Research Article

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Assessing Pre-Service Teachers' Person-Centered Attitudes: Validity Evidence for the APBS Instrument Based on Internal Structure

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Abstract: Person-centered teacher behavior is positively related to cognitive and affective-motivational student outcomes. Although underlying teacher attitudes are thought to be of great importance for person-centered teacher-student relationships, this aspect has not been considered in empirical studies to date. This study examined the internal structure and reliability of a new self-report measure assessing attitudes on person-centered behavior toward students (APBS) in a sample of 363 German pre-service teachers aged 18-40 years (M = 22.28, SD = 3.48; 72.7% female). Exploratory factor analyses and internal consistency analyses based on polychoric correlations provided evidence for a theoretically grounded four-factor model with "unconditionality" (α = .91), "empathic understanding" (α = .92), "trust" (α = .89) and "genuineness" (α = .83) explaining 46% of the total variance. Interfactor correlations ranged between .53 and .72. There is thus preliminary evidence that the APBS test scores can be interpreted as intended. However, further validation studies are required to replicate the internal structure using confirmatory factor analyses and to examine the relations between APBS test scores and external variables. The instrument can be used in research in the field of teacher-student relationships as well as in teacher education courses addressing participants' educational attitudes.

Keywords: teacher-student relationship; pre-service teachers' attitudes; person-centered approach; validation; exploratory factor analysis.

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1 Introduction

Numerous studies consistently show positive relations between positive teacher-student relationships (TSR) and cognitive (e.g. Hamre & Pianta, 2001; Hughes, 2011), motivational (e.g. Murray, 2009; Skinner et al., 2008), and social-emotional (e.g. Roorda & Koomen, 2021; Witt et al, 2004) student outcomes. Depending on the study's theoretical framework, different aspects of the multidimensional TSR construct are examined, with the focus often lying on teachers' interpersonal behavior or beliefs and attitudes (Knierim et al., 2017; Teistler et al., 2019). This paper begins by providing an overview of theoretical concepts and empirical studies regarding these two aspects of TSR. This is then used as a basis for highlighting the importance of focusing on person-centered teacher attitudes in the present study. Finally, an overview of the development and content validation of the APBS instrument is provided, before the aims of the present study are presented.

1.1 Teachers' Interpersonal Behavior

Studies examining teachers' interpersonal behavior as an aspect of TSR and its associations with different student outcomes are based on a variety of theoretical concepts (Davis, 2003; Knierim et al., 2017). For example, studies refer to Bowlby's (1971) attachment theory (e.g. Allen et al., 2013), Deci and Ryan's (1985) self-determination theory (e.g. Skinner et al., 2008), Leary's (1957) interpersonal theory (e.g. Zijlstra et al., 2013), Mehrabian's (1971) social constructivist approach (e.g. Witt et al., 2004), Rogers' (1969) person-centered approach (e.g. Aspy & Roebuck, 1972), and McCombs' (1997) learner-centered model (e.g. McCombs et al., 2008). The multitude of different theoretical orientations in these studies leads to a high heterogeneity of construct operationalizations as well as a large number of available instruments to assess teachers' interpersonal behavior (Knierim et al., 2017; Phillippo et

al., 2017; Teistler et al., 2019). Consequently, a number of reviews has been published in recent years, providing an overview of either different theoretical approaches (e.g. Davis, 2003; Knierim et al., 2017) or available instruments for assessing TSR (e.g. Phillippo et al., 2017; Teistler et al., 2019). Phillippo et al. (2017), in their systematic review of student self-report instruments assessing TSR, found "variability of phenomena measured across instruments" (p. 26). This implies that survey instruments with similar content are used to measure different constructs, while simultaneously, constructs with the same or similar names are measured with instruments with divergent content (Phillippo et al., 2017 p. 16). Heterogeneity in terms of theoretical orientations and survey instrument content risks inaccurately measuring TSR, complicates the comparability of study findings, and limits our ability to determine how to promote positive TSR (Phillippo et al., 2017; Teistler et al., 2019). With regard to teachers' interpersonal behavior, this means that it cannot be deduced readily from the various studies on teachers' interpersonal behavior which teacher behaviors are most beneficial for creating positive TSRs and different student outcomes. A meta-analysis comparing the effects of teachers' interpersonal behaviors depending on the study's theoretical orientation and/or the content of the survey instrument used would provide more transparency. Although several meta-analyses examining the effectiveness of teachers' interpersonal behaviors have been published in recent years (e.g. Roorda et al., 2011; Witt et al., 2004), these meta-analyses do not differentiate by theoretical orientation or instrument content. The one exception is the meta-analysis by Cornelius-White (2007), in which correlations from studies on person-centered teacher behavior were compared with correlations from studies on learner-centered teacher behavior. Before presenting the relevant findings, a description of these two underlying theoretical approaches is provided.

1.2 Person- and Learner-Centered Teacher Behavior

The person-centered and learner-centered approaches come from different traditions (humanistic and constructivist, respectively) and decades (1950s to 1980s and 1990s to 2000s, respectively) (Cornelius-White, 2007). The person-centered approach was originally developed by the humanistic psychologist Carl R. Rogers (e.g. 1951; 1959; 1961) as a foundation for a psychotherapy method. In the final decades of his career, Rogers dedicated numerous publications to applying the person-centered therapeutic method to the school context (e.g. Rogers, 1969; 1983). For him, the main goal of education was to facilitate learning, that is, helping a student develop the capacity for self-instruction. In his view, only "the man who has learned how to learn; the man who has learned how to adapt and change; the man who has realized that no knowledge is secure, that only the process of seeking knowledge gives a basis for security" can be called educated (Rogers, 1969, p. 120). Rogers (1969) held that "certain attitudinal qualities which exist in the personal relationship between the facilitator and the learner" could encourage this kind of learning (p.106):

> First of all is a transparent realness of the facilitator, a willingness to be a person, to be and live the feelings and thoughts of the moment [congruence]. When this realness includes a prizing, a caring, a trust, and a respect of the learner [unconditional positive regard], the climate for learning is enhanced. When it includes a sensitive and accurate empathic listening [empathic understanding] then indeed a freeing climate, simulative of self-initiated learning and growth, exists. The student is trusted to develop. (Rogers, 1969, p. 126)

To summarize, Rogers (1969, 1983) assumed that the teacher can create learning-facilitating relationships by demonstrating congruence (also termed genuineness), empathic understanding and unconditional positive regard (also termed prizing, warmth or acceptance).

In contrast, the learner-centered approach is much more comprehensive and goes beyond the creation of positive relationships. Based on learner-centered psychological principles developed in the 1990s by the American Psychological Association, it provides a research-based perspective on factors that influence students and students' learning (APA, 1997; McCombs & Whisler, 1997). The fourteen principles are categorized into the four domains of metacognitive and cognitive, affective and motivational, developmental and social, and individual differences (APA, 1997). Following these principles, McCombs (1997) developed the learner-centered model that includes several student and teacher variables that positively affect student learning and achievement. In contrast to the person-centered teacher behaviors described above, which focus on shaping learning-facilitating relationships, the learner-centered teacher practices included in the learner-centered model encompass a host of other behaviors in addition to building positive interpersonal relationships, including honoring students' voices, encouraging higher-order thinking, problem solving and self-regulated learning skills as well as adapting to individual differences in development, culture, learning and other differences

(Weinberger & McCombs, 2003). Numerous studies based on the person-centered and learner-centered approaches have been conducted to investigate the impact of the respective teacher behaviors on diverse student outcomes. The studies on person-centered teacher behaviors were mainly conducted from the 1960s to 1980s in the United States and Germany and provided consistent evidence of positive relations between person-centered teacher behaviors and students' academic performance, cognitive abilities, learning and social behaviors and affective-motivational characteristics (e.g. Aspy & Roebuck, 1972; Boak & Conklin, 1975; Ryans, 1961; Tausch & Tausch, 1963/1998). Studies of learner-centered practices were conducted primarily between the 1990s and 2000s in the United States and indicate equally consistent positive relations between learner-centered teacher behaviors and students' motivation and academic achievement (e.g. Daniels et al., 2001; McCombs et al., 2008; Meece et al., 2003).

Furthermore, Cornelius-White (2007) conducted the aforementioned meta-analysis examining the associations between nine person- and learner-centered teacher variables and eighteen cognitive, affective and behavioral student outcomes. The person-centered variables included empathy, warmth, genuineness, positive teacher-student relationships (composite of the three classical person-centered variables), and nondirectivity. The learner-centered variables comprised honoring students' voices, adapting to individual and cultural differences, encouraging learning, encouraging higher-order thinking, and having learner-centered beliefs. The meta-analysis included 119 studies conducted from 1948 to 2004. The study found a corrected correlation of r = .39 (SD = .22) between all person- and learner-centered variables and all student outcomes. Further, the analysis compared the person-centered and learner-centered models. While the person-centered teacher behaviors exhibited a corrected correlation of r = .41 (SD = .34), the learner-centered teacher behaviors exhibited a corrected correlation of r = .31 (SD = .29). The meta-analysis thus showed that the interplay of teachers' affective interpersonal behaviors is particularly conducive to students' wellbeing and success at school. It should be mentioned, however, that the studies on person-centered teacher behavior included in the meta-analysis were mainly conducted between the 1960s and 1980s and, to the author's knowledge, there is no more recent empirical evidence that could corroborate these results. However, studies asking students about their expectations and desires for "good" teachers provide more recent empirical evidence for the importance of such affective interpersonal teacher behaviors. Students in these studies indicated that they wanted their teachers to show respect, patience, empathy, interest, honesty, and openness (Raufelder et al., 2016; Schweer, 1997; Sztejnberg et al., 2004, Turley, 1994) - all aspects consistent with teacher behaviors described in the person-centered approach. In sum, the results of earlier studies - urgently requiring replication - support the application of the person-centered approach both as an operationalization of relationship-enhancing teacher behaviors in empirical studies on TSR and in order to create programs and trainings to promote (pre-service) teachers' skills in shaping positive TSRs.

The literature on TSR increasingly calls for greater attention to be paid to promoting relational competencies within teacher education (e.g. Aspelin, 2019; Aspelin & Jönsson, 2019; Reeves & Le Mare, 2017; Sabol & Pianta, 2012). Studies examining students' perceptions and experiences show that teachers often do not behave in ways that foster positive relationships. Indeed, in such studies, students reported that they frequently experience negative teacher behaviors, such as humiliation, insults, sarcasm, or corporal punishment (e.g. Brendgen et al., 2006, Lewis et al., 2005; Romi et al., 2011). Thus, it seems that creating positive TSRs is sometimes too difficult for teachers, and they should therefore be better prepared for the relational challenges of the teaching profession. According to Tausch (2017), one potential starting point for supporting teachers with these challenges and thus also improving the quality of TSRs could be providing training in person-centered communication techniques. However, Rogers (1975) expressed the view that his approach should not degenerate into a mere method. Merely applying certain techniques at the behavioral level will not yield therapeutic success, as a client will be able to recognize if and when the counselor is merely applying a technique that does not correspond to his or her inner attitude (Rogers, 1951). Rogers thus emphasized the importance of the therapist actually holding person-centered attitudes for the formation of facilitating relationships. The following section therefore focuses on the role of interpersonal teacher attitudes and beliefs in shaping positive TSRs.

1.3 Interpersonal Teacher Attitudes and Beliefs

The peak period of studies focusing on teachers' attitudes was in the 1950s through the 1970s. In current educational research, attitudes are only investigated from time to time, while beliefs have become one of the central constructs

in teacher research (Richardson, 1996). However, the distinction between the two constructs remains ambiguous in the literature (Fives & Buehl, 2012; Reusser & Pauli, 2014). Pajares (1992) provides one possible construct classification. He assumes that the organization of groups of beliefs around an object or situation results in an overall attitude toward that object or situation. This conceptualization is consistent with more recent work on the attitude construct within social psychology. Eagly and Chaiken (2007) define an attitude as "a psychological tendency that is expressed by evaluating a particular entity with some degree of favor or disfavor" (p. 582). An attitude is thus understood as an overall evaluation of an attitude object, which can be any mental object. This overall evaluation of an object can be formed through cognitive, affective and/or behavioral processes (Aronson et al., 2014, p. 218-221; Eagly & Chaiken, 2007; Haddock & Maio, 2014, p. 199-206). These cognitive processes include, but are not limited to, beliefs associated with a particular attitude object (Aronson et al., 2014, p. 218; Haddock & Maio, 2014, p. 200). These assumptions about attitude formation are consistent with Pajares' (1992) distinction between the attitude and belief constructs described above. In summary, an attitude toward a particular object may arise from, for example, various individual beliefs about the same object, with both beliefs and attitudes in turn making up an individual's belief system (Pajares, 1992).

Educational researchers justify the importance of teachers' attitudes and beliefs by arguing that both influence teachers' perceptions and behaviors in the classroom, while also playing a central role in how pre-service teachers approach teacher education and what they learn from it (Fives & Buehl, 2012; Pajares, 1992; Richardson, 1996). Theoretical work conceptualizing the TSR construct also suggests that teachers' interpersonal attitudes and beliefs toward students, themselves, and toward particular educational practices have a crucial impact on how teachers perceive students' behavior and/or how they behave toward their students (Hamre et al., 2012; Nickel, 1976; McCombs, 1997; Pianta et al., 2003). Empirical evidence for the relevance of teachers' interpersonal attitudes and beliefs for their interpersonal behavior toward students has been primarily provided through qualitative studies (e.g. Haagensen et al., 2020; Isenbarger & Zembylas, 2006; Jiang et al., 2019; Newberry & Davis, 2008; Silberman, 1969). Like the studies on teachers' interpersonal behavior, studies on interpersonal attitudes and beliefs refer to different theoretical frameworks. However, the attitude and belief objects examined in these studies closely resemble person-centered teacher behaviors. For example, studies have examined teachers' attitudes or beliefs toward relational trust (Haagensen et al., 2020), caring (Isenbarger & Zembylas, 2006), teacher roles, emotional expression, closeness and equality (Jiang et al., 2019), closeness (Newberry & Davis, 2008) and attachment, concern, indifference and rejection (Silberman, 1969). Quantitative studies on interpersonal beliefs or attitudes, meanwhile, were mainly conducted in the 1970s and 1980s (e.g. Davis & Viernstein, 1972; Krampen 1979; Mayr et al., 1987). In contrast, a large number of recent studies with quantitative methodologies focus on beliefs about specific instructional practices such as constructivist vs. transmissive or teacher-centered vs. learner-centered practices (Reusser & Pauli, 2014). However, studies on constructivist or learner-centered beliefs frequently include the creation of positive teacher-student relationships as one aspect (e.g., McCombs et al., 1997; McCombs & Whisler 1997). Systematic reviews that explicitly focus on studies and/or measurement instruments for teachers' interpersonal attitudes and beliefs are not available. However, from the results of two systematic reviews on teacher beliefs (Fives & Buehl, 2012) and on German-language instruments for assessing teacher-student relationships (Teistler et al., 2019), it can be inferred that apparently neither studies nor instruments exist in which interpersonal attitudes or beliefs are operationalized and assessed based on the person-centered approach (e.g. Rogers, 1969; 1983). As noted above, educational psychology research in the tradition of the person-centered approach focuses primarily on teachers' interpersonal behavior and its relations to student outcomes (e.g. Aspy & Roebuck, 1972; Tausch & Tausch 1963/1998). Even though Rogers (1951) himself emphasized the importance of underlying attitudes in shaping positive relationships, person-centered interpersonal attitudes have not yet been examined in educational psychology research.

1.4 The APBS as an Instrument for Measuring Pre-Service Teachers' Person-Centered Attitudes

Based on the findings reported in the previous sections, it can be concluded that (1) the person-centered approach is a suitable theoretical foundation for operationalizing teachers' interpersonal behavior and fostering relational competencies among pre-service teachers; (2) teachers' interpersonal attitudes and beliefs play an important role in TSR quality, as they affect teachers' social perceptions and interpersonal behaviors; (3) neither studies nor

survey instruments focusing on person-centered attitudes among (pre-service) teachers seem to exist so far.

The APBS instrument, for which validity evidence will be gathered in this study, is being developed to address this research gap. On the one hand, the instrument's development aims to facilitate empirical research on person-centered teacher attitudes as one aspect of teacher-student relationships. On the other hand, the instrument could be applied in teacher education courses aiming to promote pre-service teachers' relationship-related competencies in order to facilitate reflection on and engagement with pre-service teachers' educational attitudes. The APBS instrument is a German-language self-report questionnaire being developed on the basis of classical test theory that aims to measure pre-service teachers' attitudes on person-centered behavior toward students. The operationalization of the attitude construct is based on current findings from attitude research within social psychology. As mentioned above, an attitude is understood as the overall evaluation of a particular object with some degree of favor or disfavor (Eagly & Chaiken, 2007). According to studies based on the theory of planned behavior, an attitude toward a particular behavior seems to be a good predictor of that same behavior (e.g. Ajzen & Fishbein, 1977; Glasman & Albarracín, 2006; Kraus 1995). Therefore, the attitude object to be evaluated in the APBS captures person-centered behavior toward students. The operationalization of this attitude object is in turn based on theoretical work on the person-centered approach. In summary, the APBS instrument aims to assess behavioral attitudes, that is, how positively or negatively pre-service teachers evaluate person-centered behaviors toward students. The first validation study of the APBS (Teistler, 2021) was dedicated to developing the initial version of the instrument; it included construct conceptualization and item development as well as an empirical examination of the suitability of the construct conceptualization and instrument content. First, definitions for the three construct domains (here named "prizing", "understanding" and "congruence") were developed, following relevant literature on the person-centered approach (e.g., Aspy, 1972; Carkhuff, 1969; Rogers, 1969, 1983; Tausch & Tausch, 1963/1998). Then, specific person-centered behaviors were compiled for each domain, drawing upon the literature on the person-centered approach as well as a variety of instruments assessing teachers' interpersonal behaviors, attitudes and beliefs. These were finally formulated into items following the above-mentioned operationalization of the attitudinal construct. This initial version of the instrument contained 189 items. Ten subject matter experts evaluated the adequacy of the construct conceptualization and the items' suitability in terms of relevance, unambiguity, and comprehensibility. The results of quantitative and qualitative data analyses indicated both that the construct was adequately conceptualized and that the majority of items were appropriate in terms of their relevance, unambiguity, and comprehensibility. By excluding or revising the less appropriate items and implementing the experts' suggestions regarding construct conceptualization, an improved preliminary version of the APBS instrument with 114 items was obtained. The domain "prizing" consists of 46 items distributed over six facets (regard, unconditionality, acceptance, equivalence, trust, caring). The domain "understanding" consists of 31 items distributed over four facets (interest, non-judgment, inclusion, empathy). The domain "congruence" consists of 37 items distributed over five facets (openness to feelings, openness to experience, genuineness, transparency and selective transparency). The definitions of domains and their respective facets resulting from the first content validation study (Teistler, 2021) are provided in Appendix A.

1.5 The Present Study

The present study aims to provide additional validity evidence for the APBS instrument. Fundamentally, the instrument is developed based on the argument-based approach to test validation (AERA et al., 2014). According to AERA et al. (2014), validity refers to "the degree to which evidence and theory support the interpretations of test scores for proposed uses of tests" (p. 11). Validation is understood as an ongoing process in which empirical evidence for or against the assumed test score interpretations is collected. Within this process, basic assumptions are deduced from the formulated test score interpretations, which are then empirically tested using various sources of evidence, including the test content, response process, internal structure of the test, relations between test scores and external variables and consequences of testing (AERA et al., 2014). If these basic assumptions are confirmed by the empirical tests, then the assumed test score interpretations can be temporarily described as valid with regard to the intended use (AERA et al., 2014; McCoach et al., 2013). For the APBS instrument, it is assumed that test scores reflect pre-service teachers' attitudes on person-centered behavior toward students in accordance with the theoretical approach by Carl R. Rogers. To further validate the intended test score interpretation, this study aims to gather validity evidence based on the internal structure

of the second APBS test version. "The analyses of the internal structure of a test can indicate the degree to which the relationships among test items and test components conform to the construct on which the proposed test score interpretations are based" (AERA et al., 2014, p. 16). The four basic assumptions to be examined in this study are (1) that responses to items in the APBS instrument are indicators of the three attitudinal dimensions "prizing", "understanding", and "congruence" in pre-service teachers, (2) that the three scales reliably capture the respective intended constructs, (3) that the correlations between the scales are at least in the middle range, since the respective intended constructs capture aspects of an overarching person-centered attitude, and (4) that the test scores obtained with the APBS instrument can be used to differentiate between pre-service teachers with different levels of the intended construct. In addition, the present validation study also seeks to further reduce the number of items in the instrument in order to create an economical test version suitable for practical use. Whereas in the first validation study (Teistler, 2021), all potentially relevant items in terms of content were identified with the help of subject matter experts, which resulted in an uneconomical number of items for practical use, in this study, only the psychometrically best items will be selected from the 114 content-relevant items, while still ensuring that the instrument as a whole covers the full breadth of the construct, with each of the 15 facets represented by at least one or two items.

2 Method

2.1 Procedure

In order to answer the aforementioned research questions, a sample of pre-service teachers in Germany completed the second APBS test version between January and February 2020. The data were gathered during a social psychology lecture and ten educational science seminars at the Martin-Luther-University Halle-Wittenberg (MLU) as well as during ten educational science seminars at the University of Leipzig using paper-pencil questionnaires. Since attendance was not required in these courses, only 29% of the students inscribed in the courses participated in the survey. The survey took around 30 minutes of the 90-minute seminar or lecture session. Informed consent has been obtained from all individuals included in this study.

2.2 Measure

The APBS questionnaire used in the survey contained 114 items representing different person-centered behaviors toward students, which were rated by the surveyed pre-service teachers on a bipolar item-specific rating scale (Rauthmann, 2011; Saris et al., 2010) from one (extremely negative) to six (extremely positive). The APBS instrument seeks to assess the three attitudinal domains of "prizing" (item example: Taking students' fears seriously, even if one personally thinks they are exaggerated) "understanding" (item example: Trying to empathize with how students feel in class), and "congruence" (item example: Presenting oneself to students as a person with strengths and weaknesses).

2.3 Sample

The sample consisted of 365 pre-service teachers. Two participants' responses were excluded due to systematic response styles (Döring & Bortz, 2016, p. 590), reducing the sample size for the following analyses to 363. Female students comprised 72.7% (n = 263) of the sample; male students 27.3% (n = 99); one student did not specify his/her gender. The participants were between 18 and 40 years of age (M = 22.28; SD = 3.48; N/A = 1) and were in their 1st to 13th semester of studies (M = 4.44; SD = 2.09; N/A = 1). MLU students accounted for 74.0% (n = 268) of the sample, while Leipzig University students made up 26.0% (n = 94). One student did not provide information on his/her university. A total of 21.3% (n = 77) of respondents were enrolled in the primary school teaching program (German: "Grundschule"), 28.8% (n = 104) in the special education school teaching program (German: "Förderschule"), 17.5% (n = 63) in the lower-track secondary school teaching program (German: "Oberschule/Sekundarschule"), and 32.4% (n = 117) in the upper-track secondary school teaching program (German: "Gymnasium"). Two students did not provide information about their program of study.

2.4 Data Analysis

The most commonly recommended data analysis methods for examining the internal structure of a test are exploratory and confirmatory factor analysis (AERA et al., 2014, McCoach et al., 2013). When developing a new instrument, it is recommended to first conduct an exploratory factor analysis (EFA), modify the instrument based on the EFA results if necessary, and then test the

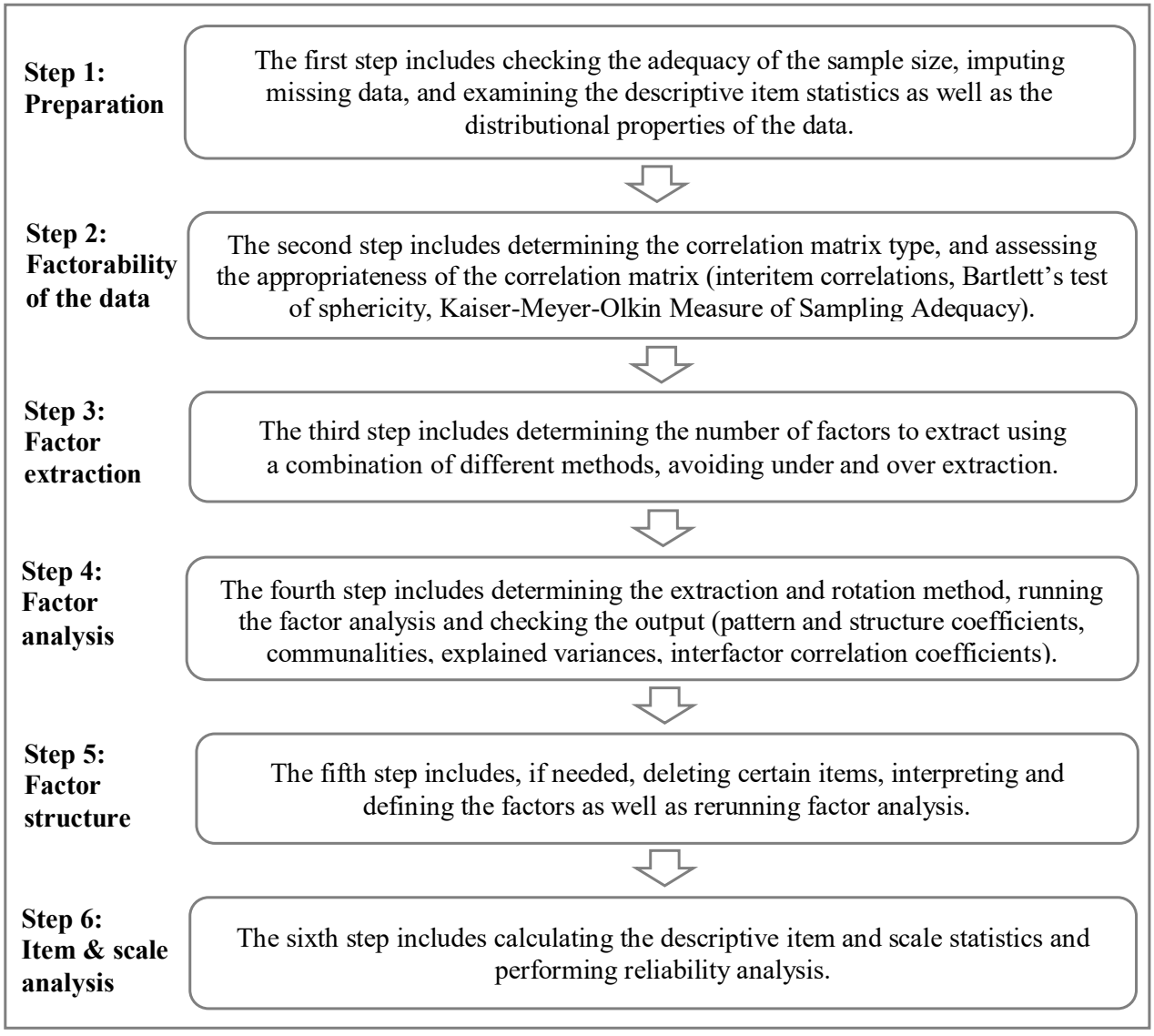

Figure 1: Steps of Exploratory Factor Analysis.

revealed factor structure using confirmatory factor analysis (CFA) with a separate sample (e.g. McCoach et al., 2013, p. 113; Worthington & Whitakker, 2006). Therefore, an EFA data analysis procedure was chosen for this study. Methodological reviews indicate that EFAs are often conducted inadequately or incorrectly and/or decisions and results are not reported with sufficient transparency (Beavers et al., 2013; Fabrigar et al., 1999; Goretzko et al., 2019; Henson & Roberts, 2006; Howard, 2016; Norris & Lecavalier, 2009). EFA is considered a relatively subjective statistical procedure because researchers must make a number of decisions when conducting the analysis, such as sample size, method of factor extraction, rotation technique, and criteria used to retain factors (Norris & Lecavalier, 2009). Any of these decisions can have serious consequences for the item selection (Fabrigar et al., 1999; Watkins, 2018). Therefore, it is necessary to transparently present the entire process and all decisions, including the underlying rationales (Beavers et al., 2013; Fabrigar et al., 1999; Henson & Roberts, 2006; Norris & Lecavalier, 2009; Worthington & Whitakker, 2006). Following the recommendations of these methodological articles, Figure 1 provides an overview of the data analysis steps that should be performed during an EFA. The results section below follows the steps shown in Figure 1. The data analysis was performed using the statistical software R for Windows 4.0.2 (R Core Team, 2020).

Table 1: Summary of Descriptive Item Statistics (114 Items).

Domain		Mdn	Mean	SD	Range	Skew	Kurtosis	Difficulty
Prizing	Min.	4	4.16	0.48	2	-3.24	-0.78	.69
	Max.	6	5.77	1.10	5	-0.27	14.06	.96
Understanding	Min.	5	4.43	0.64	2	-1.28	-0.68	.74
	Max.	6	5.55	1.03	5	-0.32	2.75	.92
Congruence	Min.	4	3.85	0.61	3	-1.43	-0.26	.64
	Max.	6	5.54	1.16	5	-0.14	2.01	.92
Total	Min.	4	3.85	0.48	2	-3.24	-0.78	.64
	Max.	6	5.77	1.16	5	-0.14	14.06	.96

Note. Six-point rating scale (1 = extremely negative; 6 = extremely positive).

3 Results

3.1 Step 1: Preparation

There are no shortage of recommendations on the appropriate sample size to use when conducting an EFA. However, a minimum sample size of 300 is commonly recommended (e.g. Rouquette et al., 1999; Worthington & Whitakker, 2006). The present study included data from 363 students, which can be considered adequate in light of these methodological recommendations. The dataset for the 114 APBS items contained 70 missing values (0.17%), which were distributed over 61 items. If the proportion of missing values in a dataset is below 5%, traditional methods like deletion or single imputation may be applied to deal with missing values (Schumacker, 2015). Since Mardia's test for multivariate normality (Mardia, 1970) indicated that the data were not normally distributed ($p < .001$), the nonparametric hot-deck method of predictive mean matching (Little, 1988) was used to impute the missing values.

A summary of descriptive item statistics at the domain level is shown in Table 1. Skewness and kurtosis parameters indicated asymmetric, left-skewed distributions. In addition, the Shapiro-Wilk test for univariate normal distribution was conducted for all variables, which confirmed that the data were not normally distributed (all $p < .001$). The aim of a psychological test is to differentiate between individuals with different levels on a trait (Döring & Bortz, 2016, p.476 f.). This means that ideally, the full width of the response scale should be utilized. This was only the case for 41 of the 114 items. The relatively high means and item difficulties further indicated that a large number of items had low discriminative ability. Thus, descriptive item statistics were used as a selection criterion when selecting suitable items in Step 5. Detailed descriptive statistics for the 114 individual items are provided in Appendix B.

3.2 Step 2: Factorability of the Data

In order to conduct an EFA, it is first necessary to decide which type of correlation matrix to use (Henson & Roberts, 2006). A consistent recommendation in the methodological literature is to use polychoric correlations when data are not normally distributed or when skewness and kurtosis are excessively high (e.g., Goretzko et al., 2019; Holgado-Tello et al., 2010; Watkins, 2018). Because the present data were not normally distributed (see Step 1), polychoric correlations were used for the analyses. A sizeable number of correlations of at least .30 provide evidence that there is enough commonality to justify comprising factors (Watkins, 2018). In the present polychoric correlation matrix, item intercorrelations ranged from .00 to .75. All items except "kosel5" (Item wording: "Avoiding freely venting negative feelings (e.g., anger or rejection) in the presence of students"), which belonged to the "selective transparency" facet of "congruence", had a correlation of at least .30 with at least one other item. The Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) represents another criterion for assessing factorability. Both the overall and item-specific KMOs should be no less than .50 (Kaiser & Rice, 1974). The overall KMO was .60, while the item-specific KMOs for 89 of the 114 items ranged from .50 to .75. The item-specific KMOs are provided in Appendix C. The last criterion for testing the factorability of the data, Bartlett's test of sphericity, was not performed because the assumption that the data are multivariate normally distributed was violated (see Step 1). In summary, the analyses indicated the appropriateness of the correlation matrix for performing an EFA. The 25 items with unsatisfactory KMOs were not excluded from further

analyses at this point, because descriptive item statistics, EFA results as well as content-related aspects should also be considered when selecting appropriate items (Worthington & Whitakker, 2006).

3.3 Step 3: Factor Extraction

The second major decision in the process of EFA pertains to the number of factors to be extracted. Both over extraction (too many factors) and under extraction (too few factors) should be avoided because both are problematic for different reasons (Fabrigar et al, 1999; McCoach et al, 2013; Watkins, 2018). Various methods are available to estimate the correct number of factors. Ruscio and Roche (2012) conducted a simulation study on the relative performance of several techniques. Since no technique is 100% accurate in determining the correct number of factors, combining different methods is recommended (Henson & Roberts, 2006; Watkins, 2018). Table 2 summarizes the methods used in the present study as well as the number of factors obtained and the accuracy of each method as calculated by Ruscio & Roche (2012). The various methods did not provide consistent results regarding the number of factors to be extracted. In such a case, it is recommended to perform several factor analyses and choose the factor solution that best approximates a simple structure – with at least three variables providing salient loadings per factor and no or few cross-loadings (Costello & Osborne, 2005; Worthington & Whitakker, 2006).

Table 2: Number of Factors to Extract (114 Items).

Method	Accuracy [a]	Number of factors [b]
Parallel Analysis (PA)	76.43%	8
Minimum-Average-Partial-Test (MAP)	59.60%	8
Acceleration-Factor-Methode (AF)	45.91%	1
Optimal-Coordinate-Methode (OC)	74.03%	8
Comparison-Data (CD)	87.14%	6
Kaiser criterion	8.77%	25
Scree Test	N/A	2, 4, 7

Note. "MHSPackage" was used for all methods except Scree Test ("psych").
[a] Reference: Ruscio & Roche (2012).
[b] The extraction method was unweighted least squares (ULS) with an oblique Promax rotation based on polychoric correlations.

3.4 Step 4: Factor Analysis

Before conducting an EFA, the factor extraction method and factor rotation technique must first be determined (McCoach et al., 2013). One of the most common factor extraction methods for non-normally distributed data is principal axis analysis (McCoach, et al. 2013, p. 118; Costello & Osborne, 2005), although the methodological literature tends to recommend the use of least squares methods (Goretzko et al., 2019). Results from simulation studies indicate a preference for the unweighted least squares method (ULS) (Viladrich et al., 2017; Zygmont & Smith, 2014), which was therefore chosen for the analyses in this study. Regarding the rotation technique, oblique methods are generally recommended, especially when the underlying theoretical approach suggests that the factors are correlated (Beavers et al., 2013; Costello & Osborne, 2005; Worthington & Whitakker, 2006). Since strong factor correlations were presumed for the APBS instrument, the oblique Promax rotation method was chosen, one of the most frequently recommended rotation techniques (e.g. Bühner, 2011; Fabrigar et al., 1999).

Based on the results from Step 3 on the number of factors to be extracted, EFAs with one, two, four, six, seven and eight factors were performed in the present study. In addition, another EFA with three factors was performed, which corresponds to the theoretically assumed structure of the construct. To ensure that no potentially adequate factor solution was omitted, the five-factor model was also included, so that a total of eight EFAs using ULS extraction and Promax rotation were performed. The factor loadings of the pattern matrices for the models with one to three factors indicated factor under extraction, as one-quarter to one-third of the items cross-loaded in each case (Watkins, 2018). In contrast, the pattern matrices for the five- to eight-factor models each contained one to two unstable factors with fewer than three strongly loading items (loadings of at least .50), indicating factor over extraction (Watkins, 2018). The four-factor model was the most satisfactory solution both in terms of approximating the simple structure and in terms of content-related interpretation (Fabrigar et al., 1999). The pattern matrix of the four-factor-solution is provided in Appendix C along with communalities, item-specific KMOs, explained variance per factor before and after rotation and interfactor correlations. As shown in Appendix C, 74 of the 114 items were found to have medium (h^2 = .40 - .60) or high (h^2 > .60) communalities, while 40 items had low (h^2 = .20 - .39) or very low (h^2 = < .20) communalities (Bühner, 2011, p. 345). The results further showed that 89 of the 114 items had substantial loadings above .40 (Howard, 2016). At the

same time, cross-loadings were identified for 11 of these 89 items, which means that these items had at least one other loading of at least .30 in addition to their main loading, with the discrepancy between the main loading and the next highest loading being less than .20 (Howard, 2016). All four factors extracted had at least five strongly loading items (.50 or better), which is considered an indicator of a solid factor (Costello & Osborne, 2005). All four factors together accounted for 43% of the total variance.

3.5 Step 5: Factor Structure

The fifth step includes item reduction, factor definition and rerunning factor analysis. When deciding whether to reject or retain an item, factor loadings, communalities, discriminative ability, item-specific KMOs as well as item content should all be considered (Bühner, 2011; Reise et al., 2000). Hence, in the first step, items were retained that had (a) a factor loading of at least .40 without cross-loadings (Howard, 2016), (b) a commonality of at least .40 (Worthington & Whittaker, 2006), (c) an adequate discriminative ability (maximum range of five, item difficulty of at most .80; Döring & Bortz, 2016, p. 477), and (d) a KMO value of at least .50 (Kaiser & Rice, 1974). In addition, the items were examined in terms of content and in the context of their respective factor (Reise et al., 2000). On the one hand, it was ensured that the items exclusively matched the construct to be measured (the other items making up the factor), while at the same time eliminating redundancies between items by retaining the items that fulfilled criteria (a) to (d) to a greater extent. On the other hand, it had to be ensured that the breadth of the target construct was still fully covered, with at least one item representing each of the 15 facets. Because coverage of the full breadth of content could not be obtained while adhering to criteria (a) through (d), criteria (a) through (c) were weakened. The cut-off values previously reported referred to the most stringent guidelines in the methodological literature. However, less stringent recommendations for item selection are also available, which were applied in the next step. Thus, items were retained that had a factor loading of at least .32 (Worthington & Whitakker, 2006), even if they had cross-loadings; a commonality of at least .20 (Child, 2006); or less optimal discriminative ability as long as their content concerned aspects of the construct not covered by the previously retained items. Item selection based on these criteria resulted in 44 retained items. Despite the application of less stringent selection criteria, not all facets of the construct could be maintained. All items for the facets "selective transparency" and "openness to feelings" within the "congruence" domain were eliminated because these items did not substantially load onto any factor or because the items' content did not match the construct (other items) of the factors on which they had their main loadings.

In the next step, names and definitions for the factors were developed (Henson & Roberts, 2006: Watkins, 2006). The first factor was labeled "unconditionality" and consisted of 12 items. The second factor was labeled "empathic understanding" and consisted of 11 items. The third factor consisted of 11 items and was labeled "trust". The fourth factor consisted of 10 items and was labeled "genuineness". The content of the construct domain originally called "understanding" was almost completely covered by the factor "empathic understanding". Only the facet "non-judgment" was no longer included, as these items expressed a form of unconditional acceptance and thus fit better within the "unconditionality" factor. Furthermore, items from the "caring" facet that were originally part of the "prizing" domain loaded onto the "empathic understanding" factor. These items expressed emotional warmth toward students and thus better matched this factor. The content of the domain originally called "congruence" was mainly covered by the "genuineness" factor, with the facets "genuineness" and "transparency". The facets "regard", "unconditionality" and "acceptance" from the "prizing" domain were represented in the "unconditionality" factor, while the items of the "prizing" facets "equivalence" and "trust" were represented in the "trust" factor. The "trust" factor also contained items from the "congruence" facets "openness to experience" and "transparency" and from the "understanding" facets "interest" and "inclusion". All of these items referred to behaviors expressing trust in students' abilities. In summary, the two factors "empathic understanding" and "genuineness" mainly included facets of the domains "understanding" and "congruence", respectively, while the facets of the "prizing" domain were divided between the factors "unconditionality" and "trust". Detailed factor definitions are provided in Appendix D.

It is possible for the factor structure to change due to the reduction of a considerable number of items (Bühner, 2011). For this reason, it is recommended to analyze the reduced test version for the stability of its factor structure by conducting another EFA (Beavers et al., 2013; Worthington & Whitakker, 2006). Both the overall (.90) and item-specific (.72 - .97) KMOs supported the factorability of the polychoric correlation matrix based on 44 items. The methods previously used in Step 3 to

determine the number of factors suggested the extraction of four factors in three cases (PA, MAP and Scree test). The results of the factor analysis with four factors using the ULS extraction method and Promax rotation, as well as the item-specific KMOs, explained variance per factor before and after rotation, interfactor correlations and English translations of the items are provided in Table 3. All but five items had substantial loadings of above .40. Cross-loadings with a discrepancy below .20 were found for nine items. Communalities were largely adequate. Most items (30 of 44) had acceptable values above .40; no item fell below the recommended minimum of .20. The "genuineness" factor had a total of four out of ten items with low loadings (< .40), cross-loadings, and/or low communalities (.20 - .39). In addition, this factor had the fewest number of strongly loading items (.50 or better) out of the four factors. Thus, the "genuineness" factor should be considered the least stable factor. Nevertheless, all factors held at least five items with strong loadings of at least .50, indicating that they were solid factors (Costello & Osborne, 2005). All four factors together accounted for 46% of the total variance. Interfactor correlations ranged between .53 and .72 and thus were moderately strong to strong, as expected.

3.6 Step 6: Item and Scale Analysis

Item and scale analysis were conducted to examine the psychometric properties of the test scales (Bühner, 2011). In order to evaluate whether the 44-item APBS version can be used to differentiate between individuals with different trait levels (Döring & Bortz, 2016, p.476 f.), descriptive statistics were calculated at the item and scale level. Descriptive scale statistics are provided in Table 4, descriptive items statistics in Appendix E. The values for skewness and kurtosis indicated asymmetric, left-skewed distributions for all scales and items. Item means varied from 3.85 to 5.55 and standard deviations from .66 to 1.12. The difficulties of the 44 items ranged from .64 to .92. The ranges varied between three and five. Only 17 of the 44 items obtained the maximum possible range of five. A range of four (min = 2; max = 6) was found for 19 items and a range of three (min = 3; max = 6) for 8 items. Thus, the descriptive item and scale statistics indicate that the majority of items may not have optimal discriminative ability.

Furthermore, examining the psychometric properties of test scales encompasses the issue of test score reliability (Bühner, 2011). Estimating internal consistency is one of the most commonly used reliability procedures (McCoach et al., 2013). In order to analyze the internal consistency reliability, Cronbach's alpha, McDonald's omega total and hierarchical, mean inter-item correlations, and corrected item-total correlations were calculated for each of the four scales. Values of .80 and above for Cronbach's alpha and McDonald's omega total as well as values of .65 and above for McDonald's omega hierarchical are considered indicators of acceptable internal consistency (Nájera Catalán, 2018). The mean-inter-item correlation should fall between .10 and .50 (Briggs & Cheek, 1986), while the corrected item-total correlations should not fall below a value of .30 (Bühner, 2011). The corrected item-total correlations of the 44 items ranged from .43 to .79 and are presented in Appendix E. The scale averages for the item-total correlations and the other calculated coefficients are provided in Table 5. The results of the analyses showed that the internal consistency of the scales making up the APBS instrument can be considered medium to high, as the values of all coefficients clearly exceed the minimum thresholds recommended in the methodological literature.

4 Discussion

This study aimed to gather validity evidence based on internal structure for the APBS instrument, test scores on which are thought to reflect pre-service teachers' attitudes on person-centered behavior toward students in accordance with the theoretical approach by Carl R. Rogers. The first basic assumption, that responses to the APBS items are indicators of the three attitudinal dimensions of "prizing", "understanding" and "congruence", was largely supported. Exploratory factor analyses based on polychoric correlations yielded a four-factor solution including 44 items with "unconditionality", "empathic understanding", "trust", and "genuineness" explaining 46% of the total variance. The items making up the "empathic understanding" and "genuineness" scales represent the central aspects of the initial construct domains "understanding" and "congruence" while the "prizing" domain is divided into the two dimensions "unconditionality" and "trust". Results from factor analyses using the Barrett-Lennard Relationship Inventory (Barrett-Lennard, 2015), an instrument developed in the 1960s to assess person-centered teacher behaviors from both the teacher and student perspectives, support the four-dimensional nature of the construct found in this study because in those studies, the person-centered variable "unconditional positive regard" (here "prizing") also appeared to consist of two relatively independent factors (Gurman, 1977). Theoretical work on the person-

Table 3: Items, Four-Factor Pattern Matrix, Communalities and KMOs (44 Items).

ID [a]	APBS Item	Factor loading 1	2	3	4	h^2	KMO
Factor 1: Unconditionality							
verwert5	Acknowledging students' feelings in a non-judgmental way	**.77**	.00	.07	-.01	.66	.90
wsbed7	Not making ironic comments when students do not understand lesson content	**.76**	.05	-.27	.10	.46	.72
wsach6	Refraining from making mocking comments toward students	**.68**	.20	-.12	-.06	.49	.80
wsbed5	Treating students with positive regard, even if their views, feelings, or behaviors differ strongly from one's own	**.68**	-.03	.02	.06	.51	.86
wsbed3	Treating students with respect, even if they do not follow the rules	**.61**	-.06	.16	-.01	.48	.86
wsakz4	Taking students' fears seriously, even if one personally thinks they are exaggerated	**.59**	.19	.08	-.03	.58	.90
wsbed6	Appreciating students, even if they do not behave in accordance with one's expectations	**.59**	.08	.09	-.05	.47	.90
wsakz6	Respecting students' attitudes, even if they are contrary to one's own	**.54**	-.12	.12	-.04	.29	.90
wsakz8	Taking students as they are	**.48**	.08	.08	.03	.38	.88
wsakz1	Accepting students' different views	**.43**	.04	.29	-.14	.39	.87
wsach4	Positively acknowledging students' individual personalities	**.41**	.39	-.01	-.08	.43	.95
wsbed1	Not measuring students' worth by their academic performance	**.35**	.17	.30	.01	.52	.91
Factor average		.57	-	-	-	.47	.87
Factor 2: Empathic understanding							
vereinf6	Empathizing with students when they are not feeling well	-.02	**.77**	-.04	.13	.65	.90
wsfuer1	Paying attention to how students feel	.18	**.75**	-.12	.07	.68	.94
verint7	Encouraging students to talk about their feelings	.07	**.71**	-.16	.12	.52	.92
vereinf4	Trying to empathize with why students feel the way they do	.11	**.69**	.10	-.03	.68	.93
verunt6	Talking with students about their current needs in class	-.16	**.66**	.13	-.02	.43	.94
wsfuer4	Offering support to students when they are having personal difficulties	-.03	**.59**	.11	.02	.45	.92
verunt5	Being responsive to students' feelings that arise in class, even if it means losing time for the content-based instruction	.09	**.50**	.08	.12	.50	.92
verint5	Showing interest in students' personal experiences	.16	**.47**	.18	.02	.56	.93
vereinf8	Trying to empathize with how students feel in class	.14	**.42**	.23	.04	.54	.93
verunt2	Resolving conflicts that affect the entire class before continuing with teaching	-.07	**.40**	.10	.12	.26	.90
vereinf5	Trying to comprehend what led students to behave the way they did	.30	**.38**	.21	-.12	.52	.89
Factor average		-	.58	-	-	.53	.92
Factor 3: Trust							
koerf3	Using students' ideas and suggestions as a stimulus to change how lessons are taught	-.04	.01	**.86**	-.10	.62	.92
koerf4	Viewing students' critiques of lessons as an impetus for one' s own professional development	-.02	.02	**.73**	-.03	.51	.93
wsakz7	Taking students' protests seriously	.15	.01	**.66**	-.05	.55	.95

Continued **Table 3:** Items, Four-Factor Pattern Matrix, Communalities and KMOs (44 Items).

ID [a]	APBS Item	Factor loading 1	2	3	4	h²	KMO
wsver1	Trusting students to make good use of the liberties they are given	.03	-.13	**.63**	.08	.38	.94
verint9	Encouraging students to express openly how they find the lessons	.03	-.11	**.63**	.13	.43	.84
wsglei5	Provide comprehensible reasons for demands made of students	.05	.18	**.61**	-.22	.46	.95
kotra3	Telling students openly when one doesn't know something	-.08	-.24	**.57**	.22	.28	.89
verunt3	Giving students the opportunity to express their personal views on the topics taught in lessons	-.01	.09	**.56**	.08	.45	.97
wsglei3	Involving students in issues of lesson design (e.g. method selection)	.00	.14	**.54**	-.09	.36	.90
verint8	Encouraging students to express their point of view when one does not understand their behavior	.13	.22	**.52**	-.08	.57	.90
wsver6	Letting students decide for themselves how to do things as often as possible	.03	.03	**.48**	-.01	.26	.90
Factor average		-	-	.62	-	.44	.92
Factor 4: Genuineness							
koecht2	Showing oneself to students as one really is.	-.16	.12	-.14	**.85**	.59	.84
koecht7	Avoiding pretending to be in a good mood in front of students when one is actually not feeling well	.04	.09	-.17	**.57**	.31	.74
koecht1	Presenting oneself to students as a person with strengths and weaknesses	.03	.10	.11	**.55**	.49	.91
koecht6	Avoiding playing a role in front of students	.44	-.34	.04	**.53**	.49	.93
koecht5	Presenting oneself to students as a person with personal quirks	-.11	.12	.08	**.52**	.34	.86
kotra1	Not lying to students	.21	.00	-.15	**.47**	.28	.83
kotra6	Admitting to students when one feels hurt by what they say	.06	.20	.01	**.44**	.40	.90
koecht4	Avoiding acting as an all-knowing expert toward students	.20	-.12	.11	**.39**	.29	.86
kotra8	Talking to students when one feels uncomfortable in their classroom	-.10	.22	.12	**.34**	.26	.88
kotra7	When making demands of students, referring not only to generally accepted norms and rules, but also to personal wishes and boundaries	-.23	.21	.39	**.27**	.37	.92
Factor average		-	-	-	.49	.38	.87
Explained variance per factor before rotation		.04	.35	.03	.04		
Explained variance per factor after rotation		.13	.13	.13	.07		
Interfactor correlations							
Factor 1: Unconditionality		-	.61	.69	.55		
Factor 2: Empathic understanding		.61	-	.72	.53		
Factor 3: Trust		.69	.72	-	.57		
Factor 4: Genuineness		.55	.53	.57	-		

Note. Bold values indicate items' main loadings; Item kotra7 was assigned to a different factor than indicated by the loading for theoretical reasons. Underlined values indicate cross-loadings with a discrepancy less than .20. The extraction method was unweighted least squares (ULS) with an oblique Promax rotation based on polychoric correlations.

[a] The first two letters indicate the domain with ws = unconditional regard, ver = understanding, ko = congruence; followed by letters indicating the facet with ach = regard, bed = unconditionality, akz = acceptance, wert = nonjudgment, fuer = caring, int = interest, unt = inclusion, einf = empathy, glei = equivalence, ver = trust, erf = openness to experience, echt = genuineness, tra = transparency.

Table 4: Descriptive Scale Statistics (44 Items).

Scale	Mdn	Mean	SD	Min	Max	Range	Skew	Kurtosis	Difficulty
Unconditionality	5.17	5.16	0.53	3.50	6.00	2.50	-0.57	0.06	.86
Empathic understanding	5.09	5.05	0.57	2.55	6.00	3.45	-0.65	0.71	.84
Trust	5.00	5.03	0.52	3.09	6.00	2.91	-0.31	0.07	.84
Genuineness	4.70	4.65	0.61	2.40	5.90	3.50	-0.66	0.54	.78
Total	5.02	4.98	0.47	3.39	5.95	2.57	-0.40	0.04	.83

Note. Six-point rating scale (1 = extremely negative; 6 = extremely positive).

Table 5: Internal Consistency Reliability (44 Items).

Scale	α	ω_t	ω_h	MIC	CITC
Unconditionality	.91	.93	.76	.44	.59
Empathic understanding	.92	.93	.81	.50	.64
Trust	.89	.90	.82	.42	.58
Genuineness	.83	.86	.60	.33	.47
Total	.96	.97	.78	.34	.57

Note. Coefficients based on polychoric correlations. α = Cronbach's alpha; ω_t = McDonald's omega total; ω_h = McDonald's omega hierarchical; MIC = mean inter-item correlation; CITC = corrected item-total correlation (scale average).

centered approach also supports the multidimensionality of the "unconditional positive regard" construct (e.g. Lietaer, 2001). Furthermore, the results from the internal consistency analyses (Table 5) confirmed the second assumption of the present study, that the scales reliably represent their intended construct. Interfactor correlations between .53 and .72. were found, which are moderately strong to strong, and could thus support the third assumption, that the correlations between the scales should be at least in the middle range, because according to Rogers (e.g. 1961), they represent dimensions of an overarching person-centered attitude. The descriptive scales and item statistics (Table 4 and Appendix E) indicated ceiling effects. That is, very few students gave the person-centered behaviors toward students negative ratings. Thus, the fourth assumption, that test scores obtained with the APBS instrument can be used to differentiate pre-service teachers with different trait levels of the intended construct, could not be supported with confidence. This aspect will be addressed again in the limitations section. Overall, however, the results of the present study preliminarily support the intended test score interpretation of the APBS.

This has the following implications for the APBS' application in research and teacher education. The instrument provides an opportunity to empirically examine the importance of person-centered attitudes as one aspect of TSR. Since theoretical work on TSR assumes that interpersonal attitudes and beliefs influence teachers' social perceptions and interpersonal behaviors, and thus both the quality of TSR and several student outcomes (Nickel, 1976; McCombs, 1997; Pianta et al., 2003), the APBS instrument could be used to conduct studies that empirically examine these theoretical assumptions. Theoretical work (e.g. Eagly & Chaiken, 2007) and empirical studies (e.g. Huskinson & Haddock, 2004) in the field of attitude research within social psychology indicate that attitudes can be formed through cognitive, affective and/or behavioral processes. Therefore, the APBS could also be used in studies investigating the formation of person-centered attitudes. For example, it could be examined whether certain teacher education courses (e.g., those focusing on participants' own educational attitudes) can promote changes in pre-service teachers' person-centered attitudes. Finally, it would be conceivable to use the APBS itself to provide targeted support within teacher education. After all, knowing pre-service teachers' person-centered attitudes would provide teacher educators with important information that could help determine the direction of their course content (Pajares, 1992). Further, it would be worth exploring whether the APBS could be utilized in teacher education as a tool to help pre-service teachers become aware of and reflect on their own educational attitudes. Becoming aware of and confronting one's own attitudes is an essential component of changing existing attitudes (Fives & Buehl, 2012; Haagensen et al., 2020; Richardson, 1996). Tausch and Tausch (1963/1998) also assume that (pre-service) teachers' person-centered attitudes can be fostered through open engagement with one's own experiences and personality, one aspect of which is open engagement with one's own educational attitudes (p.

383-387). As existing training programs aiming to foster relational competencies in (pre-service) teachers have so far primarily focused on relationship-enhancing behaviors (e.g., Aspelin, 2019; Jensen et al., 2015, Pianta et al., 2008, Rimm-Kaufmann et al., 2003), reflection on one's own person-centered attitudes could thus be a suitable extension of such programs. This could be achieved by developing a respectful and nonjudgmental climate in courses (Tausch & Tausch, 1963/1998, p. 389; Weinberger & McCombs, 2003), in which pre-service teachers develop the confidence to openly share their educational attitudes and related beliefs, feelings, and experiences.

The present study has some limitations that should be considered when interpreting the results or using the instrument for practical purposes. The first limitation relates to the sample. The survey was conducted during university courses. Since these courses had no attendance requirement, only 29% of the students inscribed in the courses participated in the survey, possibly leading to selection bias. The second limitation concerns the limited construct representation. The APBS does not cover the entire content breadth of the intended construct, since only 13 of the initial 15 construct facets (see Appendix A) could be maintained after item selection. All items for the facets "openness to feelings" and "selective transparency", which were originally assigned to the construct domain "congruence", were eliminated. According to Rogers (1969), the two eliminated facets represent central aspects of the "congruence" variable. Therefore, their exclusion results in an underrepresentation of the intended construct (McCoach et al., 2013), which must be considered when interpreting APBS test scores. However, in the studies on person-centered teacher behaviors listed at the beginning of this article, the variable "congruence" or "genuineness" was measured similarly to the APBS. The APBS' "genuineness" scale consists exclusively of items originally assigned to the construct facets "genuineness" and "transparency". Thus, the content of this APBS scale corresponds considerably to the items or observation categories from corresponding scales of the instruments used in previous studies on person-centered teacher behavior (Aspy, 1972; Barrett-Lennard, 2015; Tausch & Tausch, 1963/1998). Hence, at least in terms of empirical work applying the person-centered approach to the school context, the "genuineness" scale in the APBS seems to cover the central aspects of the construct. The third limitation refers to the potentially non-optimal discriminative ability of the APBS. The descriptive item and scale statistics indicate that only a few respondents provided negative ratings for the person-centered behaviors in the four dimensions. In addition, the full width of the response scale was not used for 27 of 44 items. This could be an indicator of socially desirable response behavior or inappropriate item content or wording (Bühner, 2011). Alternatively, this distribution may actually correspond to the trait distribution in the target group of pre-service teachers, which is supported by findings from a study in which pre-service teachers associate "good" teachers primarily with the ability to care about and relate to students above all other aspects of teaching (Weinstein, 1989). Furthermore, other studies found that self-assessed positive relationship-related traits such as learner-centered beliefs (McCombs et al., 1997), social competence (Rothland, 2010), and closeness behaviors (Milatz et al., 2014) are quite prevalent among pre-service or in-service teachers. A theoretical explanation for primarily positive person-centered attitudes among pre-service teachers stems from self-determination theory, according to which "relatedness", which refers to having meaningful interpersonal relationships, is a central basic human need (Ryan & Deci, 2000). Negative person-centered attitudes imply a rejection of meaningful relationships with students, which may be an indication of fundamental problems with social interactions. Various personality disorders characterized by problems with social interactions, such as antisocial, narcissistic, paranoid or schizoid personality disorder have prevalences of up to six percent (American Psychiatric Association, 2013), which roughly corresponds to the prevalence of negative person-centered attitudes in the current sample. Whether there is indeed a significant correlation between APBS test scores and certain personality disorders could be investigated in further validation studies. This also relates to the fourth limitation of this study. No validity evidence based on relations to external variables (AERA et al., 2014) is available for the APBS so far. In addition to certain psychological disorders, the relations between APBS test scores and certain personality traits like self-esteem (Tausch & Tausch, 1963/1998) or interpersonal behaviors toward students (Nickel, 1976) could be examined in further validation studies. Furthermore, the internal structure of the APBS identified in this study should be re-examined using confirmatory factor analyses with a separate sample of pre-service teachers (McCoach et al., 2013) before the instrument is used in research or teacher education. The fifth limitation relates to the practical use of the APBS. The instrument was developed to measure person-centered attitudes among pre-service teachers. However, its use to assess these attitudes among in-service teachers also seems conceivable. However, before the APBS can be used with in-service teachers, separate studies are required to validate the test score

interpretation with this target group and examine whether the results concerning the test's internal structure can be replicated. The final limitation relates to the use of the APBS in English-speaking samples. The items provided in this study were not translated in accordance with guidelines for psychological test translation (e.g. Gudmundsson, 2009) because their sole purpose was to facilitate interpretation of the present study results. Therefore, the APBS questionnaire should only be used with English-speaking samples after adequate translation and further validation studies with such samples.

In summary, the present study found preliminary evidence for the validity of the APBS instrument based on internal structure and reliability in a group of German pre-service teachers. As recommended in the methodological literature, the EFA procedure was reported comprehensively and transparently so that the researcher-dependent decisions influencing item selection can be tracked. The results require replication in future validation studies of the APBS which also assess the relations to external variables and thus provide a more comprehensive assessment of the validity of the APBS' test score interpretation. The APBS instrument provides the opportunity to empirically examine the relevance of person-centered attitudes, as one aspect of positive TSRs. Furthermore, the instrument could conceivably be used in teacher education courses aiming to promote pre-service teachers' relationship-related competencies, in which engagement with educational attitudes could be a constituent element.

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Appendices

Appendix A. Domain and Facet Definitions of the 114-Item APBS Version

"Prizing" Domain		
"Prizing" means unconditional regard, acceptance and caring for students, who are considered equal and trustworthy.		
Low score	Facet	High score
disregard: to be in favor of treating students with disregard	regard	regard: to be in favor of treating students with regard
conditionality: to be in favor of treating students with disregard under certain conditions	unconditionality	unconditionality: to be in favor of treating students with regard under all circumstances
rejection: to be in favor of rejecting students' thoughts and feelings	acceptance	acceptance: to be in favor of accepting students' thoughts and feelings
inequivalence: to be in favor of treating students as people of lesser value	equivalence	equivalence: to be in favor of treating students as people of equal value
distrust: to be in favor of doubting students' abilities and positive development	trust	trust: to be in favor of trusting in students' abilities and positive development
coldness: to be in favor of meeting students with emotional coldness	caring	warmth: to be in favor of meeting students with emotional warmth
"Understanding" Domain		
"Understanding" means non-judgmental empathy with students' inner worlds in order to understand students' reactions, i.e. expressions and actions. Students' inner world means their subjective reality in which they experience their environment in an individual way and encompasses their feelings, values, attitudes, experiences, motives and desires.		
Low score	Facet	High score
indifference: to be in favor of ignoring students' inner worlds	interest	interest: to be in favor of showing interest in getting to know students' inner worlds
judgment: to be in favor of encountering students' inner worlds in a judgmental way	non-judgment	non-judgment: to be in favor of encountering students' inner worlds without judgment
exclusion: to be in favor of excluding students' inner worlds from the classroom	inclusion	inclusion: to be in favor of incorporating students' inner worlds into the classroom
non-empathy: to be against trying to empathize with students' inner worlds	empathy	empathy: to be in favor of trying to empathize with students' inner worlds
"Congruence" Domain		
"Congruence" means being authentic in the relationship with students and revealing oneself as a genuine person. Such authenticity encompasses openness to one's own inner experience, which is revealed to students to the extent that it is appropriate and beneficial for the relationship with students or for students' development.		
Low score	Facet	High score
deflection of feelings: to be in favor of ignoring one's feelings that arise during interaction with students	openness to feelings	openness to feelings: to be in favor of being attentive to one's feelings that arise in interaction with students and engaging with these feelings
deflection of experience: to be in favor of facing new experiences in interactions with students in a defensive way	openness to experience	openness to experience: to be in favor of facing new experiences in interaction with students in a positive way
façade: being in favor of taking only the professional role of teacher toward students	genuineness	genuineness: to be in favor of being one's genuine self toward students
intransparency: to be in favor of being closed to students and not sharing personal thoughts and feelings with them.	transparency	transparency: to be in favor of opening up to students and sharing personal thoughts and feelings with them
unrestrainedness: to be in favor of opening up to students in all circumstances and expressing one's personal thoughts and feelings without restraint	selective transparency	appropriateness: to be in favor of opening up to students and sharing personal thoughts and feelings with them only when appropriate

Appendix B. Descriptive Item Statistics (114 Items)

Item ID	Mdn	Mean	SD	Min	Max	Range	Skew	Kurtosis	Difficulty
Prizing - Regard									
wsach1	6.00	5.72	0.51	3	6	3	-1.76	2.98	.95
wsach2	6.00	5.77	0.48	4	6	2	-1.95	3.03	.96
wsach3	6.00	5.57	0.61	4	6	2	-1.07	0.11	.93
wsach4	6.00	5.39	0.72	3	6	3	-0.90	0.09	.90
wsach5	6.00	5.43	0.92	2	6	4	-1.64	1.93	.91
wsach6	6.00	5.46	0.82	2	6	4	-1.67	2.69	.91
wsach7	6.00	5.58	0.74	2	6	4	-1.87	3.35	.93
wsach8	6.00	5.72	0.61	2	6	4	-2.56	7.71	.95
wsach9	4.00	4.44	0.94	1	6	5	-0.38	0.95	.74
Prizing - Unconditionality									
wsbed1	6.00	5.55	0.74	2	6	4	-1.71	2.81	.92
wsbed2	6.00	5.57	0.65	1	6	5	-1.96	6.94	.93
wsbed3	5.00	4.84	0.94	1	6	5	-0.70	0.58	.81
wsbed4	5.00	5.28	0.71	3	6	3	-0.55	-0.52	.88
wsbed5	5.00	4.97	0.82	2	6	4	-0.63	0.48	.83
wsbed6	5.00	4.88	0.85	2	6	4	-0.35	-0.43	.81
wsbed7	5.00	5.10	1.00	1	6	5	-0.98	0.44	.85
wsbed8	6.00	5.64	0.76	1	6	5	-3.24	14.06	.94
Prizing - Acceptance									
wsakz1	5.00	5.25	0.73	2	6	4	-0.90	1.42	.88
wsakz2	5.00	5.09	0.72	3	6	3	-0.31	-0.49	.85
wsakz3	5.00	5.36	0.69	3	6	3	-0.64	-0.52	.89
wsakz4	5.00	5.09	0.71	3	6	3	-0.27	-0.59	.85
wsakz5	5.00	5.18	0.70	3	6	3	-0.31	-0.78	.86
wsakz6	5.00	5.03	0.82	2	6	4	-0.45	-0.36	.84
wsakz7	5.00	5.06	0.80	3	6	3	-0.52	-0.29	.84
wsakz8	5.00	5.23	0.87	2	6	4	-0.91	0.25	.87
Prizing - Equivalence									
wsglei1	6.00	5.68	0.58	3	6	3	-1.89	3.69	.95
wsglei2	6.00	5.30	0.92	1	6	5	-1.46	2.19	.88
wsglei3	5.00	4.99	0.79	2	6	4	-0.42	-0.18	.83
wsglei4	5.00	5.01	1.01	1	6	5	-1.07	1.22	.83
wsglei5	5.00	5.38	0.70	3	6	3	-0.86	0.25	.90
wsglei6	6.00	5.60	0.64	3	6	3	-1.67	2.82	.93

Item ID	Mdn	Mean	SD	Min	Max	Range	Skew	Kurtosis	Difficulty
Prizing - Trust									
wsver1	5.00	4.86	0.80	2	6	4	-0.34	0.02	.81
wsver2	6.00	5.55	0.57	4	6	2	-0.79	-0.40	.93
wsver3	5.00	4.73	0.92	1	6	5	-0.60	0.74	.79
wsver4	6.00	5.59	0.60	3	6	3	-1.23	0.83	.93
wsver5	4.00	4.16	1.10	1	6	5	-0.33	-0.16	.69
wsver6	4.00	4.26	1.02	1	6	5	-0.36	0.31	.71
wsver7	5.00	5.20	0.83	2	6	4	-0.75	-0.08	.87
wsver8	5.00	5.34	0.72	3	6	3	-0.88	0.40	.89
Prizing - Caring									
wsfuer1	5.00	5.26	0.77	3	6	3	-0.58	-0.78	.88
wsfuer2	6.00	5.31	0.82	3	6	3	-0.90	-0.14	.89
wsfuer3	6.00	5.35	0.76	3	6	3	-0.87	-0.15	.89
wsfuer4	5.00	5.16	0.82	2	6	4	-0.75	0.30	.86
wsfuer5	6.00	5.52	0.63	4	6	2	-0.95	-0.17	.92
wsfuer6	6.00	5.47	0.67	3	6	3	-1.00	0.23	.91
wsfuer7	5.00	5.34	0.71	3	6	3	-0.74	-0.16	.89
Understanding - Interest									
verint1	5.00	4.83	0.89	2	6	4	-0.49	-0.03	.80
verint2	6.00	5.41	0.66	3	6	3	-0.85	0.31	.90
verint3	5.00	5.37	0.65	3	6	3	-0.59	-0.37	.89
verint4	6.00	5.55	0.64	3	6	3	-1.27	1.31	.92
verint5	5.00	5.19	0.75	2	6	4	-0.79	0.91	.87
verint6	5.00	5.10	0.85	2	6	4	-0.82	0.58	.85
verint7	5.00	5.09	0.88	1	6	5	-0.82	0.70	.85
verint8	5.00	5.23	0.72	2	6	4	-0.72	0.59	.87
verint9	5.00	5.12	0.84	2	6	4	-0.67	-0.11	.85
Understanding - Nonjudment									
verwert1	6.00	5.45	0.66	4	6	2	-0.78	-0.50	.91
verwert2	5.00	5.14	0.76	2	6	4	-0.58	0.13	.86
verwert3	6.00	5.38	0.73	3	6	3	-1.06	0.81	.90
verwert4	5.00	4.87	0.95	1	6	5	-1.06	1.95	.81
verwert5	5.00	5.13	0.79	3	6	3	-0.68	0.07	.86
verwert6	5.00	5.18	0.84	1	6	5	-1.28	2.75	.86
verwert7	5.00	5.23	0.78	2	6	4	-0.77	0.20	.87

Item ID	Mdn	Mean	SD	Min	Max	Range	Skew	Kurtosis	Difficulty
Understanding - Inclusion									
verunt1	5.00	4.43	1.03	1	6	5	-0.63	0.59	.74
verunt2	5.00	5.17	0.91	1	6	5	-1.08	1.25	.86
verunt3	5.00	4.97	0.90	1	6	5	-0.80	0.79	.83
verunt4	5.00	4.49	1.00	1	6	5	-0.39	-0.08	.75
verunt5	5.00	4.51	0.91	1	6	5	-0.50	0.39	.75
verunt6	5.00	4.60	1.00	1	6	5	-0.61	0.46	.77
verunt7	5.00	4.88	0.81	2	6	4	-0.32	-0.28	.81
Understanding - Empathy									
vereinf1	5.00	4.76	0.88	2	6	4	-0.52	0.10	.79
vereinf2	5.00	5.10	0.79	2	6	4	-0.56	-0.08	.85
vereinf3	5.00	4.99	0.81	1	6	5	-0.69	0.97	.83
vereinf4	5.00	5.09	0.79	2	6	4	-0.60	0.08	.85
vereinf5	6.00	5.42	0.66	3	6	3	-0.74	-0.27	.90
vereinf6	5.00	4.97	0.84	2	6	4	-0.50	-0.09	.83
vereinf7	5.00	5.11	0.75	3	6	3	-0.34	-0.68	.85
vereinf8	5.00	5.06	0.83	3	6	3	-0.48	-0.57	.84
Congruence – Openness to feelings									
kogef1	5.00	4.93	0.94	1	6	5	-0.80	0.64	.82
kogef2	5.00	4.67	0.91	1	6	5	-0.58	1.04	.78
kogef3	5.00	4.87	0.85	2	6	4	-0.54	0.31	.81
kogef4	5.00	4.91	0.86	1	6	5	-0.62	0.72	.82
kogef5	4.00	4.51	0.88	1	6	5	-0.21	0.42	.75
kogef6	5.00	5.25	0.80	2	6	4	-0.87	0.36	.88
kogef7	5.00	4.69	1.04	1	6	5	-0.81	0.90	.78
kogef8	5.00	5.10	0.80	2	6	4	-0.60	0.02	.85
Congruence – Openness to experience									
koerf1	5.00	4.86	0.93	1	6	5	-0.75	0.66	.81
koerf2	5.00	5.32	0.70	3	6	3	-0.67	-0.18	.89
koerf3	5.00	5.17	0.70	2	6	4	-0.54	0.41	.86
koerf4	5.00	5.07	0.86	1	6	5	-1.07	1.89	.84
koerf5	5.00	4.64	0.92	2	6	4	-0.54	0.23	.77
koerf6	6.00	5.54	0.61	3	6	3	-1.04	0.37	.92
koerf7	5.00	5.39	0.65	3	6	3	-0.70	0.00	.90
Congruence - Genuineness									
koecht1	5.00	5.08	0.92	2	6	4	-0.85	0.29	.85
koecht2	5.00	4.59	1.02	1	6	5	-0.46	0.04	.77
koecht3	6.00	5.47	0.72	3	6	3	-1.29	1.23	.91

Item ID	Mdn	Mean	SD	Min	Max	Range	Skew	Kurtosis	Difficulty
koecht4	5.00	4.97	1.00	1	6	5	-1.19	2.01	.83
koecht5	5.00	4.67	1.02	2	6	4	-0.53	-0.13	.78
koecht6	5.00	4.91	0.97	1	6	5	-1.01	1.49	.82
koecht7	4.00	3.85	1.10	1	6	5	-0.14	-0.18	.64
Congruence - Transparency									
kotra1	5.00	5.14	0.94	2	6	4	-0.96	0.44	.86
kotra2	6.00	5.43	0.73	3	6	3	-1.11	0.64	.90
kotra3	5.00	5.18	0.83	1	6	5	-0.98	1.31	.86
kotra4	6.00	5.47	0.66	3	6	3	-1.07	0.92	.91
kotra5	5.00	4.80	0.85	2	6	4	-0.52	0.02	.80
kotra6	4.00	4.30	1.12	1	6	5	-0.54	0.14	.72
kotra7	5.00	4.70	0.91	1	6	5	-0.69	0.86	.78
kotra8	4.00	4.31	1.05	1	6	5	-0.31	-0.05	.72
kotra9	6.00	5.50	0.71	3	6	3	-1.43	1.82	.92
Congruence – Selective Transparency									
kosel1	5.00	4.68	1.04	1	6	5	-0.75	0.58	.78
kosel2	5.00	4.59	1.01	1	6	5	-0.55	0.18	.76
kosel3	6.00	5.26	0.92	1	6	5	-1.32	1.78	.88
kosel4	5.00	4.63	1.06	1	6	5	-0.60	0.10	.77
kosel5	5.00	5.01	1.10	1	6	5	-1.08	0.77	.83
kosel6	4.00	4.37	1.16	1	6	5	-0.41	-0.26	.73

Note. Six-point rating scale (1 = extremely negative; 6 = extremely positive).

Appendix C. Four-Factor Pattern Matrix, Communalities and KMOs (114 Items)

	Factor loading					
Item ID	1	2	3	4	h^2	KMO
Prizing - Regard						
wsach1	.48	-.09	**.53**	-.12	.64	.75
wsach2	**.58**	.07	.28	-.14	.59	.70
wsach3	**.44**	.15	.28	.00	.59	.73
wsach4	**.40**	.31	.05	-.01	.43	.61
wsach5	**.85**	.00	-.24	.03	.53	.54
wsach6	**.77**	.10	-.08	.00	.60	.67
wsach7	**.74**	.11	-.08	-.01	.55	.58
wsach8	**.85**	.08	-.14	-.09	.59	.63
wsach9	-.04	**.56**	-.15	.16	.30	.48
Prizing - Unconditionality						
wsbed1	**.37**	.12	.34	-.01	.54	.68
wsbed2	**.45**	.22	.22	-.14	.48	.61

	Factor loading					
Item ID	1	2	3	4	h^2	KMO
wsbed3	**.50**	-.02	.14	.13	.44	.62
wsbed4	**.53**	.07	.10	.03	.43	.60
wsbed5	**.47**	.02	-.01	.29	.44	.60
wsbed6	**.43**	.08	.08	.14	.40	.61
wsbed7	**.64**	-.02	-.12	.18	.43	.52
wsbed8	**.65**	.03	-.08	.13	.47	.59
Prizing - Acceptance						
wsakz1	.34	-.03	**.43**	-.09	.41	.59
wsakz2	.00	-.07	**.59**	.12	.40	.60
wsakz3	**.40**	.23	.24	-.21	.42	.57
wsakz4	**.50**	.14	.15	.06	.55	.67
wsakz5	.20	-.18	**.53**	.03	.34	.55
wsakz6	**.34**	-.17	.22	.12	.25	.45
wsakz7	.14	.04	**.58**	.01	.52	.62
wsakz8	**.41**	.11	.05	.13	.36	.57
Prizing - Equivalence						
wsglei1	**.31**	-.02	.29	.12	.37	.61
wsglei2	.12	.08	**.23**	-.05	.13	.35
wsglei3	.04	.18	**.36**	.01	.29	.59
wsglei4	.17	-.08	**.27**	**.27**	.31	.53
wsglei5	.12	.10	**.71**	-.28	.51	.65
wsglei6	.35	-.05	**.49**	-.12	.46	.63
Prizing - Trust						
wsver1	-.04	-.08	**.59**	.13	.37	.54
wsver2	.14	-.15	**.71**	-.08	.45	.58
wsver3	.05	-.31	**.38**	.19	.16	.28
wsver4	.13	.19	**.39**	-.05	.37	.58
wsver5	-.07	-.02	.07	**.51**	.27	.38
wsver6	-.02	.01	**.41**	.12	.24	.47
wsver7	.13	-.17	**.52**	.02	.28	.48
wsver8	.27	.07	**.28**	.13	.41	.64
Prizing - Caring						
wsfuer1	.19	**.70**	-.08	.08	.66	.70
wsfuer2	.16	**.80**	-.28	.02	.53	.57
wsfuer3	.25	**.56**	-.18	.24	.57	.66
wsfuer4	.07	**.67**	.02	-.03	.49	.62
wsfuer5	.16	**.71**	-.02	.00	.63	.72
wsfuer6	.24	**.69**	-.01	-.09	.61	.70
wsfuer7	.22	**.53**	.12	-.13	.49	.65
Understanding - Interest						
verint1	.01	**.72**	.07	.04	.63	.71
verint2	.00	.05	**.81**	-.19	.55	.66
verint3	.10	.19	**.42**	.13	.53	.69
verint4	.16	.01	**.45**	-.05	.30	.50

	Factor loading					
Item ID	**1**	**2**	**3**	**4**	**h²**	**KMO**
verint5	.23	**.54**	.13	-.03	.60	.70
verint6	-.02	**.88**	.00	-.01	.75	.73
verint7	.06	**.67**	-.09	.12	.52	.62
verint8	.11	.22	**.60**	-.12	.60	.73
verint9	-.07	-.10	**.65**	.16	.43	.61
Understanding - Nonjudment						
verwert1	.15	-.03	**.57**	-.05	.39	.63
verwert2	.25	-.02	**.52**	-.03	.47	.60
verwert3	**.49**	-.09	.41	-.14	.48	.59
verwert4	**.39**	-.22	.14	.19	.25	.39
verwert5	**.52**	-.03	.19	.17	.56	.64
verwert6	**.34**	.15	.08	.11	.33	.55
verwert7	.36	.06	**.38**	.02	.54	.69
Understanding - Inclusion						
verunt1	-.09	**.34**	.09	.18	.24	.42
verunt2	.07	**.40**	.05	.05	.26	.48
verunt3	-.04	.10	**.52**	.12	.43	.60
verunt4	-.16	**.35**	.28	.29	.51	.64
verunt5	.06	**.48**	-.02	.29	.51	.62
verunt6	-.10	**.62**	.05	.04	.40	.51
verunt7	-.01	.04	**.42**	.08	.26	.51
Understanding - Empathy						
vereinf1	-.01	.25	**.45**	.07	.48	.65
vereinf2	.23	.06	**.40**	.06	.44	.63
vereinf3	.15	.26	**.37**	-.01	.47	.66
vereinf4	.04	**.63**	.26	-.05	.68	.73
vereinf5	.19	.27	**.39**	-.07	.50	.68
vereinf6	.05	**.63**	.05	.12	.60	.70
vereinf7	.09	.27	**.57**	-.08	.64	.71
vereinf8	-.04	.36	**.44**	.06	.56	.66
Congruence – Openness to feelings						
kogef1	-.05	.13	**.46**	-.05	.24	.44
kogef2	-.10	**.42**	.17	.24	.46	.65
kogef3	-.13	**.46**	.33	.01	.44	.60
kogef4	-.12	**.46**	.52	-.11	.59	.69
kogef5	-.25	.31	**.43**	.29	.58	.67
kogef6	-.08	.37	**.46**	-.12	.41	.60
kogef7	-.24	.31	**.52**	-.01	.39	.55
kogef8	-.02	.39	**.47**	.00	.61	.69
Congruence – Openness to experience						
koerf1	.01	.11	**.41**	.11	.33	.55
koerf2	-.09	-.05	**.75**	.07	.49	.64
koerf3	-.04	.04	**.74**	-.03	.53	.66
koerf4	-.05	.00	**.70**	.04	.49	.63

	Factor loading					
Item ID	**1**	**2**	**3**	**4**	**h²**	**KMO**
koerf5	-.12	**.35**	.21	.30	.47	.61
koerf6	.14	-.04	**.68**	-.15	.44	.61
koerf7	.11	.14	**.63**	-.01	.65	.73
Congruence - Genuineness						
koecht1	.03	.10	.11	**.51**	.44	.59
koecht2	-.08	.15	-.24	**.76**	.47	.42
koecht3	.09	-.06	.25	**.45**	.43	.59
koecht4	.23	-.01	-.15	**.51**	.31	.42
koecht5	-.18	.07	.20	**.46**	.33	.45
koecht6	.36	-.31	.00	**.59**	.45	.43
koecht7	-.03	.01	-.11	**.64**	.32	.33
Congruence - Transparency						
kotra1	.27	.04	-.25	**.51**	.3	.42
kotra2	-.20	-.06	**.55**	.26	.35	.53
kotra3	-.10	-.24	**.58**	.23	.30	.41
kotra4	-.01	-.11	**.65**	.25	.56	.64
kotra5	-.13	.12	**.20**	.19	.14	.33
kotra6	.04	.20	-.02	**.49**	.40	.53
kotra7	-.14	**.29**	.21	.28	.37	.55
kotra8	-.12	.19	.12	**.35**	.26	.44
kotra9	.12	**.33**	.17	.05	.34	.57
Congruence – Selective Transparency						
kosel1	-.07	.01	**.42**	-.05	.13	.28
kosel2	.13	**.35**	.19	-.04	.32	.54
kosel3	**.37**	.02	.16	.06	.30	.49
kosel4	-.06	.22	**.44**	-.17	.23	.46
kosel5	.22	.01	.10	**-.27**	.07	.07
kosel6	-.12	.23	**.24**	.09	.18	.39
Var [a]	.04	.02	.35	.02		
Var [b]	.10	.12	.16	.05		
Interfactor Correlations						
Factor 1	-	0.53	0.67	0.48		
Factor 2	0.53	-	0.70	0.57		
Factor 3	0.67	0.70	-	0.64		
Factor 4	0.48	0.57	0.64	-		

Note. Bold values indicate highest item loadings. The extraction method was unweighted least squares (ULS) with an oblique Promax rotation based on polychoric correlations. [a] Explained variance per factor before rotation. [b] Explained variance per factor after rotation.

Appendix D. Factor Definitions

Factor 1 - Unconditionality	
The extent to which pre-service teachers are in favor of unconditionally appreciating students' individuality, including *all* of their thoughts and feelings; that is, regardless of what students say or do.	
Low score	High score
Pre-service teachers with low scores are in favor of making their appreciation of students dependent on their behavior and academic performance. They are against accepting all of students' attitudes, views, and feelings and are in favor of using depreciative comments toward students.	Pre-service teachers with high scores are in favor of treating students with appreciation regardless of their behavior or academic performance, and accepting all of students' attitudes, views, and feelings. They are against making depreciative comments toward students.
This factor is composed of the facets regard, unconditionality, acceptance, and nonjudgment.	

Factor 2 – Empathic understanding	
The extent to which pre-service teachers are in favor of cognitively and emotionally empathizing with students' experiential worlds. This implies a curiosity towards and empathy with students' emotional experiences, as well as an understanding of the causes of these experiences, and, in consequence, caring, sensitive behavior toward students.	
Low score	High score
Pre-service teachers with low scores are against showing interest in students' feelings and problems, empathizing with students, or trying to understand the causes of their feelings and behaviors. They are against paying attention to students' feelings and problems during lessons.	Pre-service teachers with high scores are in favor of showing interest in students' feelings and problems, empathizing with students, and trying to understand the reasons for their feelings and behaviors. They are in favor of paying attention to students' feelings and problems during lessons.
This factor is composed of the facets caring, interest, inclusion, and empathy.	

Factor 3 - Trust	
The extent to which pre-service teachers are in favor of trusting in students' abilities and treating them as people of equal value to themselves. This implies promoting students' self-determination, considering students' thoughts, opinions and views, and consequently, a willingness to adapt one's own (teaching) actions to students' needs.	
Low score	High score
Pre-service teachers with low scores are against letting students work autonomously or showing interest in students' thoughts, opinions, and views. They are against adapting teaching behavior or lesson designs to students' suggestions and needs.	Pre-service teachers with high scores are in favor of letting students work autonomously as often as possible and showing interest in students' thoughts, opinions, and views. They are in favor of adapting teaching behavior and lesson designs to students' suggestions and needs.
This factor is composed of the facets acceptance, equivalence, trust, interest, inclusion, openness to experience, and transparency.	

Factor 4 - Genuineness	
The extent to which pre-service teachers are in favor of presenting themselves to students as a congruent personality. This implies acting in accordance with one's own feelings and thoughts and expressing them openly to students.	
Low score	High score
Pre-service teachers with low scores are against being authentic toward students and expressing one's own thoughts and feelings openly. They are in favor of playing a professional role and pretending to be something they're not.	Pre-service teachers with high scores are in favor of being authentic toward students and expressing one's own thoughts and feelings openly, without playing a role or pretending to be something they're not.
The factor is composed of the facets genuineness and transparency.	

Appendix E. Descriptive Item Statistics (44 Items)

ID	Mdn	Mean	SD	Min	Max	Range	Skew	Kurtosis	Difficulty	CITC
Unconditionality										
wsach4	6	5.39	0.72	3	6	3	-0.90	0.09	.90	.60
wsach6	6	5.46	0.82	2	6	4	-1.67	2.69	.91	.63
wsbed1	6	5.55	0.74	2	6	4	-1.71	2.81	.92	.65
wsbed3	5	4.84	0.94	1	6	5	-0.70	0.58	.81	.65
wsbed5	5	4.97	0.82	2	6	4	-0.63	0.48	.83	.66
wsbed6	5	4.88	0.85	2	6	4	-0.35	-0.43	.81	.57
wsbed7	5	5.10	1.00	1	6	5	-0.98	0.44	.85	.68
wsakz1	5	5.25	0.73	2	6	4	-0.90	1.42	.88	.58
wsakz4	5	5.09	0.71	3	6	3	-0.27	-0.59	.85	.72
wsakz6	5	5.03	0.82	2	6	4	-0.45	-0.36	.84	.52
wsakz8	5	5.23	0.87	2	6	4	-0.91	0.25	.87	.59
verwert5	5	5.13	0.79	3	6	3	-0.68	0.07	.86	.76
Empathic understanding										
wsfuer1	5	5.26	0.77	3	6	3	-0.58	-0.78	.88	.78
wsfuer4	5	5.16	0.82	2	6	4	-0.75	0.30	.86	.63
verint5	5	5.19	0.75	2	6	4	-0.79	0.91	.87	.70
verint7	5	5.09	0.88	1	6	5	-0.82	0.70	.85	.66
verunt2	5	5.17	0.91	1	6	5	-1.08	1.25	.86	.50
verunt5	5	4.51	0.91	1	6	5	-0.50	0.39	.75	.68
verunt6	5	4.60	1.00	1	6	5	-0.61	0.46	.77	.58
vereinf4	5	5.09	0.79	2	6	4	-0.60	0.08	.85	.69
vereinf5	6	5.42	0.66	3	6	3	-0.74	-0.27	.90	.79
vereinf6	5	4.97	0.84	2	6	4	-0.50	-0.09	.83	.76
vereinf8	5	5.06	0.83	3	6	3	-0.48	-0.57	.84	.64
Trust										
wsakz7	5	5.06	0.80	3	6	3	-0.52	-0.29	.84	.70
wsglei3	5	4.99	0.79	2	6	4	-0.42	-0.18	.83	.56
wsglei5	5	5.38	0.70	3	6	3	-0.86	0.25	.90	.61
wsver1	5	4.86	0.80	2	6	4	-0.34	0.02	.81	.57
wsver6	4	4.26	1.02	1	6	5	-0.36	0.31	.71	.49
verint8	5	5.23	0.72	2	6	4	-0.72	0.59	.87	.67
verint9	5	5.12	0.84	2	6	4	-0.67	-0.11	.85	.62
verunt3	5	4.97	0.90	1	6	5	-0.80	0.79	.83	.62
koerf3	5	5.17	0.70	2	6	4	-0.54	0.41	.86	.72
koerf4	5	5.07	0.86	1	6	5	-1.07	1.89	.84	.67
kotra3	5	5.18	0.83	1	6	5	-0.98	1.31	.86	.43
Genuineness										
koecht1	5	5.08	0.92	2	6	4	-0.85	0.29	.85	.65
koecht2	5	4.59	1.02	1	6	5	-0.46	0.04	.77	.52
koecht4	5	4.97	1.00	1	6	5	-1.19	2.01	.83	.63
koecht5	5	4.67	1.02	2	6	4	-0.53	-0.13	.78	.46
koecht6	5	4.91	0.97	1	6	5	-1.01	1.49	.82	.48

ID	Mdn	Mean	SD	Min	Max	Range	Skew	Kurtosis	Difficulty	CITC
koecht7	4	3.85	1.10	1	6	5	-0.14	-0.18	.64	.51
kotra1	5	5.14	0.94	2	6	4	-0.96	0.44	.86	.45
kotra6	4	4.30	1.12	1	6	5	-0.54	0.14	.72	.48
kotra7	5	4.70	0.91	1	6	5	-0.69	0.86	.78	.58
kotra8	4	4.31	1.05	1	6	5	-0.31	-0.05	.72	.43

Note. Six-point rating scale (1 = extremely negative; 6 = extremely positive). CITC = corrected item-total correlation.