, (e.g., Heikkilä & Hellman, 2017; Skelton, 2009). For educational level, an explanation might be that student teachers educated in an academic teaching program for primary teaching education, at least in the Dutch context, mostly are enrolled in research related routes (Baan et al., 2020). These routes train student teachers to become teachers as well as researchers in child development and education. Perhaps such a dual program is an important reason why students educated in an academic teaching program, compared to students educated in a professional teaching program, report lower FTPs and teacher identities across time. Hence, they simply have more role opportunities to choose out and to identify with.

7.1. Limitations and future directions

This study has several strengths, including its longitudinal nature, its sample size, and the methodological techniques used. At the same time

this study is limited in several respects. First, we used a six-month interval between measurements of teachers' FTP and their teacher identity. Although this interval was based on the results of previous qualitative studies about teachers' teacher identity development (e.g., Runhaar & Gulikers, 2016), it raises the question of how our results might have been affected by this time interval. It is well documented that studying the same constructs with different time intervals can result in different estimates of lagged effects (Liekefett et al., 2021). Indeed, selecting inappropriate intervals might yield an over- or underestimation of relationships between constructs. Furthermore, the relatively constrained time intervals between measurements might have affected the time-invariant associations of gender and educational level with teachers' teacher identity and their FTP. This raises the question what the true effect of gender or educational level might be, especially in the face of potential attrition due to student teachers dropping out of the teacher training program. It is possible, for instance, that male student teachers who remained in the teacher training program showed greater resilience in the face of their similarly gendered peers who dropped out. This resilience, in turn, might reinforce their teacher identity just before the induction phase. Although the scores on TI and FTP for males and females and for teachers with varying educational levels remained relatively stable, future research could verify our results by selecting other or longer time intervals for studying the relationship between teachers' FTP and teacher identity over time or focus on finding the appropriate time interval for observing potential effects of teachers' FTP on teacher identity, that is, that shows the strongest relation of FTP on teacher identity. Other statistical techniques, such as latent growth curve modelling, might also be helpful in the quest to further explore the potentially dynamic role of gender and educational level in teachers' teacher identity and FTP.

Ideally, student teachers would have been followed throughout teacher education. However, due to a lack of various practical reasons (time, resources) that are inherent to longitudinal research, we only followed student teachers through the first two years of teacher education. The rationale behind this choice was that in the absence of research evidence, we wanted to generate a clearer picture of the relation between student teachers' FTP and their teacher identity from the moment student teachers entered teacher education. Clearly, in hindsight, it can be suggested if the first two years of teacher education are the most interesting to study. At the same, future research can build on our results by selecting another time frame.

Third, in our study, we used a composite score of FTP which was a common and recommended approach in the FTP literature that we also decided to follow. However, given that both FTP and TI are multicomponent constructs, exploring how different FTP components might relate to different aspects of TI might be an interesting avenue for future research. In particular, it might be interesting to explore if the strength between FTP and TI relation contingent on a specific FTP component or a TI aspect. As this was also not the scope of our study, potentially other researchers could explore further the FTP and TI relations relative to the different FTP components and TI aspects, and/or conceptualizations that are being used.

Fourth, our study was conducted in the Dutch context, where student teachers spend up to half of their program on internships and reflection (Nekoda, 2020). In this way, student teachers appear to be in an educational context that stimulates reflection on aspects that may be more or less connected to their FTP and teacher identity, possibly steering our findings. By conducting studies in different countries, researchers could examine and compare our findings with their findings to identify cross-cultural similarities about the importance of FTP for teachers' teacher identity.

Fifth, student teachers not only reported about their teacher identity, but also about their FTP. It is therefore possible that this study might have been threatened by shared source variance, resulting in an overestimation of the strength of associations. At the same time, however, like we tried to argue in this study, teachers' FTP and teacher identity

are likely to be intertwined and related to one another in a reciprocal way. Given that student teachers' FTP may serve as an important source of their teacher identity (and vice versa), self-reports of these constructs seem a relevant method to disentangle this complex association. Nevertheless, future studies could employ different methods, such as interviews, or multiple informants, to further explore the present study's findings.

Finally, the direction of the relation between teachers' FTP and teacher identity was the main focus in the current study. One the one hand, RI-CLPM provided us with evidence for the strength and direction of the relationships. On the other hand, we are aware that there might have been constructs that are common causes of student teachers' FTP and teacher identity. This might have influenced the strength and direction of the correlations (Liekefett et al., 2021). A potential common cause could be, for instance, professional identity tensions (Hanna et al., 2022). Student teachers that influence a lot of professional identity tensions might develop a weak FTP and teacher identity or vice versa. Future studies that aim to establish causality between student teachers' FTP and teacher identity could consider such a potential common cause.

7.2. Conclusion and implications

In this study the focus was on investigating the direction and strength of the relation between teachers' FTP and teacher identity among student teachers preparing for primary education. Although some correlational and qualitative studies exist, little is known about the causal link between teachers' FTP and teacher identity. Two main conclusions emerged from our findings. First, on the between-person level, student teachers with stronger FTPs also seem to develop stronger teacher identities over time and vice versa. However, on the within-level, we only found that from the end of the first college year to the beginning of the second year, there is a moderate positive association of teachers' FTP with teacher identity. Additionally, we found that male student teachers, compared to their female counterparts, reported a weaker FTP and teacher identity over time. A similar relationship was found for student teachers educated in an academic teaching program compared to those in a professional teaching program.

The results of this study suggest that activities designed to target student teachers' future time perspective can help strengthen teacher identity. One way of providing such supports is by pointing student teachers to the future importance of their current internship and reflective related tasks, and by guiding them to anticipate their future, and attach more value and positive feelings to distant goals. Given that teachers' FTP and teacher identities for male student teachers and students educated in an academic teaching program were weaker compared to the other group, they could particularly benefit from such activities.

Declaration of competing interest

This research received a grant from Stichting Kenniscentrum Onge-lijkheid Amsterdam, the Netherlands.

Data availability

Data will be made available on request.

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