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Feminization of teaching: gender and motivational factors of choosing teaching as a career

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Introduction: The feminization of the teaching profession is widely discussed internationally. In light of current debates on changes in the perception of gender roles and gender diversity, it is important to examine whether students' motives for choosing the teaching profession vary by gender.

Methods: To explore this question, we assessed student teachers' motives for choosing teaching as a career as well as their perception of future demands and abilities to cope with stress using an online tool.

Results: Female students showed higher pedagogical, altruistic, and idealistic motivations, while male students had higher subject-related motivation and more often chose teaching as a fallback career. In addition, female students displayed greater openness to professional cooperation, interest in students' social and cultural diversity, and less avoidance of social support under stress.

Discussion: These results support theories that gender role expectations influence perceptions of occupational gender fit.

KEYWORDS

career choice motives, student teachers, gender differences, cluster analyses, feminization of teaching

1 Feminization in the teaching profession

The gender imbalance in the teaching profession, referred to as feminization of teaching, has been a widely discussed phenomenon for several decades (Moreau, 2019). Within this discussion, the term feminization may refer to the numerical over-representation of women in the teaching profession (in Germany, this phenomenon concerns primarily but not exclusively the primary teaching profession), to the view that the teaching profession rewards values associated with femininity (e.g., relational skills) over those associated with masculinity, or to the idea of teaching as a "female-friendly" profession (Helbig, 2012; Moreau, 2019). The feminization of teaching has been observed in various countries, especially in general education, and has led to debates regarding its causes and implications for education and society. Within this debate, both positive aspects such as progress toward gender equality and concerns such as potential negative effects on educational outcomes (e.g., lower school performance of boys) have been discussed (Drudy, 2008; Skelton, 2009), even though empirical research does not support concerns regarding student performance(e.g., Coenen et al., 2018; Helbig, 2012).

A possible reason for the gender imbalance in teaching is gender-related differences in students' motives as well as their perception of occupational demands (Richardson and Watt, 2016). As theoretical perspectives suggest that gender is a primary factor in the process of choosing a potential career, perceptions of gender roles and gender fit are likely reflected in the motives and perceptions that students indicate as relevant for choosing the teaching

profession (Gottfredson, 2005). While a considerable body of previous research has examined female and male (student) teachers' differing motivation for teaching (for reviews see Heinz, 2015; See et al., 2022), recent debates about the social construction of gender, gender equality and diversity, and the dissolution of gender-specific role expectations constitute a need for more contemporary research (Butler, 2024; Moreau, 2019). More precisely, the criticism of traditional gender concepts related to masculinity and femininity and an increased recognition of gender beyond the traditional binary categories likely affected young people's perception of gender in the workforce and their motivation for choosing as specific profession, including the teaching profession. Moreover, the introduction of the category "diverse" as a third gender option on official documents for individuals in Germany in 2018 may have contributed to this development. In light of these societal developments, the current study examined whether and how students' motives for choosing the teaching career as well as their perception of occupational demands still differ by gender at present. Our study focused on a large sample of student teachers in Germany who were in teacher training for primary and (lower and upper) secondary general education (but not vocational education), as at those levels the proportions of female teachers are highest in Germany (87, 66, and 60%, respectively) (Statistische Ämter des Bundes und der Länder, 2024).

In sum, the current study aims to expand existing knowledge by providing more contemporary insights into the effect of gender on student teachers' career choice motives, thereby contributing to a better understanding of the underlying mechanisms behind the feminization of teaching in Germany. In addition, we investigated potential gender differences in student teachers' perception of occupational demands as well as in their stress experiences and coping strategies, to enhance our understanding of the findings on career choice motives within the context of gender-specific perceptions of the teaching profession and personal characteristics.

1.1 Motives for choosing teaching as a career

Career choice motives represent reasons and related goals for the choice of a specific profession (Keller-Schneider, 2011; Richardson and Watt, 2016; Tillmann et al., 2020). These motives are categorized in accordance to distinctions made by the motivation theory of Deci and Ryan: Intrinsic motivation refers to the execution of an activity for its own value because it is enjoyable, whereas extrinsic motivation relies on factors outside the activity and is rather instrumental (Deci and Ryan, 1985; Ryan and Deci, 2000). In context of the career choice motives of the teaching profession, intrinsic motives are related directly to the teaching profession and may refer, for example, to pedagogical/altruistic reasons such as working with children or supporting special needs students, teaching-related/subject-related reasons such as general teaching interest or interest in a particular subject, or idealistic desires such as contributing to society (Cramer, 2012; Cramer and Neugebauer, 2023; Heinz, 2015). Extrinsic motives can be fulfilled by various professions that yield a similar desired effect. With regard to the teaching profession, those motives may refer to flexibility/self-determination of working time, family-friendly working hours, salary, or prestige of the teaching profession (Heinz, 2015). Another set of motives has been described in the literature as pragmatic reasons such as recommendation by others or lack of alternative career paths. As pragmatic motives are completely unrelated to the profession itself, whereas extrinsic motives are still related to characteristics of the profession (e.g., prestige) (e.g., Rauin and Römer, 2010), we will refer to pragmatic motives as a distinct category in this study.

Although previous research on motives for choosing teaching as a profession is characterized by a high heterogeneity regarding sample characteristics, methodology, and instruments (Richardson and Watt, 2016; Scharfenberg, 2020), the differentiation of motives and the pattern of results are quite consistent across studies and countries: Intrinsic motives are most dominant, especially pedagogical motives (e.g., working with children/youth), followed by subject/teaching-related motives and idealistic/altruistic motives (Heinz, 2015; König and Rothland, 2012; Nesje et al., 2018; Rothland, 2014; See et al., 2022; Syring et al., 2017; Wang and Houston, 2023). Extrinsic motives such as salary and prestige are less important, although the relative importance of particular motives varies depending on the country the study was conducted in (Bastick, 2000; Rothland, 2014). For German student teachers, particularly work–family balance, self-determined working time and job security were important reasons for choosing the teaching profession (Keller-Schneider et al., 2023a,b). Pragmatic motives such as teaching as a fallback career are usually rated lower than intrinsic or other extrinsic motives (Rothland, 2014). However, in some countries (e.g., China, Taiwan, Turkey, and Malaysia), extrinsic and/or pragmatic reasons were as important or more important than intrinsic motives (for review see Heinz, 2015; Keller-Schneider et al., 2023a).

1.2 Differences in student teachers' career choice motives by gender and school level

Despite research findings revealing that intrinsic motives predominate student teachers' career choice, individual differences can be observed regarding the importance of certain motives underlying the decision for a teaching career. Based on psychological theories of motivation (e.g., Ryan and Deci, 2000; Wigfield and Eccles, 2000), a broad variety of theoretical frameworks has been developed to describe career decisions and potential differences in this process (e.g., Holland, 1997; Watt et al., 2012; Watt and Richardson, 2007). For the current study, we will refer to Gottfredson's (2005) dynamic-procedural model of circumscription and compromise as the model emphasizes the role of perceived gender fit for the consideration of possible career paths. Gottfredson's model suggests that career development is influenced both by internal factors, such as the (social) self-concept (including gender), and by external factors, such as societal expectations and occupational information, and that career choices are gradually refined through circumscription and compromise (Gottfredson, 2005). As an individual's chosen profession largely defines their status in society, gender—as part of the social self-concept—plays a crucial role in the consideration of potential career options as it supports one's efforts to maintain their social identity (Gottfredson, 2005; Trojer, 2018). Consequently, a person's preference for a specific profession is mostly due to the perceived comparability with the person's self-image. Gottfredson's perspective is supported by assumptions of social role theory, which posits that gender stereotypes lead individuals to act in ways that align with societal roles and expectations (Eagly and Wood, 2012). In fact, empirical studies have shown males' and females' preference for career paths they perceive as being gender-typical (Barth and Masters, 2024; Kleinert and Schels, 2020; Miller and Hayward, 2006). In particular, traditional female gender roles have been

associated with nurturing and caregiving, and therefore, women have been perceived as more naturally suited for the teaching profession than men (Drudy, 2008; Moreau, 2019). With respect to the primary school teaching profession, Combe (1996) has referred to this gender-stereotypical perception as "professionalized motherliness" (p. 508).

Previous studies have indeed consistently reported that pedagogical and idealistic/altruistic motives were more relevant for female students, while subject-related intrinsic motives and extrinsic/pragmatic motives were more important for male students (for review see See et al., 2022). This pattern of results has been replicated across time (Ulich, 1998, 2000, 2004) as well as across a variety of countries (Bruinsma and Jansen, 2010; Jungert et al., 2014; Shang et al., 2022), although some studies indicate different result patterns for non-OECD/non-industrialized countries (e.g., Bastick, 2000; See et al., 2022). Previous studies with German student teachers provide a comparable picture. Studies by different research groups (e.g., Scharfenberg, 2020; Ulich, 1998, 2000, 2004; Weiß and Kiel, 2011) indicate that female students referred more frequently to interest in working with children/adolescents, supporting children with special educational needs, enjoying teaching, and work–family compatibility (extrinsic), while male students referred more frequently to interest in the subject, extrinsic motives such as salary, self-determined working time, and job security, or the lack of alternative career paths. The contemporary study by Scharfenberg (2020) showed that, overall, gender-based differences were more pronounced with regard to intrinsic motives (e.g., child-related vs. subject-related motives) than extrinsic and pragmatic motives.

Importantly, student teachers' career choice motives differ also by school level (i.e., primary school level vs. secondary school level). Although in the majority of studies the predominant motives across school levels were pedagogical (e.g., Rothland, 2022), previous research has shown that pedagogical motives were more important for primary school student teachers than for secondary school student teachers, whereas subject interest was more important for secondary school student teachers than for primary school student teachers (Glutsch and König, 2019; Keller-Schneider et al., 2023b; Retelsdorf and Möller, 2012; Rothland, 2014; Scharfenberg, 2020; Weiß and Kiel, 2013). In addition, idealistic/altruistic reasons appeared to be more important and financial security to be less important for primary school student teachers than for secondary school student teachers (Cramer, 2012; Weiß and Kiel, 2013).

It is important to note that gender and school level are two highly related factors, that is, the proportion of women in primary school (OECD average 82.6%; Germany 87.3%) is higher than of men in primary school and higher than of women in secondary school (OECD average 68.1–62.8%; Germany 66.3–59.8%, for lower secondary level and upper secondary level, respectively) (Statistische Ämter des Bundes und der Länder, 2024). Consequently, the effects of gender and school level on motives for choosing the teaching profession are confounding. For instance, Jungert et al. (2014) have shown that altruistic motives were most pronounced in male primary school student teachers in Sweden. Thus, it is important to consider individual and combined effects of those factors on student teachers' career choice motives.

1.3 Perception of demands and coping with stress

In addition, students' perception of future demands of the teaching profession and their ability to cope with stress might differ by gender and may be crucial factors in the decision to enter the teaching profession. The perception of demands refers to general conditions such as flexible time management, workload or public appreciation of the profession as well as aspects of cooperation and perception of diversity in classrooms (Cramer, 2014; Tillmann et al., 2019). Previous research has shown that the experience of high demands and difficult conditions were related to emotional exhaustion and the intention to leave the teaching job (Dicke et al., 2014; Rajendran et al., 2020). At the same time, teacher collaboration was related to positive outcomes and perceived benefits for teachers and students such as experience of emotional support, decreased workload, higher teacher motivation, or better student performance (Muckenthaler et al., 2020; Vangrieken et al., 2015), although the effect of different indicators of collaboration differed depending on contextual factors (Reeves et al., 2017). Additional important factors for teachers' mental health are personal characteristics and abilities in coping with stress, more precisely, their self-efficacy (Lazarides et al., 2020), dysfunctional cognitions/stress-inducing thoughts, and coping strategies (Brown and Beck, 2002; Montgomery and Rupp, 2005).

With regard to gender differences in teachers' perception of occupational demands and their abilities for coping with stress, research has shown mixed results. While some studies reported that female teachers generally perceived more job resources and greater teacher collaboration (Collie et al., 2020; Ronfeldt et al., 2015; Skaalvik and Skaalvik, 2018), other studies reported that female teachers experienced higher levels of work–family conflict, workload, classroom stress, and student misbehavior compared to male teachers (Klassen and Chiu, 2010; Rajendran et al., 2020). Interestingly, previous research found positive relations between experience of high demands and emotional exhaustion as well as the intention to quit for both female and male teachers (Dicke et al., 2014; Rajendran et al., 2020). Regarding self-efficacy, the pattern of results is mixed, with some studies indicating lower classroom management self-efficacy of female teachers (Klassen and Chiu, 2010) and others reporting no gender differences in teachers' classroom management self-efficacy (Lazarides et al., 2020). Studies investigating dysfunctional cognitions as well as coping strategies of student teachers and related gender differences are rare (e.g., Braun et al., 2020). However, studies on gender differences in college students have shown that female students reported higher levels of experienced stress and were more likely to use emotional and instrumental support and self-distraction as coping strategies than male students (Eisenbarth, 2019; Graves et al., 2021). Overall, current evidence on gender differences in (student) teachers' perception of demands and coping with stress is inconclusive and restricted to traditional gender categories (i.e., male and female). Thus, our study aimed at contributing to a better understanding of this research gap by exploring possible gender differences in male, female, and diverse student teachers' perception of future demands and their abilities to cope with stressful experiences.

1.4 The current study

The current study investigated gender differences in student teachers' motives for choosing teaching as a career as well as in their perception of demands and their coping with stress by drawing on a large sample of student teachers in Germany. With regard to the aforementioned societal discussions about gender diversity and the

dissolution of gender-specific role expectations, it is important to regularly examine whether or to what extent the theoretically proposed influence of gender on occupational choices and perceptions is still supported by empirical data. More precisely, young student teachers may perceive gender and ascribed roles as less strictly categorical, which could affect the role of gender in their social self-concept and consequently mitigate the restriction to certain professions. In accordance with these considerations, the current study aimed to investigate such differences in female and male students and aimed to include also diverse students, as so far studies on student teachers' career choice motives have not considered gender beyond the two traditional categories. Please note that we have derived directed hypotheses from the literature only for specific differences on certain aspects (e.g., intrinsic motives) as the theoretical and empirical foundation seemed sufficient only for these derivations.

The main question of interest our study addressed was to determine whether gender differences exist in the current generation of student teachers regarding their career choice motives. Moreover, as student teacher's career choice motives might differ also by school level, it is important to examine interaction effects between student gender and school level. Thus, research question 1 addressed the following question: Do student teachers' motives for choosing teaching as a career differ by gender and school level?

> *H1.1*: There is a difference between male, female, and diverse students regarding their motives for choosing teaching as a career, especially regarding intrinsic motives, that is, pedagogical vs. subject-specific interests (main effect of gender). More specifically, based on theoretical considerations and previous research, we expected a higher importance of pedagogical motives for female than for male student teachers and a higher importance of subject-specific interest for male than for female student teachers.
>
> *H1.2*: There is a difference between student teachers in primary school and secondary school regarding their motives for choosing teaching as a career (main effect of school level). More specifically, based on previous research, we expected a higher importance of pedagogical motives for primary school student teachers and a higher importance of subject-specific interest for secondary school student teachers.
>
> *H1.3*: There is an interaction effect of gender and school level.

A common approach in examining and describing differences in student teachers' motives is the identification of different motivational groups (i.e., clusters) (Scharfenberg, 2020; Thomson et al., 2012; Tillmann et al., 2020). Moreover, previous research has shown that male and female student teachers are not equally distributed across clusters of career choice motives (e.g., Scharfenberg, 2020). Our study adds to this research by examining whether different motivational groups can be identified and how these clusters differ with regard to the proportion of female, male, and diverse students. Thus, research question 2 addressed the following question: Which groups of students with the same motives can be identified and (how) does the specific distribution of respondents in the individual clusters differ by gender?

> *H2*: Male, female, and diverse students are not equally distributed across identified clusters. Based on theoretical considerations and previous research, we particularly expected a higher proportion of female students in clusters with more pronounced pedagogical motives and a higher proportion of male students in clusters with more pronounced subject-specific motives. We did not have specific predictions regarding the distribution of diverse students.

Furthermore, based on literature suggesting gender-based differences in (student) teachers' perception of occupational demands as well as gender-based differences in abilities to cope with stressful experiences, research question 3 addressed the following question: Does student teachers' perception of demands of the teaching profession and their coping with stress (i.e., self-efficacy, dysfunctional cognitions, and coping strategies) differ by gender? As theoretical considerations and empirical findings for gender differences on perception of demands and coping with stress were mostly inconclusive, we state an undirected hypothesis for these domains.

> *H3*: There is a difference between male, female, and diverse students regarding their perception of demands and their coping with stress.

2 Materials and methods

2.1 Project context and sample

The present study is based on an online tool developed within the context of the project *Risk-Check for Teaching Profession* under guidance of [blind for review]. The overarching project was conducted between 2015 and 2018 as part of the "Education Offensive for Increasing the Quality of Future Teachers' Training" and aimed to identify criteria and conditions for successful teaching. Within the project, a self-developed online tool for preservice teachers was developed with the goal to support student teachers in determining their individual career choice motives, their expectations, and personal characteristics (i.e., coping with stress) and comparing these with real professional requirements. Such tools are quite popular and well-established in Germany (cf. CCT – Career Counselling for Teachers; Mayr et al., 2016). The finalized online tool [blind for review] was implemented in summer 2021 as a compulsory part of the accompanying online course of the pedagogical-didactical school internship at [blind for review]. The online tool is available online for high school graduates and university students who are interested in studying teaching as a profession.

The initial sample comprised 1,021 participants. We excluded 13 participants due to missing personal data ($n = 4$), multiple completion of the online tool ($n = 6$), and irrelevant types of schools ($n = 3$). Those types of schools (i.e., vocational training school and non-specified secondary school) were irrelevant for the current study because their educational focus lies on vocational education rather than general education. The final sample consisted of 1,008 participants, of which 97.2% were already enrolled as student teachers. The majority of students was studying in the third semester (56%) or the fifth semester (13.4%) ($M = 4.66$, $SD = 1.70$). Gender distribution was unbalanced, with 772 female students (76.6%), 218 male students (21.6%), and 18 diverse students (1.8%). Regarding school level, 427 (42.4%) participants studied/were interested in studying primary school teaching (88.1% female, 11% male, 0.9% diverse) and 581 (57.6%) studied/were interested in studying secondary level teaching (68.2%

TABLE 1 Scales, number of items, example items, and reliability of the scale career choice motives.

Scale	No. of items	Example item: I am interested in the teaching profession...	Reliability
Pedagogical work	3	… because I enjoy being together with children and young people.	0.69
Interest in subject contents	3	... because I am very interested in a particular subject/subjects.	0.79
Support of students	3	... to support children and young people with learning difficulties.	0.74
Flexible management of work and time	3	... to be able to determine my working hours as a teacher outside the classroom by myself.	0.76
Idealism	2	... to improve school.	0.63
Recommendation from others	4	... because friends advised me to do so.	0.85
Teaching training as a fallback career	3	... because it happened / happens by chance.	0.72

female, 29.4% male, 2.4% diverse). Within gender categories, female students were similarly distributed across primary (48.7%) and secondary school teaching (51.3%), whereas male students and diverse students more frequently studied secondary school teaching (78.4 and 77.8%, respectively) than primary school teaching (21.6 and 22.2%, respectively).

2.2 Measures

Data were collected between August 2021 and September 2023 via the online tool. When registering for the online tool, students indicated their gender, their student status (student teacher vs. interested in studying teaching), the school level of their teaching studies (i.e., primary school vs. different levels of secondary school), and their current semester. The online tool comprised three domains, namely, motives for choosing teaching as a career (*career choice motives*), perception of demands of the teaching profession (*perception of demands*), and coping with stress (*coping with stress*). Each domain is based on several measurement instruments of which each consist of several scales and subscales. Students were permitted to select the order in which they responded to the three domains.

2.2.1 Career choice motives

Career choice motives were assessed by seven scales representing various intrinsic motives (e.g., enjoyment of pedagogical work with children and youth), extrinsic motives (e.g., flexible working hours), and pragmatic motives (e.g., teaching training as a fallback career) (cf. Scharfenberg, 2020). Each subscale comprised between 2 and 4 items, resulting in a total of 21 items. Participants were shown one item at a time and were asked to answer the respective item on a 4-point Likert-scale with the response options "1 = does not apply at all," "2 = does rather not apply," "3 = does rather apply," and "4 = does apply completely." Table 1 presents the different subscales, number of items, one example item for each scale, and reliability measures (i.e., Cronbach's alpha). For statistical analyses, mean values of the subscales were used.

2.2.2 Perception of demands

Perception of demands of the teaching profession was assessed by three scales, each consisting of several subscales with 3 to 5 items: three subscales for forms of cooperation (Fussangel, 2008) (10 items), three subscales for motivation in dealing with heterogeneity (Syring et al., 2018; adapted from Gebauer et al., 2013) (12 items), and 6 subscales for characteristics of the teaching profession (Tillmann et al., 2019) (21 items), resulting in a total of 43 items. Participants were shown one item at a time and were asked to answer the respective item on a 4-point Likert-scale with the response options "1 = does not apply at all," "2 = does rather not apply," "3 = does rather apply," and "4 = does apply completely." Table 2 presents the different subscales, number of items, one example item for each scale, and reliability measures (i.e., Cronbach's alpha). For statistical analyses, mean values of the subscales were used.

2.2.3 Coping with stress

Individual coping with stress is the third domain of the online tool and includes three aspects: self-efficacy expectations (Schwarzer and Jerusalem, 1999), dysfunctional cognitions (Hautzinger et al., 1985), and level of stress experiences (Nilges and Essau, 2015). Self-efficacy expectations consisted of 10 items, dysfunctional cognitions consisted of four subscales with 4 items each (i.e., 16 items), and level of stress experiences consisted of 7 items, resulting in a total of 33 items. Participants were shown one item at a time and were asked to answer the respective item on a 4-point Likert-scale for the scales self-efficacy expectations ("1 = does not apply at all," "2 = does rather not apply," "3 = does rather apply," and "4 = does apply completely") and level of stress experiences ("1 = did not apply to me at all," "2 = sometimes applied to me," "3 = quite often applied to me," and "4 = strongly applied to me") and on a 5-point Likert-scale for the scale dysfunctional cognitions ("1 = does not apply at all," "2 = does rather not apply," "3 = does partly apply," "4 = does rather apply," and "5 = does apply completely"). For the scale *level of stress experiences,* values were recoded in the following manner: 1 recoded 0, 2 recoded 2, 3 recoded 4, and 4 recoded 6. Thus, the values for this scale ranged from 0 to 42. Table 3 presents the different subscales, number of items, one example item for each scale, and reliability measures (i.e., Cronbach's alpha). For statistical analyses mean values of the scales

TABLE 2 Subscales, number of items, example items, and reliability of the scale perception of demands.

Scale	Subscale	No. of items	Example item	Reliability
Practicing/Forms of cooperation	Professional exchange	4	For my future job I can imagine to share important professional information with my colleagues.	0.66
	Student-related exchange	3	For my future job I can imagine to discuss difficulties with individual students with my colleagues.	0.68
	Joint work organization	3	For my future job I can imagine to develop worksheets together with my colleagues.	0.70
Motivation in dealing with heterogeneity	Social heterogeneity	4	I perceive the social diversity in school classes to be an enrichment.	0.81
	Cultural heterogeneity	4	The cultural diversity in school classes will be fun for my teaching.	0.84
	Special educational needs	4	Disability, illness and conspicuous behavior in school classes will be a positive challenge for my teaching work.	0.87
Characteristics of the teaching profession	Flexible time management	4	I want to be able to decide for myself when I do my work outside the classroom.	0.43
	Tasks are open-ended	3	I do not mind the feeling that I can always do more.	0.26
	Balance of requirements and freedom	4	I like to have a lot of freedom in my work and to decide for myself how I want to shape it.	0.23
	Influence on and work with students	5	I have the confidence to deal with students' problems.	0.16
	Balance of effort and appreciation	3	I would like a profession in which additional effort is rewarded with appropriate pay.	0.37
	General public judgment about the profession	3	I want a profession that is highly acknowledged in society.	−0.30

self-efficacy experiences and stress experiences were used, whereas for the dysfunctional cognitions scale mean values of the single subscales (e.g., resignation) were used.

2.3 Data exclusion, reduction, and statistical analyses

Data exclusion, reduction, and statistical analyses were conducted in R Studio. Prior to data analyses, we excluded participants with data that were not relevant for the current study (see sample description). Moreover, we combined the different types of secondary schools in one category, resulting in two school levels (i.e., primary school level vs. secondary school level). As special needs schools (i.e., "Förderschulen") constitute a distinct type of secondary school in the German educational system, it was unclear whether teacher candidates specializing in this field should be categorized under the secondary school level. Thus, we performed all analyses with and without special needs school student teachers. As both analyses yielded by-and-large similar patterns of results, we report results for the analyses with special needs school student teachers included to provide a more representative sample of teacher candidates. Please note, that for research questions 1 and 3 we decided to focus on the two gender groups female and male. This was done because the substantially smaller sample size in the third gender group "diverse" ($n = 18$) may reduce statistical power to detect true effects (Field et al., 2012). However, in the results section, we provide descriptive data and brief paragraphs on analyses that included the third gender category and that showed similar results.

To answer research question 1, we conducted a two-way analysis of variance (ANOVA) for each career choice motive, with main effects of gender and school level as well as the respective interaction effect. As our design was not balanced (i.e., unequal group sizes), we conducted ANOVA with Type III sums of squares using the *Anova* function of the car package. Prior to analyses, we conducted Levene's tests to test the assumption of homogeneity of variance. In case of violation of homogeneity of variance, we used robust calculation methods according to Wilcox (Mair and Wilcox, 2018). Note that for this robust method, no degrees of freedom are provided. We used the *cohens_f* function of the effect size package to calculate partial Cohen's f (f) as a measure of effect size. Cohen's f values of 0.10, 0.25, and 0.40 represent small, medium, and large effect sizes, respectively (Cohen, 1988).

To answer research question 2, we conducted cluster analyses for identifying student groups with similar motives. We applied k-means as an agglomerative partitioning method, which makes it necessary to determine the number of clusters (k) in advance. In a first step, we determined the optimal number of clusters graphically and mathematically. We created a scree plot with the *fviz_nbclust* function of the factoextra package displaying the development of the heterogeneity measure as a function of the cluster number (Backhaus et al., 2023) and applied the elbow criterion as a decision criterion for the number of clusters to be selected. Moreover, we calculated the

TABLE 3 Subscales, number of items, example items, and reliability of the scale level of stress experiences.

Scale	Subscale	No. of items	Example item	Reliability
Self-efficacy experiences	–	10	I can find a solution for every problem.	0.85
Dysfunctional cognitions	Dependence on sympathy	4	I need people to like me.	0.85
	Risk avoidance	4	Taking even a small risk is stupid because if I lose, it will be a disaster.	0.84
	Loss of value in case of failure	4	If I fail at my job, then I am a failure as a whole person.	0.87
	Avoidance of social support	4	I cannot stand asking other people for support.	0.88
Stress experiences	–	7	I found it hard to calm down. [In a stressful situation last week]	0.87

Dunn index (Dunn, 1974) with the *NbClust* function of the NbClust package.

In a second step, we conducted k-means analysis using the *kmeans* function of the stats package to optimize cluster assignment until stable clusters had formed. We checked the overall cluster assignment with a discriminant analysis using the *lda* function of the MASS package and by calculating *F*-values at the level of the individual scales. The *F*-values examine whether the within-group variance of each motive and each cluster is smaller or larger than the variance in the overall sample. Subsequently, we analyzed mean differences between the clusters on each motive scale using univariate one-way analyses of variance (ANOVA). In case of homogeneity of variance, we used the *aov* function (base package), and in case of heterogeneity of variance, we used the *bf.test* function (onewaytest package) to conduct a one-way ANOVA according to Brown-Forsythe. Cohen's *f* was calculated with the respective function of the effect size package. In case of significant differences in the overall group, we used robust *post-hoc* tests according to Games and Howell to conduct pairwise comparisons (cf. Games and Howell, 1976; Shingala and Rajyaguru, 2015). To characterize the individual clusters, t-values were used to describe for each cluster which motives were over- or underrepresented in comparison with the overall group/sample (Backhaus et al., 2023). A higher positive t-value of a motive indicates an overrepresentation in the corresponding cluster, while a lower or negative t-value represents an underrepresentation. In addition, pooled Cohen's *d* values between individual clusters were calculated. Cohen's *d* values of 0.20, 0.50, and 0.80 represent small, medium, and large effect sizes, respectively (Cohen, 1988).

To further answer research question 2, we calculated a χ^2 test of independence to examine the gender-specific distribution of students across the career choice motives. As a measure of effect size, Cramer's V (corrected) was calculated.

To answer research question 3, we used the *t.test* function of the stats package to conduct two sample *t*-tests for examining gender differences in students' ratings on each subscale of the domains, perception of demands, and level of stress experiences. Prior to analyses, we conducted Levene's tests to test the assumption of homogeneity of variance. In case of violation of homogeneity of variance, a robust method according to Welch was used (Delacre et al., 2017; Welch, 1947). We used the *cohens_d* function of the effect size package to calculate Cohen's *d* as a measure of effect size. For effect sizes that accompanied a Welch's *t*-test, unpooled estimates were used.

3 Results

3.1 Descriptive statistics

Figure 1 displays the means of the career choice motive scales for all participants and separated by gender. Female and male participants rated the intrinsic motive of *pedagogical work* highest and *recommendation* as well as *fallback career* lowest, whereas diverse participants rated *pedagogical work* and *subject interest* highest. Supplementary Table 1 presents descriptive statistics for the (sub-) scales of the other domains, that is, perception of demands and coping with stress.

3.2 Differences in career choice motives by gender and school level

3.2.1 Pedagogical work

A robust two-way ANOVA (Gender x School Level) revealed a significant main effect of gender on students' rating of the motive pedagogical work ($Q = 9.596$, $p = 0.004$) with an effect size of $f = 0.27$. Female students ($M = 3.74$, $SD = 0.35$) indicated higher scores for the motive pedagogical work than male students ($M = 3.53$, $SD = 0.52$) did. Neither a significant main effect of school level ($Q = 1.579$, $p = 0.215$) nor a significant interaction effect ($Q = 0.013$, $p = 0.911$) was found.

3.2.2 Subject interest

A two-way ANOVA (Gender x School Level) revealed a significant main effect of gender (F (1, 973) = 4.631, $p = 0.032$) and school level (F (1, 973) = 37.119, $p < 0.001$) on students' rating of the motive subject interest, with effect sizes of $f = 0.07$ and $f = 0.20$, respectively. Male students ($M = 3.41$, $SD = 0.59$) indicated higher scores for the motive subject interest than female students ($M = 3.19$, $SD = 0.63$) did, and student teachers studying secondary school level ($M = 3.37$, $SD = 0.60$) indicated higher scores than student teachers studying

primary school level ($M = 3.05$, $SD = 0.62$). There was no significant interaction effect (F (1, 973) = 1.199, $p = 0.274$).

3.2.3 Student support

A robust two-way ANOVA (Gender x School Level) revealed a significant main effect of gender on students' rating of the motive student support ($Q = 32.328$, $p = 0.001$) with an effect size of $f = 0.32$. Female students ($M = 3.55$, $SD = 0.48$) indicated higher interest in supporting students than male students ($M = 3.25$, $SD = 0.61$) did. Neither a significant main effect of school level ($Q = 0.025$, $p = 0.877$) nor a significant interaction effect ($Q = 0.156$, $p = 0.694$) was found.

3.2.4 Flexibility of work

A two-way ANOVA (Gender x School Level) revealed neither significant main effects of gender (F (1, 973) = 3.131, $p = 0.077$) and school level (F (1, 973) = 0.000, $p = 1.00$) nor a significant interaction effect (F (1, 973) = 0.621, $p = 0.431$) on students' rating of the motive Flexibility of work.

3.2.5 Idealism

A two-way ANOVA (Gender x School Level) revealed a significant main effect of gender on students' rating of the motive idealism (F (1, 973) = 9.765, $p = 0.002$) with an effect size of $f = 0.10$. Female students ($M = 3.31$, $SD = 0.59$) indicated higher scores for the motive idealism than male students ($M = 3.14$, $SD = 0.66$) did. Neither a significant main effect of school level (F (1, 973) = 0.761, $p = 0.383$) nor a significant interaction effect (F (1, 973) = 0.143, $p = 0.706$) was found.

3.2.6 Recommendation

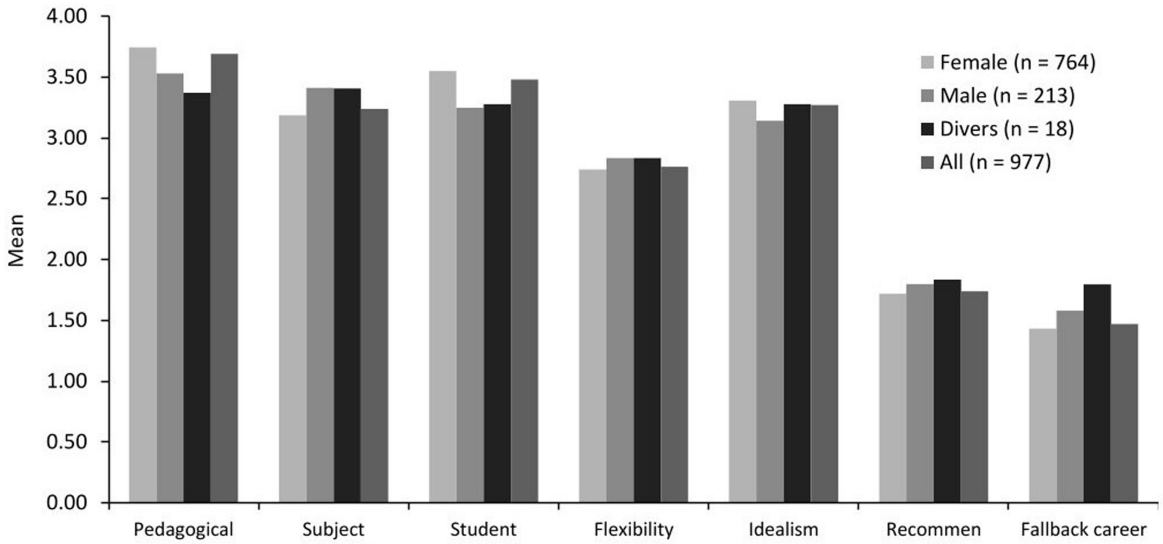
A two-way ANOVA (Gender x School Level) found neither significant main effects of gender (F (1, 973) = 2.594, $p = 0.108$) or school level (F (1, 973) = 0.120, $p = 0.729$) nor a significant interaction effect (F (1, 973) = 1.508, $p = 0.220$) on students' rating of the motive recommendation.

3.2.7 Fallback career

A two-way ANOVA (Gender x School Level) revealed a significant main effect of gender (F (1, 973) = 13.281, $p < 0.001$) with an effect size of $f = 0.12$ but no main effect of school level (F (1, 973) = 1.064, $p = 0.303$) on students' rating of the motive fallback career. Male students ($M = 1.58$, $SD = 0.63$) indicated higher scores for choosing the teaching profession as a fallback career than female students ($M = 1.43$, $SD = 0.62$) did. There was a significant interaction effect (F (1, 973) = 5.827, $p = 0.016$) with an effect size of $f = 0.08$. Figure 2 depicts the interaction effect and shows that choosing teaching as a fallback career was rated highest by male students studying primary school teaching and lowest by female students studying primary school teaching, whereas students' rating on the secondary school level did not differ by gender.

3.2.8 Additional analyses including three gender categories

For the sake of completeness and comparability, we briefly refer to results of analyses including three gender categories (i.e., female, male, and diverse). Similar to analyses with two gender categories, we found main effects of gender for the same five motive scales (i.e., pedagogical work, interest, student support, and fallback career), with *post-hoc*



	Pedagogical work	Subject interest	Student support	Flexibility of work	Idealism	Recommendation	Fallback career
Female	3.74 (0.35)	3.19 (0.63)	3.55 (0.48)	2.74 (0.66)	3.31 (0.59)	1.72 (0.74)	1.43 (0.62)
Male	3.53 (0.52)	3.41 (0.59)	3.25 (0.61)	2.83 (0.67)	3.14 (0.66)	1.80 (0.76)	1.58 (0.63)
Divers	3.37 (0.66	3.41 (0.63)	3.28 (0.72)	2.83 (0.87)	3.28 (0.75)	1.83 (0.83)	1.80 (0.92)
All	3.69 (0.41)	3.24 (0.63)	3.48 (0.53)	2.76 (0.66)	3.27 (0.61)	1.74 (0.75)	1.47 (0.63)

FIGURE 1
Means (SD) of career choice motives for all participants and separated by gender.

tests indicating significant differences between male and female students but no differences between male and diverse or female and diverse students. In contrast to analyses with two gender categories, we did not find main effects of school level for interest (F (1, 989) = 0.869, p = 0.351) or student support (Q = 0.235, p = 0.646). The interaction effect of gender and school level on the motive fallback career was marginally significant for analyses with three gender categories (F (1, 989) = 2.945, p = 0.053), indicating a similar trend than the respective analysis with two gender categories. In addition, we found a significant main effect of school level (F (1, 989) = 6.001, p = 0.014, f = 0.08) and a significant interaction effect of gender and school level (F (1, 989) = 3.351, p = 0.035, f = 0.08) for the motive flexibility. Yet, *post-hoc* test did not yield significant differences which is likely due to the small sample size for the gender group diverse and the resulting lack of power. Overall, analyses with three gender categories revealed a similar result pattern as analyses with two gender categories, especially regarding the significant main effects of gender.

3.3 Cluster analyses of career choice motives

3.3.1 Clustering of students by career choice motives

A graphical determination of the optimal number of clusters did not yield a clear result and suggested either a solution with two clusters or four clusters. The mathematical determination based on the Dunn index suggested that a solution with four clusters would best fit our data. Figure 3 shows the four-cluster solution obtained using the k-means method, with 333 students in the cluster 1 (35%), 184 students in cluster 2 (19%), 213 students in cluster 3 (22%), and 235 students in cluster 4 (24%).

A discriminant analysis indicated a model accuracy of 95.1% for correct categorization. Regarding the three determined discriminant functions, the first discriminant function (LD1 = 0.50) showed a higher discriminating power than the second (LD2 = 0.29) and third discriminant function (LD3 = 0.21). Hence, 50% of the between-class variance was explained by the first linear discriminant function. Inspection of F-values showed that 86% of F-values were below the threshold value of 1, indicating an overall sufficiently homogeneous variable structure. In particular, cluster 2 showed a higher level of within-group variance for the motives (F-values > 1 for pedagogical work, student support, and fallback career), whereas clusters 1, 3, and 4 showed a smaller within-group variance for the motives compared to the overall group variance (all F-values < 1, except for cluster 3: pedagogical work). The results of one-way ANOVAs revealed that all four clusters differed significantly from each other on all motives (Table 4) with large effect sizes.

3.3.2 Description of clusters

Table 5 presents the t-values for each cluster and motive scale and Cohen's d for pairwise comparison of clusters. The following paragraphs summarize the results and offer a description for each of the four clusters.

3.3.2.1 Cluster 1

Cluster 1 represents the biggest cluster (35%). Students in this cluster can be described as strongly intrinsically motivated as they reported the highest scores for all intrinsic motives compared to the other clusters. More specifically, cluster 1 was characterized by significantly higher scores in *pedagogical work*, *subject interest*, *student support* (all *ps* < 0.001), and *idealism* (clusters 1–2: p = 0.045; clusters 1–3: p < 0.001) compared to cluster 2 and cluster 3. Effect sizes were small to medium for differences between clusters 1 and 2 and small to large for differences between clusters 1 and 3. Compared to cluster 4, students in cluster 1 reported higher scores in *subject interest* and *idealism* (all *ps* < 0.001, large effects) but reported similar scores for the motives *pedagogical work* (p = 1.000) and *student support* (p = 0.291). Regarding the extrinsic motive *flexibility of work*, students' scores in cluster 1 were at a medium level, with significantly higher scores than cluster 4 (p < 0.001, large effect), lower scores than cluster 2 (p < 0.001, medium effect), and similar scores as cluster 3 (p = 0.417). Regarding the two pragmatic motives, cluster 1 indicated scores on a low level similar to cluster 3 and cluster 4 in terms of *recommendation* (p = 0.853 and p = 0.404, respectively) as well as to cluster 4 in terms

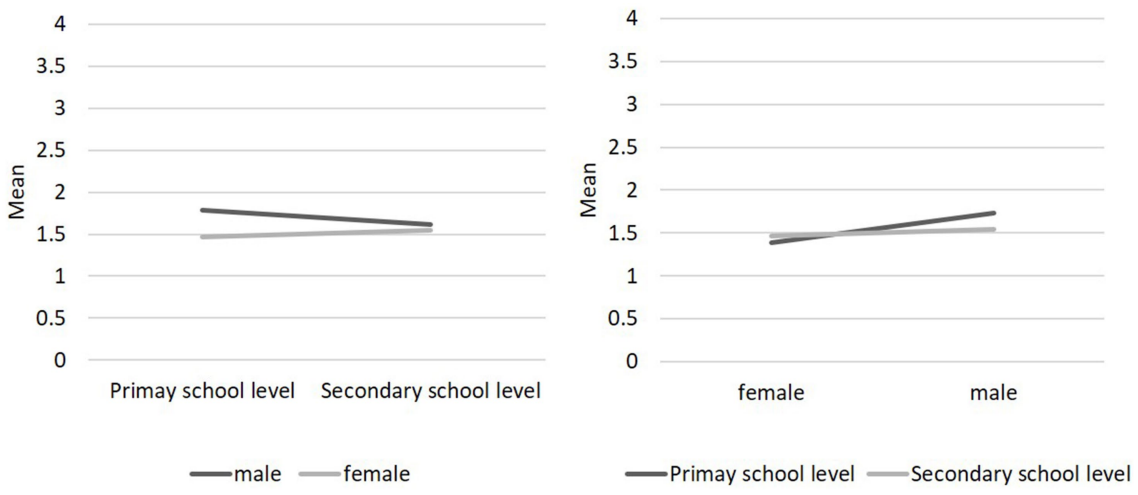


FIGURE 2
Interaction effect of gender and school level for the motive "fallback career".

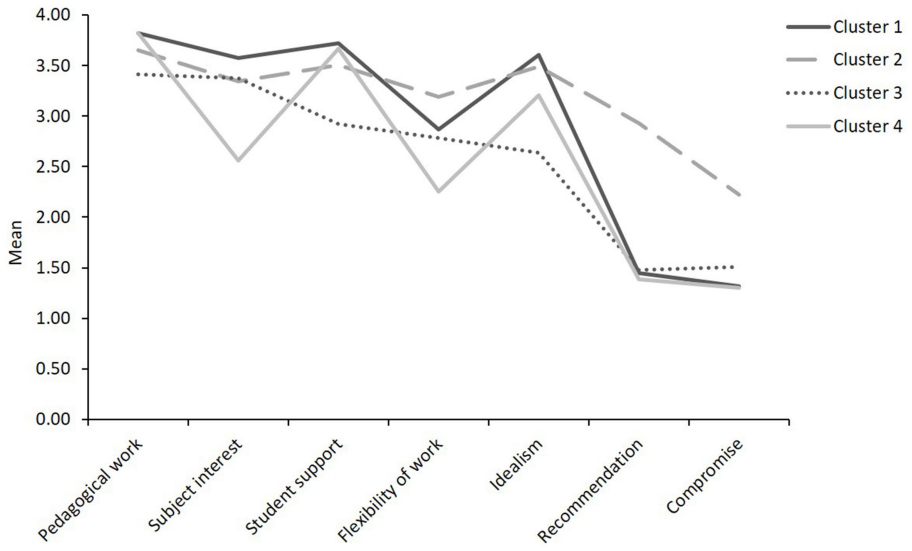


FIGURE 3
Four cluster solution for career choice motives.

of *fallback career* ($p = 0.952$) and slightly lower to cluster 3 in terms of *fallback career* ($p < 0.001$, small effect). At the same time, students in cluster 1 reported significantly lower scores for *recommendation* and *fallback career* than those in cluster 2 ($ps < 0.001$, large effects).

3.3.2.2 Cluster 2

Cluster 2 represents the smallest (19%) and according to the *F*-values the most heterogenous cluster. Students in this cluster can be characterized as extrinsically pragmatically motivated as they reported the highest scores for extrinsic and pragmatic motives compared to the other clusters. That is, students in cluster 2 reported significantly higher scores for *flexibility of work*, *recommendation,* and *fallback career* compared to all other clusters (all $ps < 0.001$, medium to large effects). Although, overall, students in cluster 2 reported a higher intrinsic motivation than students in cluster 3 and cluster 4, they reported a lower intrinsic motivation than students in cluster 1. More specifically, students' scores in cluster 2 were significantly higher in *pedagogical work, student support,* and *idealism* compared to scores in cluster 3 (all $ps < 0.001$, small and large effects) and significantly higher in *subject interest* ($p < 0.001$, large effect), *student support* ($p = 0.003$, small effect), and *idealism* ($p < 0.001$, medium effect) compared to scores in cluster 4. No significant difference was found between cluster 2 and cluster 3 in *subject interest* ($p = 0.969$). At the same time, students in cluster 2 reported significantly lower scores in *pedagogical work, subject interest, student support* (all $ps < 0.001$, small to medium effects), and *idealism* ($p = 0.045$, small effect) than those in cluster 1, as well as lower scores in *pedagogical work* than students in cluster 4 ($p < 0.001$, small effect).

3.3.2.3 Cluster 3

In contrast to clusters 1 and 2, students in cluster 3 demonstrated a motivational profile with relatively low pedagogical/educational intrinsic motivation. Students in cluster 3 reported significantly lower scores in *pedagogical work, student support*, and *idealism* compared to all other clusters (all $ps < 0.001$, small effect and large effects). At the same time, students in cluster 3 reported their *subject interest* at a medium to high level compared to the other clusters, with a similar level than students in cluster 2 ($p = 0.969$), a lower level than students in cluster 1, and a higher level than students in cluster 4 ($ps < 0.001$, small effect and large effect, respectively). Regarding the extrinsic motive *flexibility of work*, students' scores in cluster 3 were at a medium level, with similar scores as cluster 1 ($p = 0.417$), significantly higher scores than cluster 4 ($p < 0.001$, large effect), and lower scores than cluster 2 ($p < 0.001$, medium effect). Regarding the pragmatic motive *recommendation*, cluster 3 was similar to cluster 1 and cluster 4 ($p = 0.853$ and $p = 0.159$, respectively), while showing lower scores in *recommendation* than cluster 2 ($p < 0.001$, large effect). Moreover, students in cluster 3 reported higher scores in *fallback career* than those in cluster 1 and cluster 4 (all $ps < 0.001$, small effects) and lower scores in *fallback career* than those in cluster 2 ($p < 0.001$, large effect).

3.3.2.4 Cluster 4

Students in cluster 4 can be characterized as highly pedagogically and low extrinsically motivated. They reported high scores in *pedagogical work* and *student support,* similar to students in cluster 1 ($p = 1.000$ and $p = 0.291$, respectively) and significantly higher scores than students in cluster 2 ($p < 0.001$ and $p = 0.003$, respectively, small effects) and cluster 3 ($ps < 0.001$, large effects). Interestingly, students in cluster 4 reported substantially lower levels of *subject interest* than students in all other clusters ($ps < 0.001$, large effects) and reported scores of *idealism* at a medium level, with lower scores than cluster 1 and cluster 2 and higher scores than cluster 3 (all $ps < 0.001$, medium to large effects). At the same time, students in cluster 4 reported the lowest scores for the extrinsic motive *flexibility of work* compared to the other clusters ($ps < 0.001$, large effects). This motivational profile of cluster 4 demonstrated the specific importance of pedagogical/educational motives for students in cluster 4. Similar to clusters 1 and 3, students in cluster 4 reported low scores on pragmatic motives that were significantly lower than scores on pragmatic motives for cluster 2 ($p < 0.001$, large effects). Moreover, students in cluster 4 reported similar scores for *recommendation* than clusters 1 and 3 ($p = 0.404$ and

TABLE 4 Descriptive statistics and results of the ANOVAs analyzing differences between cluster centers.

	Descriptive statistics (*M* (*SD*))				ANOVA			
Sub-scale	Cluster 1 (*n* = 333)	Cluster 2 (*n* = 184)	Cluster 3 (*n* = 213)	Cluster 4 (*n* = 235)	*F* (*df1* = 3)	*df2*	*p*	*f*
Pedagogical work	3.82 (0.27)	3.65 (0.48)	3.42 (0.45)	3.82 (0.26)	57.57	605.75	< 0.001	0.44
Subject interest	3.57 (0.42)	3.35 (0.58)	3.37 (0.51)	2.56 (0.50)	194.62	765.22	< 0.001	0.77
Student support	3.72 (0.32)	3.50 (0.53)	2.92 (0.45)	3.67 (0.38)	164.32	679.61	< 0.001	0.74
Flexibility of work	2.86 (0.60)	3.19 (0.57)	2.78 (0.60)	2.25 (0.56)	94.73	961	< 0.001	0.54
Idealism	3.60 (0.42)	3.49 (0.49)	2.64 (0.50)	3.21 (0.53)	185.16	829.30	< 0.001	0.77
Recommendation	1.45 (0.42)	2.93 (0.53)	1.48 (0.45)	1.39 (0.45)	528.80	961	< 0.001	1.28
Fallback career	1.32 (0.35)	2.22 (0.71)	1.50 (0.46)	1.30 (0.36)	153.85	517.64	< 0.001	0.77

ΔM = means, SD = standard deviation, F = F-value, df = degrees of freedom—not integer for robust ANOVA, p = significance value, f = Cohen's f.

TABLE 5 t-values and Cohen's d for each of the four clusters.

	t-values for clusters				Cohen's d between clusters					
Sub-scale	1	2	3	4	1–2	1–3	1–4	2–3	2–4	3–4
Pedagogical work	0.31	−0.12	−0.71	0.30	0.44	1.08	0.00	0.50	−0.44	−1.09
Subject interest	0.53	0.17	0.21	−1.08	0.44	0.43	2.20	−0.05	1.46	1.61
Student support	0.45	0.03	−1.10	0.34	0.49	2.03	0.15	1.17	−0.35	−1.78
Flexibility of work	0.16	0.64	0.04	−0.76	−0.54	0.13	1.04	−0.69	1.65	0.92
Idealism	0.55	0.36	−1.05	−0.11	0.25	2.10	0.83	1.73	0.56	−1.10
Recommendation	−0.37	1.62	−0.33	−0.45	−3.20	−0.07	0.13	2.95	3.16	0.20
Fallback career	−0.36	1.20	−0.04	−0.39	−1.62	−0.46	0.05	1.20	1.64	0.49

TABLE 6 Gender distribution across the four clusters (%).

	Cluster			
Gender	1	2	3	4
Female	266 (35.8%)	135 (18.1%)	138 (18.5%)	205 (27.6%)
Male	59 (29.1%)	42 (20.7%)	73 (36%)	29 (14.3%)
Diverse	8 (44.4%)	4 (22.2%)	5 (27.8%)	1 (5.6%)
All	333 (35%)	184 (19%)	213 (22%)	231 (24%)

$p = 0.159$, respectively) and similar scores for *fallback career* than cluster 1 ($p = 0.952$) as well as lower scores for *fallback career* than cluster 3 ($p < 0.001$, small effect).

3.3.3 Differences in gender distribution across clusters

Table 6 displays the gender distribution across the four clusters. A χ^2 test of independence with *p*-values computed by Monte Carlo simulation showed significant gender-specific distributions across clusters ($\chi^2 = 40.465$, $p < 0.001$). According to *post-hoc* tests, male students were found more frequently than expected in cluster 3, the cluster with low pedagogical/educational intrinsic motivation (standardized residual = 5.4), and less frequently than expected in cluster 4, the cluster with high pedagogical and low extrinsic motivation (standardized residual = −3.8), whereas female students were found more frequently than expected in cluster 4 (standardized residual = 4.3) and less frequently than expected in cluster 3 (standardized residual = −5.4). Frequency of the gender category diverse did not significantly differ across clusters. The overall effect of the unequal gender distribution was only weak ($C_{corr} = 0.102$). Note that the *post-hoc* findings for the gender category diverse may be due to the small group size, resulting in a lack of power, as the chi-square test requires expected frequencies in each cell of the contingency table to be greater than or equal to 5. To address this power issues, we conducted an additional χ^2 test, including only two gender categories (female vs. male). This additional χ^2 test yielded the same result pattern as the χ^2 test with three gender categories, with a larger but still small effect size (χ^2 (3, $n = 947$) = 36.872, $p < 0.001$; $C_{corr} = 0.19_7$).

3.4 Gender differences in perception of demands and coping with stress

Table 7 shows the results of the conducted *t*-tests for testing differences between the two genders with regard to the (sub-)scales of the domain perception of demands and level of stress experience.

3.4.1 Perception of demands

Regarding students' perception of demands, female students compared to male students indicated a higher openness to future professional and student-related exchange, and joint work organization, a higher interest in social and cultural heterogeneity and special educational needs. Moreover, male students indicated a higher desire of a positive public judgment of their future profession. There

TABLE 7 t-test results for subscales of the domains perception of demands and stress experiences.

	Mean		*t*-test				
(Sub-)Scale	Female	Male	*ΔM*	*t*	*df*	*p*	*d*
Demands	*n* = 758	*n* = 206					
Professional exchange	3.68	3.54	−0.14	−4.44	298.82	< 0.001	−0.36
Student-related exchange	3.64	3.52	−0.12	−3.44	962	< 0.001	−0.27
Joint work organization	3.63	3.44	−0.19	−4.86	303.24	< 0.001	−0.39
Social heterogeneity	3.50	3.38	−0.12	−2.96	300.16	0.003	−0.24
Cultural heterogeneity	3.60	3.41	−0.21	−4.49	292.97	< 0.001	−0.37
Special educational needs	3.37	3.20	−0.17	−3.45	962	< 0.001	−0.27
Flexible time management	3.26	3.23	−0.03	−1.08	962	0.280	−0.08
Open-ended tasks	2.94	3.00	0.08	1.95	962	0.051	0.15
Freedom-requirements-balance	3.12	3.16	0.04	1.22	962	0.222	0.10
Influence on students	3.14	3.13	−0.01	−0.33	962	0.741	−0.03
Effort-appreciation-balance	2.51	2.53	0.02	0.37	962	0.712	0.03
Public judgment	2.68	2.76	0.08	2.19	962	0.028	0.17
Stress	*n* = 749	*n* = 208					
Self-efficacy	3.20	3.25	0.05	1.81	955	0.071	−0.32
Dependence on sympathy	2.86	2.79	−0.07	−0.96	955	0.339	−0.07
Risk avoidance	2.09	2.13	0.04	0.76	955	0.449	0.06
Loss of value	1.81	1.90	0.11	1.34	955	0.181	0.10
Avoidance of social support	1.58	1.72	0.13	2.03	955	0.043	0.16
Stress experience	9.06	8.94	−0.12	−0.20	955	0.845	−0.02

ΔM = difference of means, SD = standard deviation, t = t-value, df = degrees of freedom—not integer with Welch correction, p = significance value, d = Cohen's d (not pooled in case of Welch correction).

was also a trend for a higher openness of male students compared to female students regarding open-ended tasks ($p = 0.051$).

3.4.2 Coping with stress

Regarding students' stress experiences, male students indicated higher/more dysfunctional cognitions in terms of avoidance of social support than female students. At the same time, there was a trend for a higher self-efficacy perception in male students than in female students ($p = 0.071$).

3.4.3 Additional analyses including three gender categories

For the sake of completeness and comparability, we briefly refer to results of analyses including three gender categories (i.e., female, male, and diverse).

Regarding students' perception of demands, analyses with three gender categories yielded the same result pattern (i.e., significant gender differences) as analyses with two categories, except for the subscale public judgment (F (2, 979) = 2.520, $p = 0.081$).

Regarding students' stress experiences, we did not find significant gender differences for any subscale, except for a trend in the scale avoidance of social support (F (2, 972) = 2.398, $p = 0.091$), which mirrors the trend observed in the analysis with two gender categories.

4 Discussion

The feminization of the teaching profession is an internationally discussed phenomenon. With current debates about gender diversity and the dissolution of traditional gender roles, it is important to investigate whether or to what extent students' motives for choosing the teaching profession differ by gender nowadays. We addressed this question by assessing a large sample of student teachers' career choice motives as well as their perception of future demands and stress coping abilities via an online tool in Germany. Female students indicated higher pedagogical, altruistic, and idealistic motivation, whereas male students indicated higher subject-related motivation and more frequently chose teaching as a

fallback career. In addition, female students reported higher openness to future professional cooperation, higher interest in students' social and cultural diversity, and lower avoidance of social support in stressful situations. The pattern of results supports theoretical frameworks on career choices proposing that gender ascriptions and expectations may influence the perception of occupational gender fit.

4.1 Student teachers' career choice motives by gender and school level

Our findings that female students reported higher scores for pedagogical work, student support and idealism, whereas male students reported higher scores for subject interest, support our hypothesis and replicate previous findings on gender differences in student teachers' career choice motives (for review see See et al., 2022). These findings align with Gottfredson's (2005) theoretical framework, suggesting that the perceived gender fit of certain characteristics of the teaching profession is reflected in students reasoning about possible career paths. Moreover, they support ideas of the social role theory by Eagly and Wood (2012) which posits that gender stereotypes (e.g., traditional ideas of "feminine" and "masculine" traits) shape behavior, leading individuals to act in ways that align with societal roles. Thus, female and male students may focus on different aspects of the teaching profession. More precisely, female students may perceive pedagogical and social aspects as more appealing and fitting their gender, whereas male students may do so for subject-related or content-related aspects.

With regard to differences between school levels, our finding that secondary school level student teachers reported higher subject interest adds to previous research on school-level differences in student teachers' career choice motives (Glutsch and König, 2019; Keller-Schneider et al., 2023b; Retelsdorf and Möller, 2012; Scharfenberg, 2020).

An interesting interaction of gender and school level appeared with regard to choosing teaching as a fallback career. Male primary school student teachers most frequently chose this motive, whereas female primary school student teachers least frequently did so. This finding supports the idea that female students may perceive primary school teaching as most fitting to their gender and their high pedagogical interest. At the same time, male primary school student teachers' perception of primary school teaching may not fit as well to their intrinsic interest (i.e., interest in subject content) and may more likely choose it as a fallback career (Scharfenberg, 2020).

Flexibility of work was an equally important reason for male and female student teachers' career choice. Whether this can be attributed to a more balanced distribution of family responsibilities or a greater emphasis on work balance in both genders has to be examined in further research. Finally, the finding that both genders based their career choice on recommendations to a similarly low extent indicates that recommendations of the social environment may depend more on individual characteristics than on the student's gender.

As our analyses with three gender groups were underpowered, we mainly focused our discussion on the differences between male and female student teachers. Yet, we want to refer to the findings for diverse students at least on a descriptive level. Overall, mean scores of diverse students were more similar to scores of male students for subject interest, supporting students, flexibility, and recommendation, and more similar to female students' scores for idealism. Interestingly, diverse student teachers reported the lowest pedagogical interest and at the same time reported most frequently that they choose teaching as a fallback career. While we cannot draw strong conclusions due to the small sample size, this last finding may be explained in a similar manner as for male primary school student teachers.

4.2 Gender distribution across clusters of career choice motives

In addressing research question 2, we identified four distinct motivational clusters among student teachers, ranging from highly intrinsic (Cluster 1), highly extrinsic pragmatic (Cluster 2), and moderately intrinsic with high subject-related interest (Cluster 3), to high pedagogical with low extrinsic motivation (Cluster 4). In line with the findings of research question 1, we found that female students were overrepresented and male students were underrepresented in the highly pedagogically motivated cluster, whereas male students were overrepresented and female students were underrepresented in the cluster of low pedagogical intrinsic but higher subject-related motivation. Similar profiles and gender differences have been found in previous research (cf. Scharfenberg, 2020).

4.3 Gender differences in perception of demands and coping with stress

Our third research question focused on gender differences in student teachers' perception of demands and in their coping with stress. Female student teachers compared to male students indicated a higher openness to different forms of professional cooperation (i.e., student-related and teaching-related exchange, and joint work organization), as well as a higher interest in social and cultural diversity and special needs education. These findings are in line with previous research on teacher cooperation and coping with heterogeneity in classrooms (Collie et al., 2020; Ronfeldt et al., 2015; Skaalvik and Skaalvik, 2018). They also align well with our interpretation that social characteristics of the teaching profession are more relevant in female student teachers' perception. In contrast, for male students, a positive public judgment of their future profession appeared to be more important than for female students. This finding is in line with previous research (e.g., See et al., 2022) and may explain why the proportion of male teacher is considerably lower in primary school than in secondary school in Germany.

Regarding coping with stress, the only significant difference was found in the avoidance of social support. Male students reported more often than female students that they would avoid seeking social support in times of stress. This finding may be better explained in combination with our result of a trend toward higher self-efficacy perception in male students than in female students. More precisely, male students may be more confident in their ability to resolve stressful situations independently and therefore may not seek social support as much as female students do. However, this is only speculation, and more research is needed to investigate this question in more depth.

On a descriptive level, mean scores of diverse students were similar to female student teachers' scores for most perception of

demands subscales. Yet, diverse students reported lower scores for professional exchange, flexible time management, and freedom-requirements-balance and higher scores for effort-appreciation-balance than male and female student teachers. Moreover, diverse students reported similar levels of self-efficacy than female students as well as of risk avoidance and social support avoidance than male students. Interestingly, they reported the highest scores for dependence on sympathy and loss of value, and a considerably higher level of stress experience. In the light of mental health issues of teacher, these findings emphasize the need for future research to consider diverse students as a separate group to better understand their resources and needs in relation to their future profession.

4.4 Theoretical and practical implications

It is interesting to note that the pattern of results of research questions 1 and 2 fits well to a classic typology regarding teacher characteristics mentioned by Caselmann (1949) several decades ago. Caselmann differentiated two poles of intrinsic motivation specific to the teaching profession, that is, between paidotropic motivation (i.e., child-related or pedagogical/educational motivation) and logotropic motivation (i.e., subject-related motivation). The findings of our cluster analyses suggest that these two motivational profiles are still relevant for student teachers today. Moreover, as discussed above, the results on differences between male and female student teachers' specific intrinsic motivation support claims of the career choice theory by Gottfredson (2005) and the social role theory by Eagly and Wood (2012). In relation to Gottfredson's model, our findings indicate that gender remains a significant component of the social self-concept and thus plays a key role in how individuals perceive occupations that align with their gender and alleged gender-specific traits. Our result that female students are more interested in cooperative work and diversity in classroom than male students adds to these theoretical perspectives. These characteristics align with the social aspects of teaching and the perception of female gender roles being associated with social and communal traits (e.g., communication and caretaking) (Froehlich et al., 2020) and a preference for "people-oriented occupations" (Hustad et al., 2020; Su et al., 2009). At the same time, the higher importance of job prestige for male students aligns with the perception of male gender roles being associated with agency-related traits (e.g., assertiveness, power, and leadership) (Froehlich et al., 2020). While this pattern of findings support theoretical accounts on the importance of gender stereotypes and perceived gender fit of career paths, we have to note that pedagogical reasons were still the most important career choice motive of male student teachers.

The question of whether men should be actively encouraged and recruited into the teaching profession remains a topic of ongoing debate (e.g., Skelton, 2002, 2012). While scientific evidence does not strongly support gender-specific recruitment strategies, our findings that male (as well as diverse) primary school student teachers most frequently indicated teaching as their fallback career, nevertheless informs practical implications for recruiting processes and teacher training. Despite being the lowest-rated motive, it is critical to consider that, especially in the primary school level, a proportion of student teachers may be pursuing a profession that does not appear as their first choice. Given that pedagogical interest and skills are especially important in primary school, this raises the question of whether students who view primary teaching as a fallback career possess the necessary commitment and aptitude. Thus, it is crucial to ensure that those entering the teaching profession are well-prepared and committed, regardless of whether primary school teaching was their first career choice. Overall, while the feminization of the teaching profession is not problematic and we do not suggest implementing gender-specific recruitment strategies, it is important to consider how to attract qualified candidates based on their abilities and competencies, regardless of gender. Given the teacher shortage in Germany (Seeliger and Håkansson Lindqvist, 2023), this is crucial for all school levels and types.

Overall, our findings suggest that gender (and corresponding internalized role expectations) is more relevant in explaining differences in student teachers' specific intrinsic reasons (such as pedagogical interest or subject interest) for choosing the teaching profession. However, gender does not appear to influence reasons related to extrinsic or pragmatic aspects (such as job flexibility) or social influences (such as recommendations).

4.5 Limitations, future directions, and conclusion

The current study expands our knowledge on gender differences in current student teachers' career choice motives and their perception of the teaching profession in Germany but contains some limitations and open questions future research should address. First, while the overall sample size of the current study exceeded sample sizes in the majority of previous studies on teacher motivation (Heinz, 2015; Watt et al., 2012), our group sizes were neither equally distributed across gender and school level nor representative of the distribution of currently enrolled student teacher in Bavaria across school levels (Bayerisches Landesamt für Statistik, 2023). Although different group sizes were accounted for in our analysis using robust calculation methods, the overrepresentation of female students and primary school student teacher limits the representativeness and generalizability of our findings. Future studies may attempt to recruit more student teachers of other school levels.

Second, only 1.8% ($n = 18$) of student teachers indicated their gender as "diverse," making reliable and powerful analyses including this group not possible. However, based on the discussed descriptive differences, it may be interesting to specifically target this group of student teachers. Future research may also examine the unique challenges and motivations of student teachers who identify as diverse and develop tailored support mechanisms to enhance their career development. Please note that unlike previous studies on gender differences in student teachers, we offered the students the option to indicate their gender as diverse. Providing this option is important because higher education statistics often do not assess or separately consider this group (Bayerisches Landesamt für Statistik, 2023; München, 2023; Julius-Maximilians-Universität Würzburg, 2019). In addition, as "Geschlecht" in German refers to both sex and gender, future research should follow Muschalik et al.'s (2021) recommendation to assess gender in two steps, in which the first step assesses gender assigned at birth and the second step the subjective gender identity. Future research could also explore the implications of this two-step assessment on the accuracy and depth of gender-related findings.

Third, our online tool focused on few selected career choice motives. Although we intentionally focused on most commonly investigated motives and demands, a more differentiated list of possible reasons (e.g., subject interest vs. general interest in teaching) as well as

additional open questions may help to get a more detailed understanding of future teachers' motivation and expectations. Future studies could also employ mixed-method approaches to gain deeper insights into student teachers' motivations. In addition, it may be valuable to conduct longitudinal studies to track changes in career choice motives and perceptions of the teaching profession over the course of teacher education and early career stages and examine the long-term impact of initial career choice motives on job satisfaction, retention, and professional development.

Finally, in the scientific literature, potential limitations of self-report measures with Likert-scale response options have been discussed that refer to potential validity problems caused by response biases such as social desirability, central tendency, or idiosyncratic response biases (Barker et al., 2025; Grimmond et al., 2025). While we acknowledge the possibility of such biases, we consider self-report measures as particularly valuable for assessing personal motives, perceptions, and subjective experiences because they provide direct insights in respondents' mental content that cannot reasonably or accurately be obtained by other means such as observation, informant reports, or implicit measures (Barker et al., 2025; Corneille and Gawronski, 2024). Moreover, except for one scale we applied 4-point Likert scales without a midpoint, which may minimize social desirability bias (Nadler et al., 2015). Nevertheless, future research should critically evaluate the number of response options and attempt to combine closed-ended self-reports with other approaches (McDonald, 2008) such as additional open-ended questions or semi-structured interviews (Barker et al., 2025).

Overall, our findings suggest that gender (and corresponding internalized role expectations) is more relevant in explaining differences in student teachers' specific intrinsic reasons (such as pedagogical interest or subject interest) for choosing the teaching profession and in student teachers' openness to future professional cooperation and classroom diversity. However, gender does not appear to influence reasons related to extrinsic or pragmatic aspects (such as job flexibility) or recommendations by others, and perceptions on structural conditions of the teaching profession.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving humans were approved by the local ethics committee of the Faculty of Psychology and Educational Sciences at the LMU Munich. The studies were conducted in accordance with the local legislation and institutional requirements. Written informed consent for participation was not required from the participants or the participants' legal guardians/next of kin because it was not required/requested by the ethics committee.

Author contributions

MK: Formal analysis, Visualization, Writing – original draft. MM: Methodology, Writing – review & editing, Validation. SW: Conceptualization, Writing – review & editing, Funding acquisition, Methodology, Supervision, Investigation, Project administration. EK: Conceptualization, Funding acquisition, Investigation, Methodology, Project administration, Supervision, Writing – review & editing.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

Supplementary material

The Supplementary material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/feduc.2025.1471015/full#supplementary-material

References

Backhaus, K., Erichson, B., Gensler, S., Weiber, R., and Weiber, T. (2023). *Multivariate Analysemethoden. Eine anwendungsorientierte Einführung (17th ed.).* Wiesbaden: Springer Gabler.

Barker, C., Pistrang, N., and Elliott, R. (2025). Self-report methods. in Research methods in clinical psychology: An introduction for students and practitioners. eds. C. Barker, N. Pistrang and R. Elliott 116–143. (Oxford, UK: John Wiley & Sons). 116–143.

Barth, J. M., and Masters, S. (2024). In their own words: re-examining gender differences in career interests and motivations in a new generation. *Sex Roles* 90, 1828–1843. doi: 10.1007/s11199-024-01536-4

Bastick, T. (2000). Why teacher trainees choose the teaching profession: comparing trainees in metropolitan and developing countries. *Int. Rev. Educ.* 46, 343–349.

Bayerisches Landesamt für Statistik. (2023). Studierende an den Hochschulen in Bayern. Wintersemester. Available online at:https://www.statistik.bayern.de/mam/produkte/veroffentlichungen/statistische_berichte/b3410c_202000.pdf

Braun, A., Weiss, S., and Kiel, E. (2020). How to cope with stress? The stress-inducing cognitions of teacher trainees and resulting implications for teacher education. *Eur. J. Teach. Educ.* 43, 191–209. doi: 10.1080/02619768.2019.1686479

Brown, G. P., and Beck, A. T. (2002). "Dysfunctional attitudes, perfectionism, and models of vulnerability to depression" In G. L. Flett and P. L. Hewitt Perfectionism: Theory, research, and treatment. Washington, DC, US: American Psychological Association, 231–251.

Bruinsma, M., and Jansen, E. P. W. A. (2010). Is the motivation to become a teacher related to pre-service teachers' intentions to remain in the profession? *Eur. J. Teach. Educ.* 33, 185–200. doi: 10.1080/02619760903512927

Butler, J. (2024). Who's afraid of gender? New York: Farrar, Straus & Giroux.

Caselmann, C. (1949). Wesensformen des Lehrers. Versuch einer Typenlehre. Stuttgart: Ernst Klett.

Coenen, J., Cornelisz, I., Groot, W., Maassen van den Brink, H., and Van Klaveren, C. (2018). Teacher characteristics and their effects on student test scores: a systematic review. *J. Econ. Surv.* 32, 848–877. doi: 10.1111/joes.12210

Cohen, J. (1988). Statistical power analysis for the behavioral sciences. *2nd* Edn. Hillsdale, NJ: Lawrence Erlbaum Associates.

Collie, R. J., Malmberg, L. E., Martin, A. J., Sammons, P., and Morin, A. J. S. (2020). A multilevel person-centered examination of teachers' workplace demands and resources: links with work-related well-being. *Front. Psychol.* 11, 1–19. doi: 10.3389/fpsyg.2020.00626

Combe, A. (1996). "Pädagogische Professionalität, Hermeneutik und Lehrerbildung" in Pädagogische Professionalität. Untersuchungen zum Typus pädagogischen Handelns. eds. A. Combe and W. Helsper. (Frankfurt: Suhrkamp), 501–520.

Corneille, O., and Gawronski, B. (2024). Self-reports are better measurement instruments than implicit measures. *Nat. Rev. Psychol.* 3, 835–846. doi: 10.1038/s44159-024-00376-z

Cramer, C. (2012). *Entwicklung von Professionalität in der Lehrerbildung: empirische Befunde zu Eingangsbedingungen, Prozessmerkmalen und Ausbildungserfahrungen Lehramtsstudierender*. Bad Heilbrunn: Klinkhardt. Available at: https://books.google.de/books?id=oC9DinWvu2QC

Cramer, C. (2014). "Charakteristika und Rahmenbedingungen des Lehrerberufs". In *Handbuch der Forschung zum Lehrerberuf.* eds. E. Terhart, H. Bennewitz, and M. Rothland (Münster: Waxman), 177–186.

Cramer, C., and Neugebauer, M. (2023). "Berufswahl Lehramt. Wer entscheidet sich warum" in Beruf Lehrer:in. Ein Studienbuch. ed. M. Rothland (Münster: Waxmann UTB), 295–311.

Deci, E. L., and Ryan, R. M. (1985). "Intrinsic motivation and self-determination in human behavior" in Вестник Росздравнадзора (New York: Springer).

Delacre, M., Lakens, D., and Leys, C. (2017). Why psychologists should by default use welch's t-test instead of student's t-test. *Int. Rev. Soc. Psychol.* 30, 92–101. doi: 10.5334/irsp.82

Dicke, T., Marsh, H. W., Parker, P. D., Kunter, M., Schmeck, A., and Leutner, D. (2014). Self-efficacy in classroom management, classroom disturbances, and emotional exhaustion: a moderated mediation analysis of teacher candidates. *J. Educ. Psychol.* 106, 569–583. doi: 10.1037/a0035504

Drudy, S. (2008). Gender balance/gender bias: the teaching profession and the impact of feminisation. *Gend. Educ.* 20, 309–323. doi: 10.1080/09540250802190156

Dunn, J. C. (1974). Well-separated clusters and optimal fuzzy partitions. *J. Cybernetics* 4, 95–104. doi: 10.1080/01969727408546059

Eagly, A. H., and Wood, W. (2012). Social role theory. In Lange, P. A. Van, A. W. Kruglanski, E. T. and Higgins (Eds.), Handbook of theories of social psychology (*2*) (pp. 458–476). London: SAGE Publications.

Eisenbarth, C. A. (2019). Coping with stress: gender differences among college students. *Coll. Stud. J.* 53, 151–162.

Field, A., Miles, J., and Field, Z. (2012). Discovering statistics using R. L.A., London, a.o.: Sage.

Froehlich, L., Olsson, M. I. T., Dorrough, A. R., and Martiny, S. E. (2020). Gender at work across nations: men and women working in male-dominated and female-dominated occupations are differentially associated with agency and communion. *J. Soc. Issues* 76, 484–511. doi: 10.1111/josi.12390

Fussangel, K. (2008). *Eine Analyse der Zusammenarbeit von Lehrerinnen und Lehrern in Lerngemeinschaften* [Universität Wuppertal]. Available online at:http://elpub.bib.uni-wuppertal.de/edocs/dokumente/fbg/paedagogik/diss2008/fussangel

Games, P. A., and Howell, J. F. (1976). Pairwise multiple comparison procedures with unequal n's and/or variances: a Monte Carlo study. *J. Educ. Stat.* 1, 113–125.

Gebauer, M. M., McElvany, N., and Klukas, S. (2013). Einstellungen von Lehramtsanwärterinnen und Lehramtsanwärtern zum Umgang mit heterogenen Schülergruppen in Schule und Unterricht. eds. N. McElvany, M. M. Gebauer, W. Bos and H.-G. Holtappels (Hrsg.), *Jahrbuch der Schulentwicklung.* 116–143. (Weinheim [u.a.]: Juventa). (Bd. 17) (S. 191-216).

Glutsch, N., and König, J. (2019). Pre-service teachers' motivations for choosing teaching as a career: does subject interest matter? *J. Educ. Teach.* 45, 494–510. doi: 10.1080/02607476.2019.1674560

Gottfredson, L. S. (2005). "Applying Gottfredson's theory of circumscription and compromise in career guidance and counseling" in Career development and counseling: Putting theory and research to work. eds. S. D. Brown and W. R. Lent (Hoboken, N. J.: John Wiley), 71–100.

Graves, B. S., Hall, M. E., Dias-Karch, C., Haischer, M. H., and Apter, C. (2021). Gender differences in perceived stress and coping among college students. *PLoS One* 16, e0255634–e0255612. doi: 10.1371/journal.pone.0255634

Grimmond, J., Brown, S. D., and Hawkins, G. E. (2025). A solution to the pervasive problem of response bias in self-reports. *Proc. Natl. Acad. Sci. USA* 122, e2412807122–e2412807129. doi: 10.1073/pnas.2412807122

Hautzinger, M., Luka, U., and Trautmann, R. D. (1985). Skala dysfunktionaler Einstellungen—Eine deutsche version der dysfunctional attitude scale. [dysfunctional attitude scale: a German version of the dysfunctional attitude scale.]. *Diagnostica* 31, 312–323.

Heinz, M. (2015). Why choose teaching? An international review of empirical studies exploring student teachers' career motivations and levels of commitment to teaching. *Educ. Res. Eval.* 21, 258–297. doi: 10.1080/13803611.2015.1018278

Helbig, M. (2012). Boys do not benefit from male teachers in their reading and mathematics skills: empirical evidence from 21 European Union and OECD countries. *Br. J. Sociol. Educ.* 33, 661–677. doi: 10.1080/01425692.2012.674782

Holland, J. L. (1997). "Making vocational choices: a theory of vocational personalities and work environments" in Making vocational choices: A theory of vocational personalities and work environments. *3rd* ed (Odessa, FL, US: Psychological Assessment Resources).

Hustad, I. B., Bandholtz, J., Herlitz, A., and Dekhtyar, S. (2020). Occupational attributes and occupational gender segregation in Sweden: does it change over time? *Front. Psychol.* 11, 1–8. doi: 10.3389/fpsyg.2020.00554

Julius-Maximilians-Universität Würzburg. (2019). Genderdatenreport. Betrachtungszeitpunkt 2019. Würzburg: Julius-Maximilians-Universität.

Jungert, T., Alm, F., and Thornberg, R. (2014). Motives for becoming a teacher and their relations to academic engagement and dropout among student teachers. *J. Educ. Teach.* 40, 173–185. doi: 10.1080/02607476.2013.869971

Keller-Schneider, M. (2011). Die Bedeutung von Berufswahlmotiven von Lehrpersonen in der Bewältigung beruflicher Anforderungen in der Berufseingangsphase. *Lehrerbildung Auf Dem Prüfstand* 4, 157–185.

Keller-Schneider, M., Kahre, I., Weiß, S., and Kiel, E. (2023a). Berufswahlmotive von ostasiatischen und deutschsprachigen Lehramtsstudierenden. *Journal Für LehrerInnenbildung* 23, 24–39. doi: 10.35468/jlb-04-2023-02

Keller-Schneider, M., Weiß, S., and Kiel, E. (2023b). Warum Lehrer/in werden? Idealismus, Sicherheit oder "da wusste ich nichts Besseres"? Ein Vergleich von Berufswahlmotiven zwischen deutschen und schweizerischen Lehramtsstudierenden und die Bedeutung von länderspezifischen Bedingungen. *Schweizerische Zeitschrift Für Bildungswissenschaften* 40, 217–242. doi: 10.24452/sjer.40.1.5060

Klassen, R. M., and Chiu, M. M. (2010). Effects on teachers' self-efficacy and job satisfaction: teacher gender, years of experience, and job stress. *J. Educ. Psychol.* 102, 741–756.

Kleinert, C., and Schels, B. (2020). Zurück zur Norm? Kompromissbildung zwischen geschlechtstypischen und -untypischen Berufsaspirationen, Bewerbungs- und Ausbildungsberufen. *Kölner Zeitschrift Für Soziologie Und Sozialpsychologie* 72, 229–260. doi: 10.1007/s11577-020-00668-1

König, J., and Rothland, M. (2012). Motivations for choosing teaching as a career: effects on general pedagogical knowledge during initial teacher education. *Asia Pac. J. Teach. Educ.* 40, 289–315. doi: 10.1080/1359866X.2012.700045

Lazarides, R., Watt, H. M. G., and Richardson, P. W. (2020). Teachers' classroom management self-efficacy, perceived classroom management and teaching contexts from beginning until mid-career. *Learn. Instr.* 69:101346. doi: 10.1016/j.learninstruc.2020.101346

Mair, P., and Wilcox, R. (2018). Robust statistical methods in R using the WRS2 package. *Behav Res.* 52, 464–488. doi: 10.3758/s13428-019-01246-w

Mayr, J., Müller, F. H., and Nieskens, B. (2016). CCT – Career Counselling for Teachers: Genese, Grundlagen und Entwicklungsstand eines webbasierten Beratungsangebots. In A. Boeger (Ed.), *Eignung für den Lehrberuf.* Wiesbaden: Springer. (pp. 181–214).

McDonald, J. D. (2008). Measuring personality constructs: the advantages and disadvantages of self- reports, informant reports and Behavioural assessments. *Enquire* 1, 75–94.

Miller, L., and Hayward, R. (2006). New jobs, old occupational stereotypes: gender and jobs in the new economy. *J. Educ. Work.* 19, 67–93. doi: 10.1080/13639080500523000

Montgomery, C., and Rupp, A. A. (2005). A meta-analysis for exploring the diverse causes and effects of stress in teachers. *Canadian J. Educ.* 28:458. doi: 10.2307/4126479

Moreau, M.-P. (2019). Teachers, gender and the feminisation debate. London: Routledge.

Muckenthaler, M., Tillmann, T., Weiß, S., and Kiel, E. (2020). Teacher collaboration as a core objective of school development. *Sch. Eff. Sch. Improv.* 31, 486–504. doi: 10.1080/09243453.2020.1747501

München, H. (2023). Gender Monitoring der Hochschule München, München: Hochschule München.

Muschalik, C., Otten, M., Breuer, J., and von Rüden, U. (2021). Erfassung und Operationalisierung des Merkmals "Geschlecht" in repräsentativen Bevölkerungsstichproben: Herausforderungen und Implikationen am Beispiel der GeSiD-Studie. *Bundesgesundheitsbl. Gesundheitsforsch. Gesundheitsschutz* 64, 1364–1371. doi: 10.1007/s00103-021-03440-8

Nadler, J. T., Weston, R., and Voyles, E. C. (2015). Stuck in the middle: the use and interpretation of mid-points in items on questionnaires. *J. Gen. Psychol.* 142, 71–89. doi: 10.1080/00221309.2014.994590

Nesje, K., Brandmo, C., and Berger, J. L. (2018). Motivation to become a teacher: a norwegian validation of the factors influencing teaching choice scale. *Scand. J. Educ. Res.* 62, 813–831. doi: 10.1080/00313831.2017.1306804

Nilges, P., and Essau, C. (2015). Die Depressions-Angst-Stress-Skalen. *Schmerz* 29, 649–657. doi: 10.1007/s00482-015-0019-z

Rajendran, N., Watt, H. M. G., and Richardson, P. W. (2020). Teacher burnout and turnover intent. *Aust. Educ. Res.* 47, 477–500. doi: 10.1007/s13384-019-00371-x

Rauin, U., and Römer, J. (2010). "Motive als Prädiktor des Studien- und Berufserfolgs bei Lehramtsstudierenden und Hauptfachpädagogen" in Erziehungswissenschaftliche Forschung – nachhaltige Bildung (Erziehungswissenschaft, Band 28). eds. B. Schwarz, P. Nenniger and R. S. Jäger (Landau: Verlag Empirische Pädagogik), 244–252.

Reeves, P. M., Pun, W. H., and Chung, K. S. (2017). Influence of teacher collaboration on job satisfaction and student achievement. *Teach. Teach. Educ.* 67, 227–236. doi: 10.1016/j.tate.2017.06.016

Retelsdorf, J., and Möller, J. (2012). Grundschule oder gymnasium? Zur motivation ein lehramt zu studieren. *Zeitschrift Für Pädagogische Psychologie* 26, 005–017. doi: 10.1024/1010-0652/a000056

Richardson, P. W., and Watt, H. M. G. (2016). "Factors influencing teaching choice: why do future teachers choose the career?" in International handbook of teacher education. eds. J. Loughran and M. L. Hamilton (Singapore: Springer), 275–304. doi: 10.1007/978-981-10-0369-1_8

Ronfeldt, M., Farmer, S. O., McQueen, K., and Grissom, J. A. (2015). Teacher collaboration in instructional teams and student achievement. *Am. Educ. Res. J.* 52, 475–514. doi: 10.3102/0002831215585562

Rothland, M. (2014). "Warum entscheiden sich Studierende für den Lehrerberuf? Berufswahlmotive und berufsbezogene Überzeugungen von Lehramtsstudierenden" in Handbuch der Forschung zum Lehrberuf. ed. E. Terhart (Münster: Waxmann), 349–385.

Rothland, M. (2022). "Berufswahl Grundschullehrer*in – kindorientiert, nicht fachinteressiert? Variablen- und personenzentrierte Forschungsbefunde zu einer vorgeblich grundschulspezifischen Motivation" in Professionalisierung von Grundschullehrkräften. Kontext, Bedingungen und Herausforderungen. eds. I. Mammes and C. Rotter (Bad Heilbrunn: Julius Klinkhardt), 95–113.

Ryan, R. M., and Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *Am. Psychol.* 55, 68–78. doi: 10.1037/0003-066X.55.1.68

Scharfenberg, J. (2020). Warum Lehrerin, warum Lehrer werden? Motive und Selbstkonzept von Lehramtsstudierenden im internationalen Vergleich. Bad Heilbrunn: Julius Klinkhardt.

Schwarzer, R., and Jerusalem, M. (1999). Skalen zur Erfassung von Lehrer- und Schülermerkmalen. Dokumentation der psychometrischen Verfahren im Rahmen der wissenschaftlichen Begleitung des Modellversuchs Selbstwirksame Schulen. Berlin: Freie Universität Berlin.

See, B. H., Munthe, E., Ross, S. A., Hitt, L., and El Soufi, N. (2022). Who becomes a teacher and why? *Rev. Educ.* 10, 1–40. doi: 10.1002/rev3.3377

Seeliger, S., and Håkansson Lindqvist, M. (2023). Dealing with teacher shortage in Germany - a closer view of four federal states. *Educ. Sci.* 13:227. doi: 10.3390/educsci13030227

Shang, W., Yu, T., Wang, J., Sun, D., and Su, J. (2022). Why choose to become a teacher in China? A large-sample study using the factors influencing teaching choice scale. *Asia Pac. J. Teach. Educ.* 50, 406–423. doi: 10.1080/1359866X.2022.2066504

Shingala, M. C., and Rajyaguru, A. (2015). Comparison of post hoc tests for unequal variance. *Int. J. New Technol. Sci. Eng.* 2, 22–33.

Skaalvik, E. M., and Skaalvik, S. (2018). Job demands and job resources as predictors of teacher motivation and well-being. *Soc. Psychol. Educ.* 21, 1251–1275. doi: 10.1007/s11218-018-9464-8

Skelton, C. (2002). The "feminisation of schooling" or "re-masculinising" primary education? *Int. Stud. Sociol. Educ.* 12, 77–96. doi: 10.1080/09620210200200084

Skelton, C. (2009). Failing to get men into primary teaching: a feminist critique. *J. Educ. Policy* 24, 39–54. doi: 10.1080/02680930802412677

Skelton, C. (2012). Men teachers and the "feminised" primary school: a review of the literature. *Educ. Rev.* 64, 1–19. doi: 10.1080/00131911.2011.616634

Statistische Ämter des Bundes und der Länder (2024). Internationale Bildungsindikatoren im Vergleich: Statistisches Bundesamt. (Wiesbaden: Destatis)

Su, R., Rounds, J., and Armstrong, P. E. (2009). Men and things, women and people: a meta-analysis of sex differences in interests. *Psychol. Bull.* 135, 859–884. doi: 10.1037/a0017364

Syring, M., Tillmann, T., Weiß, S., and Kiel, E. (2018). Empirische Arbeit: Positive Einstellung zur Inklusion – ablehnende Haltung zur Umsetzung in der Schule. Analyse des Widerspruchs durch Überprüfung eines aus der Heterogenitätsforschung adaptierten Messinstruments für die Inklusion an Lehramtsstudierenden. *Psychol. Erzieh. Unterr.* 65:206. doi: 10.2378/peu2018.art12d

Syring, M., Weiß, S., Keller-Schneider, M., Hellsten, M., and Kiel, E. (2017). Berufsfeld "Kindheitspädagoge/in": Berufsbilder, Professionalisierungswege und Studienwahlmotive im europäischen Vergleich. *Zeitschrift Für Pädagogik* 63, 139–162.

Thomson, M. M., Turner, J. E., and Nietfeld, J. L. (2012). A typological approach to investigate the teaching career decision: motivations and beliefs about teaching of prospective teacher candidates. *Teach. Teach. Educ.* 28, 324–335. doi: 10.1016/j.tate.2011.10.007

Tillmann, T., Weiß, S., Hillert, A., and Kiel, E. (2019). Wie erleben Lehrkräfte ihren Arbeitsalltag? *Pädagogische Rundschau* 73. Jahrgang / 2019, 27–42. doi: 10.3726/pr012019.0003

Tillmann, T., Weiß, S., Scharfenberg, J., Kiel, E., Keller-Schneider, M., and Hellsten, M. (2020). The relationship between student teachers' career choice motives and stress-inducing thoughts: a tentative cross-cultural model. *SAGE Open* 10. doi: 10.1177/2158244020927016

Trojer, P. (2018). Wer wird Lehrer/Lehrerin?: Konzepte der Berufswahl und Befunde zur Entwicklung des Berufswunsches Lehrer/in und ihre Bedeutung für das Studium. Bad Heilbrunn: Klinkhardt Available at: https://books.google.de/books?id=uQRODwAAQBAJ

Ulich, K. (1998). Berufswahlmotive angehender LehrerInnen. *Die deutsche Schule 90,* 64–78.

Ulich, K. (2000). Traumberuf Lehrer/in? Berufsmotive und die (Un)sicherheit der Berufsentscheidung. *Die Deutsche Schule*. 92, 41–53.

Ulich, K. (2004). "Ich will Lehrer, −in werden": eine Untersuchung zu den Berufsmotiven von Studierenden. Weinheim: Beltz.

Vangrieken, K., Dochy, F., Raes, E., and Kyndt, E. (2015). Teacher collaboration: a systematic review. *Educ. Res. Rev.* 15, 17–40. doi: 10.1016/j.edurev.2015.04.002

Wang, W., and Houston, M. (2023). Teaching as a career choice: the motivations and expectations of students at one Scottish university. *Educ. Stud.* 49, 937–954. doi: 10.1080/03055698.2021.1921703

Watt, H. M. G., and Richardson, P. W. (2007). Motivational factors influencing teaching as a career choice: development and validation of the FIT-choice scale. *J. Exp. Educ.* 75, 167–202. doi: 10.3200/JEXE.75.3.167-202

Watt, H. M. G., Richardson, P. W., Klusmann, U., Kunter, M., Beyer, B., Trautwein, U., et al. (2012). Motivations for choosing teaching as a career: an international comparison using the FIT-choice scale. *Teach. Teach. Educ.* 28, 791–805. doi: 10.1016/j.tate.2012.03.003

Weiß, S., and Kiel, E. (2011). Berufswunsch Fremdsprachenlehrer/in: motive und Selbstbild. Career choice foreign language teacher: motives and self-image. *Forum Sprache* 3, 24–39.

Weiß, S., and Kiel, E. (2013). Who chooses primary teaching and why? *Educ. Res.* 23, 415–433.

Welch, B. L. (1947). The generalization of "student's" problem when several different population varlances are involved. *Biometrika*. 34, 28–35. doi: 10.1093/biomet/34.1-2.28

Wigfield, A., and Eccles, J. S. (2000). Expectancy-value theory of achievement motivation. *Contemp. Educ. Psychol.* 25, 68–81. doi: 10.1006/ceps.1999.1015