

Reading Persuasive Texts Affects Preservice Teachers' Beliefs About Cultural Diversity in the Classroom

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Abstract

Research has suggested that teachers' beliefs toward culturally diverse classrooms are affected during teacher education. Text reading, as one of the major learning activities in initial teacher education, is supposed to affect teachers' educational concepts and beliefs. We conducted two experiments to test the impact of reading a positively or negatively oriented persuasive text about diversity on preservice teachers' belief change. In Study 1 ($N = 42$), we found that belief change varied significantly as a function of the direction of the text condition, and that the reading of the texts led to a significantly stronger belief change if the text was in alignment with participants' prior beliefs. Study 2 ($N = 57$) revealed a middle-sized but non-significant moderator effect for prior knowledge ($p = .08$, $\eta_p^2 = .06$), suggesting that participants with more prior knowledge were less likely to be persuaded by the text. The results provide new insights into factors that may affect the development of preservice teachers' diversity beliefs.

Keywords

teacher beliefs, teacher knowledge, persuasive text, diversity

Worldwide, today's classrooms are becoming more culturally diverse, within many countries nearly half of the students being multicultural, whereas the teacher workforce is far less diverse (e.g., The United States: National Center for Education Statistics, 2018; Germany: Statistisches Bundesamt, 2018). As this demographic divide between students and teachers increases, teacher educators are challenged to prepare culturally responsive teachers who accept and appreciate cultural diversity in their classrooms (Castro, 2010). Teachers' beliefs are considered among the most important constructs in educational research as they explain teachers' interpretation of classroom situations and consequently the decisions teachers make (Valcke et al., 2010). This plays a particular role in classrooms with a diverse student population, as many teachers consider classroom diversity to be one of their greatest challenges and feel they have not been sufficiently prepared to deal with it (Acquah et al., 2016). Yet, although researchers and policy makers agree on the importance of educating teachers in developing functional knowledge, beliefs, and concepts about diversity, research about how this process can be supported, and which specific teaching practices and curricular components help fostering belief change of preservice teachers (PSTs), is still scarce (Castro, 2010; Gay, 2015).

Even if PSTs do not yet learn sufficiently about diversity in their formal training (Cochran-Smith, 2020), they can access information about diversity in classrooms through

informal channels, such as internet and other media that may shape their beliefs (Valkenburg et al., 2016; Yzer, 2017). Even more than scientific and academic texts used in formal teacher education, such texts are often aiming at changing the reader's understanding—thus, at persuading the reader toward a certain view (Garner et al., 1991). Contrary to text reading in formal teacher education, which is usually embedded into coursework that stimulates reflection (Cochran-Smith & Villegas, 2016), informal reading without further reflection may evoke misconceptions. In particular, internet-based texts were found to provide a suboptimal quality of information (Daraz et al., 2019) and may even include inaccurate or contradictory information (Kammerer et al., 2019). In this study, we examined how PSTs' beliefs about classroom diversity develop after reading a persuasive text about diversity, and whether PSTs' prior beliefs and perceived prior knowledge about diversity moderate the effect of the persuasive text on the PSTs' belief change.

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Teacher Beliefs, Teacher Knowledge, and Their Formation During Teacher Education

Beliefs and knowledge are generally viewed as explanatory principles for teacher behavior (Skott, 2015). Following constructivist learning theories that regard learning as an active and constructivist process, PSTs enter teacher education with preexisting beliefs and knowledge that influence what and how they learn (Richardson, 1996). In this way, beliefs and knowledge can serve as heuristics for teachers to orientate in the classroom and can act as a filter for what is learned (Fives & Buehl, 2012). The distinction between beliefs and knowledge is often fuzzy (Pajares, 1992). As beliefs and knowledge guiding teaching behavior are closely related, boundaries between both constructs are often unclear (Alexander & Dochy, 1995), and both overlap (Levin, 2015). Whereas beliefs are usually considered to arise from everyday experiences, knowledge is seen to develop from formal learning experiences, such as school or higher education (Southerland et al., 2001). Likewise, knowledge has been conceptualized as representations of factual or objective information, whereas beliefs are seen as subjective and affective (Alexander & Dochy, 1995). Eventually, knowledge refers to representations of information that are expected to be true and can be externally verified, whereas beliefs are referred to as representations that do not require verification or cannot be verified (Murphy & Mason, 2006).

Teacher Knowledge

Knowledge thus requires a proposition to be agreed upon as being true, usually based on evidence that supports the proposition (Richardson, 2002). Teacher knowledge can be found in textbooks or research articles and be part of the curriculum in teacher education. Teacher knowledge consists of different domains: (a) content knowledge, (b) pedagogical content knowledge, and (c) generic pedagogical knowledge (Shulman, 1986). Professional content knowledge refers to the understanding of the content to be taught (Döhrmann et al., 2012). Pedagogical content knowledge describes the knowledge about how to make this content available for the learners (Depaepe et al., 2013). Generic pedagogical knowledge refers to the subject-unspecific knowledge necessary for creating effective learning environments (König et al., 2011), and comprises of declarative knowledge of facts and procedural knowledge of skills regarding instruction, learning, and assessment, thereby also knowledge about student diversity (Voss et al., 2011). All three knowledge domains play important roles for teachers' successful teaching: Classroom research revealed that instructional quality can be predicted by pedagogical content knowledge (Hill & Chin, 2018) and by generic pedagogical knowledge (König & Pflanzl, 2016). However, findings indicate that there is more

to teaching competence than teachers' knowledge: for example, their professional beliefs (Thibaut et al., 2018).

Teacher Beliefs

Because beliefs do not require a truth condition, they are accepted as truth by the individual that is holding the beliefs (Richardson, 2002). As evaluative ideas and assumptions about school- and teaching-related phenomena and processes, the nature of beliefs is diverse (Fives & Buehl, 2012): They refer to (a) the self (e.g., self-efficacy beliefs about one's ability to perform particular teaching tasks in particular contexts; Bandura, 1997), (b) the context, (c) the content (e.g., epistemic beliefs about the nature of knowledge and knowing; Hofer, 2002), (d) teaching practices (e.g., cooperative learning; Borko et al., 2000), (e) a holistic approach to teaching, and (f) the students (e.g., about marginalized student groups; McAllister & Irvine, 2002). As such, beliefs involve both cognitive and non-cognitive processes and lead to the development of an attitude of acceptance or refusal. These beliefs can be implicit and unconsciously guide their teaching practice, or they can be explicit and require justification to be maintained (Osisioma & Moscovici, 2008). Whereas deeply integrated beliefs are resistant to change, some beliefs are dynamic (Thompson, 1992). For example, teachers' beliefs about mathematics were found to be stable across the first 3 years in the teaching profession, whereas beliefs about the nature of mathematics (i.e., mathematical worldviews about mathematics either a static system or as a dynamic process) changed toward a more process-oriented view (Blömeke, 2012). Ultimately, teachers' beliefs are considered to influence their judgments and actions in the classroom (Levin, 2015) because they were found to systematically correlate with teaching quality (Thibaut et al., 2018).

Filter Effect of Prior Knowledge and Prior Beliefs

When PSTs begin their professional careers, their beliefs tend to be intuitive rather than reflective, and act as a screen for what they learn (Levin, 2015). Beliefs act as a filter by benefiting information which is congruent with existing beliefs as this information is more likely to be recalled than inconsistent information (Andiliou et al., 2012). This is as learners apply their prior beliefs and knowledge to validate the plausibility of information (Maier & Richter, 2014). Thus, the quality of processing controversial information depends on the amount and quality of readers' prior knowledge (Kendeou & Van Den Broek, 2005), as well as on their prior beliefs (Wolfe & Williams, 2017). Yet, the evidence is inconsistent. Some research indicated that learners with limited prior knowledge fail to recognize contradictions between their current (mis)conceptions and more accurate

scientific conceptions and do not see the need to change their knowledge structures (Limón, 2001), whereas others found that learners with high prior knowledge are often critical and more able to defend their current conceptions and, therefore, resistant to change (Kardash & Scholes, 1995). Learners with moderate prior knowledge may be most likely to alter their conceptions and beliefs (Murphy & Alexander, 2004). Nevertheless, there is only limited understanding on how teacher education affects belief change (Cochran-Smith & Zeichner, 2005).

Formal and Informal Learning Opportunities in Teacher Education

In many countries, such as Germany, initial teacher education does not involve substantial practical classroom experience, but focuses on providing a theoretical base through lectures and courses, with coursework substantially involving learning from reading texts (Civitillo et al., 2018; Cochran-Smith & Villega, 2016). Besides academic texts from courses, PSTs often use the internet and social media as information source (Henderson et al., 2017). Whereas teacher educators designate elements such as a *critical reflection with others* to influence PSTs' learning during initial teacher education, PSTs indicate *internet resources* as one of the strongest elements influential for their learning (Ell et al., 2017). Yet, many university students have difficulties to evaluate the correctness of information provided on websites (Leporati et al., 2019). Consequently, learners often fail to consider alternative interpretations, particularly regarding controversial, socio-scientific issues that are publicly debated (Bromme & Goldman, 2014). As in most countries student diversity has not become an integral part of the teacher education curriculum yet (Cochran-Smith et al., 2016), it is likely that PSTs gather information about diversity from such informal settings. However, information gained from the internet is often inaccurate (Scheufele & Krause, 2019) or written to persuade the reader toward a particular view (Allcott et al., 2019).

Persuasive Texts

Persuasion is regarded as the process of promoting a shift in people's beliefs in a certain direction (Hynd, 2003). Persuasive pedagogy has been argued to have the potential to change a learner's beliefs in the educational setting, for example, in the scope of a persuasive discourse during classroom discussions, or with regard to persuasive textbook content (Murphy, 2001). Likewise, persuasive texts are designed to challenge the readers' prior beliefs and conceptions by presenting a new position to evoke a change in the readers' beliefs (Chambliss & Garner, 1996) or their conceptual understanding (Dole & Sinatra, 1998). In persuasive texts, confrontational language is used to stress either the "pros" or "cons" of a particular subject rather than refutations into both

directions. To this end, a positively oriented persuasive text about classroom diversity would highlight the advantages and present diversity as an asset to teaching, whereas a negatively oriented persuasive text would emphasize the disadvantages and present diversity as an obstacle. Research has demonstrated that reading persuasive texts can promote belief change (e.g., Muis et al., 2020; Thacker et al., 2019), also specifically in PSTs (Ferrero et al., 2020; Gregoire-Gill et al., 2004; Vaughn & Johnson, 2018).

Findings are inconsistent concerning the extent to which persuasion depends on the structure of the text. Whereas some researchers have found that the most persuasive texts present two-sided arguments (Guzzetti & Hynd, 1998), others have shown that strong one-sided arguments were more effective in changing beliefs, though two-sided texts were more effective in changing knowledge (Buehl et al., 2001). In general, there is substantial evidence indicating that persuasive texts can change beliefs (for a meta-analytic review, see Braddock & Dillard, 2016). This does not necessarily result in an entire transformation of beliefs but at least induces a critical weighing of arguments (Murphy & Alexander, 2004). Moreover, persuasion most likely occurred when the discrepancy between the new ideas presented in the text and the reader's prior beliefs is small (Vosniadou, 2001).

The Present Studies

Although PSTs' beliefs about diversity are highly relevant for teacher education, little research has been conducted on the processes that underlie their formation and development (Gay, 2015). Whereas self-efficacy beliefs about teaching in diverse classrooms may only play a role once inservice teachers have gathered some teaching experience, beliefs about diversity may act as a filter for new information that PSTs acquire teacher education. As the PSTs in our study had not gained any teaching experience in the classroom yet,¹ we did not assess self-efficacy beliefs but investigated PSTs' development of beliefs about diversity.

Given the dominance of text-based learning in and outside teacher education, research on persuasive texts can prove informative for the investigation of PSTs' beliefs change. Despite the strong evidence base for the effects of persuasive texts on belief change in students, we know much less about these processes in PSTs—in particular, with regard to student diversity. Understanding the potential of persuasive texts about diversity for PSTs' belief change could be one first step in examining aspects of persuasive pedagogy for teacher education with regard to diversity.

Furthermore, the increasing amount of opportunities for informal reading during teacher education in the course of a rapid growth in available texts on the internet and in social media invites research on the effects that persuasive texts about diversity have on PSTs' belief change, and on the moderating role of prior beliefs and knowledge. Whereas most

research on persuasive text focused on an intended belief change in the scope of the PSTs' learning processes and, eventually, the potential of persuasive practice for teacher learning, there is also research indicating that persuasive text provided in informal settings, such as on the internet, can distribute one-sided, biased, or inaccurate information, and readers often do not know how to evaluate the plausibility of this information and whether it is supported by evidence (Sinatra & Lombardi, 2020). In this regard, persuasive texts may also be a risk for the development of PSTs' views about societal and educational topics, such as diversity in the classroom. Thus, we intended to extend previous research and to contribute to the question of how the effect of persuasive texts on belief change is moderated by PSTs' prior beliefs and knowledge as they could serve as catalyzer to promote intended belief change but also as risk or protective factor for or against a persuasive effect of questionable or inaccurate information. The following questions were investigated:

1. Does reading persuasive texts about diversity affect PSTs' beliefs about teaching diverse classes?
2. Do PSTs' prior beliefs work as filters for the adoption of ideas about classroom diversity presented in persuasive texts?
3. Does PSTs' perceived prior knowledge about classroom diversity work as a filter in the adoption of ideas about classroom diversity presented in persuasive texts?

General Method

We conducted two experiments on the impact that reading a persuasive text about classroom diversity has on PSTs' diversity belief change. In both studies, participants were randomly assigned to one of two conditions (reading a one-sided either positively or negatively oriented persuasive text about classroom diversity; see appendix available with the online version of this article for the texts), and we examined the persuasive effect of the text on the post-reading beliefs. In Study 1, we assessed the participants' beliefs prior to and after reading the texts to determine whether participants' prior beliefs moderate the effect of the text on belief change. In Study 2, we additionally tested the role of participants' perceived prior knowledge prior to reading as a moderator for the effect of the texts on beliefs change.

Procedure

The study design and the experimental paradigm had been approved by the Ethics Commission of the University. Participants were informed that they took part in a scientific study and were asked for informed consent. The experimental paradigm aimed at either changing or strengthening participants' beliefs by reading a one-sided persuasive text. Participants were randomly assigned to one of the text conditions and were told the cover story detailed below. After

completing the pretest, they read the texts in their individual pace. The reading situation was implemented independently so that students read the text on their own without exchanging their thoughts about it. In Study 1, the data collection was carried out within the scope of a course session. These PSTs participated in a paper/pencil experiment. In Study 2, the data collection was carried out in the lab, and the text and all instruments were presented on the computer. Post-reading, the participants answered some control questions, which served as manipulation check, and completed the posttest questionnaire. To re-mediate the effects of the persuasive texts in the end of the experiment, a debriefing took place in which the lecturer/experimenter explained the cover story after the data collection was finished, and discussed the one-sidedness of the arguments presented in the texts together with the participants, identified inaccurate or exaggerated information, and considered alternative interpretations.

Text Conditions

In both studies, participants received the same persuasive texts, either with a positive or a negative orientation toward diversity. In both conditions, the persuasive texts were about cultural diversity in the classroom and how it affects teaching (see online material for the texts). Texts were compiled of information from scientific studies as well as from textbooks about student diversity and differed only in the orientation of arguments presented. In the text with a positive orientation toward diversity, benefits of classroom diversity were presented, whereas the text with a negative orientation presented classroom diversity as a challenge. Both texts followed the same structure: The topic of cultural diversity was introduced and an example of pedagogical approaches for classroom diversity was provided. Then, empirical evidence on students' and teachers' well-being in diverse classrooms were presented. The texts ended with a teacher's comment about her personal experience with classroom diversity. Every paragraph presented diversity either as an asset to teaching or as an obstacle, depending on the condition. Each text consisted of 834 (negative text) and 832 (positive text) words, respectively. The Flesch Reading Ease Level (FREL; Flesh, 1948), a widely used tool to estimate the readability of a text depending on its grammatical structure, was computed, indicating a comparable readability of the texts, which corresponded to university level (35.04² for the positive text and 35.73 for the negative text). A pilot study with 56 PSTs revealed significant differences in the perception of the text arguments aligned with our intended direction of the text (see online material for information on the pilot study).

Cover Story

To conceal the research question and prevent participants from recognizing the experimental design, which could lead to participants making a conscious effort to avoid being manipulated, we asked participants to provide feedback on a

text to be published in a scholarly book for PSTs. At the end of the session, participants were asked to complete an allegedly unrelated questionnaire that we presented as a newly developed tool for collecting data for a study independent of the study they had just participated in with the text, which was in fact a questionnaire to assess participants' beliefs.

Dependent Variables

The following instruments were applied in both studies to assess PSTs' beliefs about diverse classrooms, to test the manipulation, and to control for the difficulty of the texts.

Beliefs about classroom diversity. A German questionnaire to assess teacher beliefs about cultural diversity in the classroom (*Questionnaire to assess teachers' beliefs about diversity*; Dignath et al., 2020) was applied. It measures teachers' extent of agreement with different statements that present diversity as an obstacle that has to be overcome ("In classes with pupils with a migration background, the level of performance will not be as high as in classes without pupils with a migration background") or as an asset to teaching ("Students without migration background can benefit from a culturally diverse classroom"). The five items, which address potential benefits and costs of classroom diversity for the teacher and the students, had to be rated on a 4-point Likert-type scale. Statements presenting diversity as an obstacle were recoded for the analyses so that high values represent favorable beliefs about diversity. The scale showed satisfying internal consistency (Cronbach's $\alpha = .80$), retest reliability ($r = .59, p < .001$), and validity in prior studies (Dignath et al., 2020).

Control questions. Several questions about the text were posed to support the cover story that students should provide feedback on the text. These questions also served to control for the comparability of difficulty and understandability of both texts (see Online Material Table 1). To test the comparability of both text conditions, a multivariate analysis of variance (MANOVA) was conducted for the control questions concerning the comparability of the texts. Because we assumed that there were no group differences, a conservative level of significance of $p = .20$ was applied.³

Manipulation check. Participants were asked to rate several statements that served as a manipulation check to test whether the texts had been perceived as positive versus negative toward classroom diversity—for example, the extent to which reading the text encouraged or discouraged them to teach diverse classes (see Online Material Table 1). Participants in the positive condition were expected to report greater motivation and less concern to teach in diverse classrooms. To check the manipulation, a MANOVA was conducted. As we assumed differences between the groups for the items of the manipulation check, we used $p = .05$ for significance testing.

Prior knowledge. Only in Study 2, we additionally assessed participants' knowledge. As research has shown that perceived knowledge is a good indicator of actually demonstrated knowledge in a knowledge test (Stanovich & West, 2008), and even more predictive of belief change than actually demonstrated knowledge (Murphy & Alexander, 2004), we used participants' perceived knowledge as a proxy for prior topic knowledge. Prior to reading, the participants responded to six items about their perceived knowledge on a 10-point Likert-type scale ranging from *not very much* (0) to *very much* (9) by rating how much they knew about classroom diversity. The internal consistency index for participants' scores on the knowledge measure was satisfying, $\alpha = .86$.

Study 1: Does Reading a Persuasive Text Induce Belief Change and Do Prior Beliefs Moderate This Effect?

The first study was conducted to determine whether PSTs' beliefs change as a result of reading persuasive texts and whether their prior beliefs have a filtering effect on the effectiveness of the persuasive text. We assumed that participants change their beliefs in alignment with the position advocated in the text (Hypothesis 1). Moreover, we expected the persuasive effect of the texts to be stronger if the orientation of the text (positive or negative) is aligned with the participant's prior beliefs about classroom diversity (diversity as favorable or challenging). To test this moderator effect, we computed the interaction effect Pretest Beliefs \times Manipulation and added this as a regressor to the analysis (Hypothesis 2).

Method

Sample. The first experiment was conducted at a university in South-Western Germany, and recruitment of participants took place during a university course that was part of the initial teacher education program.⁴ The 42 PSTs participating in Study 1 ($M_{\text{age}} = 23.46$ years, $SD = 4.75$, 61.5% female) were on average in their third year of initial teacher education at university.

Analyses. Comparability of the texts and manipulation check were submitted to two MANOVAs. To test whether the belief change differed between the two groups (Hypothesis 1), a repeated-measures analysis of variance (ANOVA) was performed. The main effect of time (within-subject factor) measures effects of reading a persuasive text regardless of its orientation, and the main effect of grouping (between-subject factor) measures differences between groups regardless of the measurement point. The interaction indicates whether positive and negative text orientations lead to different degrees of change from pretest to posttest. We used moderated multiple regression to test the interaction between

prior beliefs and text condition (Hypothesis 2; McClelland & Judd, 1993). A moderator effect indicates that the magnitude of the relation between the text condition and the beliefs in the posttest varies as a function of the pretest beliefs. A significant b -coefficient indicates the proportion of explained variance in participants' post-reading beliefs. All analyses were conducted using SPSS Version 25 (IBM, 2017).

Results

Comparability of the texts. The results of the MANOVA on control items to compare the texts revealed overall differences between the groups, $F(3,37) = 2.06, p = .12$.⁵ However, post hoc tests showed that participants differed for the item, "The style of the text is too scientific for practitioners," $M_{\text{pos}} = 0.74 (SD = 0.45)$ and $M_{\text{neg}} = 0.36 (SD = 0.49)$. Thus, in this sample the positive text was more often perceived as too scientific. On all other variables, the texts were rated as comparable as the p values for the remaining control items did not indicate any group differences (see Online Material Table 1).

Manipulation check. In line with our expectations, the MANOVA showed that participants reading the positive text evaluated the text as being more positive compared with those reading the negative text, who expressed greater concern about teaching diverse classes, $F(3, 37) = 44.19, p < .001$.

Test of normal distribution. A Kolmogorov–Smirnov test indicated that the beliefs variable was normally distributed, $Z_{\text{pre}} = 0.76, p_{\text{pre}} = .61$ and $Z_{\text{post}} = 1.09, p_{\text{post}} = .18$, and could be analyzed using linear modeling methods.

Test for pretest differences. The reliability of the beliefs scale proved satisfying, Cronbach's $\alpha_{\text{pre}} = .68; \alpha_{\text{post}} = .80$. A t test for independent groups showed no significant differences in beliefs in the pretest between participants reading the positive text, $M = 2.29 (SD = 0.50)$ and participants reading the negative text, $M = 2.41 (SD = 0.58)$, $t(41) = -0.68, p = .50$. We next proceeded to compare participants' beliefs after reading the texts.

Hypothesis 1: Effect of reading a persuasive text. A repeated-measures ANOVA was computed to investigate whether participants changed their beliefs in alignment with the position advocated in the text. This was statistically tested as the interaction between the text and the two measurement points. The results did not indicate a significant main effect between the two measurement points, $F(1, 41) = 0.91, p = .35$, $\eta_p^2 = .02$, or between the two groups, $F(1, 41) = 0.001, p = .98$, $\eta_p^2 < .001$: No differences between the participants' beliefs of both groups at the two measurement points were found, and neither within one group between the pretest

Table 1. Descriptives Sorted per Text Condition (Study 1).

Text condition	n	M_{pre}	SD_{pre}	M_{post}	SD_{post}
Positive text	20	3.29	0.50	3.36	0.45
Negative text	21	3.41	0.58	3.23	0.70

and the posttest. In line with our expectations, the analyses revealed a significant interaction effect, $F(1, 41) = 9.01, p = .048, \eta_p^2 = .09$: Belief change over time differed as a function of group membership, with participants reading the negative text reporting less favorable beliefs post-reading and vice versa (see Table 1).

Hypothesis 2: Filter effect of prior beliefs. To identify a potential moderator effect of participants' prior beliefs, we regressed participants' belief scores in the posttest on belief scores in the pretest, text condition, and the interaction term. Our assumption that the effect of the text differed as a function of participants' prior beliefs should be reflected in a significant b -coefficient of the interaction effect. We found that both PSTs' prior beliefs, $b = 0.59, t(41) = 3.45, p = .001$, and the text condition contributed significantly to the post-reading beliefs, $b = -1.32, t(41) = -2.56, p = .02$, indicating that participants reading the negative text on diversity reported less favorable beliefs about diversity post-reading. Moreover, the regression revealed a significant interaction effect for PSTs' Prior Beliefs \times Text Condition, $b = 0.47, t(41) = 2.18, p = .04$. As the positive b -coefficient indicates, the effect of the text was significantly stronger when the orientation of the text was in alignment with their prior beliefs reported on the pretest. Thus, the negatively oriented text had a stronger negative effect on the beliefs of participants, who reported already negative beliefs prior to reading the text, whereas the positively oriented text had a stronger positive effect on the beliefs of participants with positive prior beliefs.

Study 2: Do Prior Beliefs and Prior Knowledge Moderate the Effect of Persuasive Texts?

In the next study, we additionally investigated the filter effect of prior knowledge on the effect of reading a persuasive text on belief change. The design of Study 2 was a replication of Study 1, but this time we also assessed the participants' self-rated prior knowledge, and data were collected individually and computer-based in the laboratory. As in the previous experiments, we expected that PSTs would change their beliefs in alignment with the text that they read (Hypothesis 1), and that participants' prior beliefs would moderate their belief change (Hypothesis 2). In addition, we expected that participants' prior knowledge would additionally affect their belief change (Hypothesis 3). Because the literature indicates

Table 2. Descriptives Sorted by Text Condition (Study 2).

Text condition	<i>n</i>	M_{pre}	<i>SD</i>	M_{post}	<i>SD</i>
Positive text	27	3.34	0.40	3.36	0.46
Negative text	30	3.34	0.41	3.20	0.37

that readers are more easily persuaded the less they know about a certain topic (Andiliou et al., 2012; Kendeou & Van Den Broek, 2005), we assumed that the persuasive effect of the texts will be stronger if participants report to have less prior knowledge about diversity.

Method

Sample. Experiment 2 was carried out at the same university, but recruitment of participants took place by posting on notice boards through the university, by advertising in several university courses of initial teacher education, and by putting up an ad in the social media group for teacher education of this university. Only PSTs were admitted to the experiment who had not participated in Experiment 1 yet. In total, 57 PSTs participated ($M_{age} = 22.19$ years, $SD = 4.82$, 75% female), who were on average in their second study year (third semester), $SD = 2.71$.

Analyses. Similar to Study 1, ANOVA with repeated measures was used to test Hypothesis 1, and moderated multiple regression was applied to investigate Hypothesis 2. To simultaneously account for the effect of participants' perceived prior knowledge as well as a potential moderator effect of prior knowledge (Hypothesis 3), we added both the prior knowledge measure and the interaction term to the multiple regression carried out to test Hypothesis 2.

Results

Comparability of conditions. In line with our assumption, the MANOVA demonstrated that the participants' rating of the control questions did not differ between the conditions, $F(1, 55) = 0.33$, $p = .89$, $\eta_p^2 = .03$.

Manipulation check. As expected, the MANOVA yielded significant group differences for all control variables, $F(1, 55) = 76.35$, $p < .001$, $\eta_p^2 = .81$, showing that the PSTs perceived the text of the positive condition as significantly more positive than the text of the negative condition.

Test of normal distribution. A Kolmogorov–Smirnov test indicated normal distribution of the data, $Z_{pre} = 0.48$, $p = .98$ and $Z_{post} = 0.96$, $p = .31$, suggesting the feasibility of linear modeling approaches.

Pretest differences in prior beliefs and prior knowledge. A preliminary ANOVA excluded significant differences in prior

beliefs among the participants of both conditions, $F(1, 56) = 0.002$, $p = .96$. An independent-samples *t* test was carried out, showing that the groups did not differ in terms of their perceived prior knowledge, $t(55) = 1.12$, $p = .27$.

Hypothesis 1: Effect of reading a persuasive text. Again, the internal consistency of the beliefs measure was acceptable, $\alpha_{pre} = .71$ and $\alpha_{post} = .72$. The results of the repeated-measures ANOVA revealed no significant main effects between the two measurement points, $F(1, 56) = 2.23$, $p = .14$, $\eta_p^2 = .04$, or between the two conditions, $F(1, 56) = .53$, $p = .47$, $\eta_p^2 = .01$, but a significant interaction effect, $F(1, 56) = 4.08$, $p = .048$, $\eta_p^2 = .07$. As expected, belief change differed between the two text conditions: Whereas the group that read the positive text hardly changed their beliefs, $M = 2.73$ ($SD = 0.46$), participants in the negative text condition reported less favorable beliefs after reading the text, $M = 2.58$ ($SD = 0.37$). As shown in Table 2, the posttest difference in participants' beliefs results from a decrease in belief scores in the negative condition, indicating that beliefs became less favorable. Hence, participants changed their beliefs in line with the position advocated in the text, but this change mainly occurred in the negative text condition.

Hypothesis 2: Filter effect of prior beliefs. We tested for an interaction between prior beliefs and text condition using a multiple regression analysis, including prior beliefs, text condition, and their interaction as predictors. Unlike in Study 1, the regression did not reveal that prior beliefs at t_1 moderated the effect of the text, $b = -0.15$, $t(55) = -0.81$, $p = .42$. Thus, in Study 2, the effect of the texts on belief change was not moderated by participants' prior beliefs.

Hypothesis 3: Moderating effect of perceived prior knowledge. In the next step, we added participants' perceived prior knowledge as well as the interaction term to the multiple regression. The omnibus test of a moderating effect for perceived prior knowledge failed the 5% significance level in the two-sided test, $b = -0.12$, $t(55) = -0.64$, $p = .08$, $\eta_p^2 = .06$. Nevertheless, η_p^2 indicated a moderate interaction effect between perceived prior knowledge and the effect of reading the text on belief change (Cohen, 1988). The negative *b*-coefficient suggested that—in line with our assumption—the effect of the texts may be stronger, the less participants feel knowledgeable about diversity.

Discussion

We conducted two experiments to investigate whether reading a persuasive text about diversity affects PSTs' beliefs about classroom diversity, delivering important insights into the role of prior beliefs and knowledge for moderating this effect. Generally, the effect of reading a persuasive text about diversity on belief change could be replicated across both experiments and extends earlier research on the

effectiveness of persuasive texts for belief change to the field of teacher beliefs. Moreover, the results suggest that this effect may be moderated by PSTs' prior beliefs and their prior knowledge. Both results have important implications for research on persuasive texts, teacher beliefs, and teacher education practice.

Reading Persuasive Texts Leads to Belief Change

Both experiments show that after reading, all participants reported stronger beliefs in line with the position on diversity advocated in the text. This finding supports earlier evidence for the effect of reading a one-sided persuasive text on belief change (Murphy & Mason, 2006), also in the context of PSTs' learning about classroom diversity. Specifically, the descriptive results of both studies indicate that the negative texts have stronger effects on the development of beliefs from pretest to posttest than the positive texts.

Prior Beliefs Moderate Belief Change

Although we did not find conclusive evidence for a filter effect of prior beliefs, the Study 1 findings suggest that negative texts are more persuasive for participants with initially negative beliefs than for participants with initially positive beliefs and vice versa. PSTs may adopt new ideas more readily if these are in accordance with their existing beliefs. This is in line with former research showing that reading a belief-inconsistent text increases the likelihood for belief change compared with a belief-consistent text (e.g., Wolfe & Williams, 2017), and that teachers' beliefs function as a filter in the processing of incoming information (Fives & Buehl, 2012). Furthermore, it suggests that PSTs with negative diversity beliefs are more at risk to be influenced by a persuasive text presenting diverse classrooms as an obstacle. However, these conclusions must be tentative because we could not replicate the filter effect in Study 2. One reason for this could be that the Study 2 participants, who were mostly still in their first semesters of teacher education, had not developed strong beliefs on diversity yet. Former research indicated that stable beliefs are less likely to change than instable beliefs (Pajares, 1992). PSTs may form professional beliefs over the course of their studies, and that beliefs of PSTs may be less stable at the beginning of their education, and therefore do not act as filters yet.

Prior Knowledge May Moderate Belief Change

We did not find clear support of a moderating effect of prior knowledge. Although the effect size indicates a large effect for prior knowledge, this effect was not statistically significant in the two-sided test. Further research is necessary to test whether PSTs with little prior knowledge are more easily subject to persuasion than more knowledgeable ones. Compared with prior beliefs, PSTs' prior knowledge about

diversity might play a more important role in the beginning of initial teacher education as PSTs may not have developed strong beliefs yet. Former research has been inconsistent about the moderating effect of prior knowledge on belief change (e.g., Kardash & Scholes, 1995; Murphy & Alexander, 2004). If our result can be corroborated in future studies, this would support previous results about little prior knowledge as a "risk factor" for premature belief change. For teacher education, this indicates that PSTs in the beginning of their education are more easily at risk of persuasion of perceiving diverse classrooms as an obstacle than later on.

Implications for Teacher Education Practice

Persuasive text can be useful for bringing about belief change (Vosniadou, 2001). Our findings suggest that persuasive texts have the potential to foster belief change in PSTs when learning about classroom diversity. Although reading a persuasive text cannot replace teacher education, it could be implemented within an instructional setting to support PSTs' development of functional beliefs about diversity as an asset to teaching. A text that includes information designed to reduce negative diversity beliefs could help PSTs to feel more empowered about classroom diversity. As research has shown that many teachers feel insufficiently prepared to teach in multicultural classrooms (Malinen et al., 2013), an encouraging persuasive text about classroom diversity could have a catalyst effect on PSTs' learning and could invite belief change. On the contrary, our findings underline the urgency to implement the topic of classroom diversity into the curriculum of teacher education (Cochran-Smith et al., 2016). Nowadays, many students seek out for information on the internet (Henderson et al., 2017), but for controversial, socio-scientific topics, the internet provides many one-sided texts, which often enhance misconceptions (Scheufele & Krause, 2019). Teacher education should provide a learning environment to reflect these texts and to discuss alternative arguments.

Moreover, our findings imply that there may be a Matthew effect in learning about diversity: PSTs, who are already positive about diversity, have a higher chance to be resistant toward a negative text, whereas PSTs holding dysfunctional diversity beliefs have a higher risk to be reinforced in their negative beliefs when reading a negative text and may be difficult to convince by a positive text. Especially PSTs with negative beliefs about diversity need a guided reflection when reading persuasive texts about controversial issues.

Furthermore, as our findings suggest a filter effect of PSTs' prior beliefs and prior knowledge, teacher education should address PSTs' existing beliefs about diversity. Earlier research indicated that reflecting one's existing beliefs in the scope of teacher education can support PSTs in developing favorable beliefs about diversity (Civitillo et al., 2018), and generally, that texts should address the learners' preconceptions and prior beliefs to enhance belief change as the

explicit reference to two conflicting viewpoints can support the learner in recognizing the dissonance between one's existing beliefs and new information provided in the text (Vosniadou, 2001). Thus, teacher education courses should provide two-sided texts to address PSTs' intuitive beliefs as these may affect the persuasive effect of a text.

And, finally, our findings suppose that PSTs in the beginning of their education might be more at risk for persuasion toward negative beliefs. This aligns with former research highlighting the importance of formal learning opportunities in an early stage of initial teacher education (e.g., Blömeke et al., 2012).

Limitations and Implications for Future Research and Educational Practice

Several implications can be derived from our results, and there are limitations to our studies that provide ideas for future research.

Limitations. As in most studies about teacher beliefs, we assessed PSTs' beliefs by means of self-report, bearing the risk of a desire to give socially acceptable responses (Kagan, 1992). Because PSTs might feel the need to give politically correct responses rather than reporting their real beliefs, future studies should also use implicit assessment, such as the *Implicit Associations Test* (Markova et al., 2016), in addition to an explicit assessment by questionnaire. The same applies to the assessment of knowledge, which has been measured by means of self-report in this study. An additional knowledge test could add information by being a more objective measure. Second, all participants in these studies read a one-sided persuasive text, so we cannot investigate whether this persuasive text stimulated more belief change than a non-persuasive text would have done, and whether a two-sided persuasive text would have less or more effect on belief change as it would explicitly address the two conflicting views on the topic and therefore also the readers' prior beliefs. Third, due to the design and cover story of our studies, we cannot exclude that participants reported beliefs change to meet the requirements that they anticipated from our cover story. Studies with different cover stories could replicate our findings to test whether PSTs change their beliefs in accordance with a persuasive text, even without any relation to given authorities. Fourth, we focused only on the change of PSTs' beliefs. However, there is evidence that persuasive texts not only affect beliefs but also knowledge (Sinatra et al., 2012). Future studies should investigate the effect of persuasive texts on the development of PSTs' knowledge about classroom diversity and examine how the belief change can contribute to knowledge development. Fifth, another limitation of our studies is that we only investigated short-term effects; as for ethical reasons, we implemented an immediate debriefing at the end of the data

collection so that participants would not leave the experiment with one-sided information. This, however, excluded a follow-up measurement on possible long-term effects of the intervention. Yet, reading only one persuasive text may not be sufficient to influence substantial change. Further investigation should be made into the stability of change in such beliefs by applying designs that allow for follow-up measures. To shed more light on the sustainability of the effect of the persuasive text on belief change, an intervention study, wherein the intervention group for ethical reasons receives two-sided information, and is tested against a control group that does not receive any intervention, might be helpful. Finally, these experiments were a first step to investigate the risk and the potential of persuasive texts on PSTs' change of beliefs about diversity.

Implications

Investigating the potential of persuasive pedagogy for teacher preparation. As our research has demonstrated again that reading persuasive texts can affect belief change in PSTs, the full potential of persuasive pedagogy should be examined by integrating the reading of the text into an instructional setting that incorporates a guided reflection of the arguments presented in the text. Research has indicated that teachers feel insecure about teaching culturally diverse students, partly due to poor self-efficacy about teaching diverse classrooms and partly due to insufficient knowledge of various cultures and of effective ways to teach diverse classes (Silverman, 2010). Considering diversity as an obstacle for teaching can affect the expectations that teachers have for their students (Van den Berg et al., 2010) and may be reflected in their teaching behavior (Gay, 2015). For example, holding dysfunctional beliefs about classroom diversity impeded teachers' noticing of relevant classroom situations in diverse settings (Roose et al., 2019) and was associated with less adaptive teaching practices (Hachfeld et al., 2015; MacFarlane & Woolfson, 2013). Thus, to support teachers to effectively teach in diverse classrooms later on, it is essential to understand how PSTs think and feel about classroom diversity, and how their beliefs are shaped by characteristics of their students and of the learning environment. Still, although we have strong evidence from research about the effects of reading persuasive texts on belief change in students, particularly in science learning, we know much less about these processes in PSTs. Moreover, to date, no study has investigated the effectiveness of persuasive texts on PSTs' change of beliefs about diversity yet. Understanding the potential of reading persuasive texts about diversity on teachers' belief change could be one first step in examining aspects of persuasive pedagogy for teacher education with regard to diversity. Therefore, we aimed at investigating the effects of persuasive texts for the specific target group of PSTs and the context of diversity in the classroom to extend the research field.

Investigating the risk of negative belief change due to persuasion. Furthermore, the increasing amount of opportunities for informal reading during teacher education in the course of a rapid growth in available texts on the internet and in social media invites research on the effects that persuasive texts about diversity have on PSTs' belief change, and on the moderating role of prior beliefs and knowledge. Whereas most research on persuasive text focused on an intended belief change in the scope of the PSTs' learning processes and, eventually, the potential of persuasive practice for teacher learning, there is also research indicating that persuasive text provided in informal settings, such as the internet, can also work to distribute one-sided, biased, or inaccurate information, and readers often do not know how to evaluate the plausibility of this information and whether it is supported by evidence (Sinatra & Lombardi, 2020). In this regard, persuasive texts may also be a risk for the development of PSTs' views about societal and educational topics, such as diversity in the classroom. Thus, the purpose of our study was to extend previous research by investigating the persuasive effect of positive as well as negative texts about diversity. Future research could investigate the added value of guided reflection to foster intended belief change, or the potential of stimulating reflection to avoid premature change of beliefs.

Clarifying the filter function of previous beliefs and prior knowledge in teacher preparation. Finally, evidence on the filtering effect of prior beliefs and prior knowledge has been inconsistent (see, for example, Andiliou et al., 2012; Kardash & Scholes, 1995; Kendeou & Van Den Broek, 2005; Murphy & Alexander, 2004). With our research, we intend to contribute to the question of how the effect of persuasive texts on belief change is moderated by PSTs' prior beliefs and knowledge as they could serve as a catalyzer to promote intended belief change but also as a risk or a protective factor for or against a persuasive effect of questionable or inaccurate information. Although the evidence is not conclusive yet, our results suggest that PSTs are particularly prone to persuasion in the beginning of their preparation, and they invite further research to detect differential effects of persuasion among novice and advanced PSTs.

Conclusion

Beliefs are an important aspect of beginning teachers' professional competence (Blömeke et al., 2012; Kunter et al., 2013). Already within teacher education, beliefs about diversity should be considered as they can affect how PSTs learn about controversial topics (Fives & Buehl, 2012). Yet, how such beliefs develop in the scope of the learning processes of PSTs is still poorly understood. Our findings suggest that providing a persuasive text can support the development of functional professional beliefs and can facilitate belief change, in particular for controversial topics that may

conflict with PSTs' intuitive beliefs, and when PSTs dispose only of limited prior knowledge. Moreover, our findings advocate that the availability of persuasive texts on the internet and in social media may be a risk for PSTs' development of professional beliefs about controversial topics that teacher education should take into account. Buehl and Beck (2015) argue that teacher education is the right setting to investigate change in PSTs' beliefs as beliefs are still in flux. To help PSTs develop the professional competence they need to teach diverse classrooms effectively, their beliefs and knowledge should be aligned with scientific findings and reflected on during their education.

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Supplemental Material

Supplemental material for this article is available online.

Notes

1. German teacher education is organized in two phases. First, preservice teachers are enrolled as university students and take university courses about two school subjects and educational sciences. The first phase ends with a bachelor's or master's degree of education but does not qualify for teaching in a school yet. In the following 18-month long induction phase, preservice teachers are working in a school where they receive on-site training by a mentor teacher. In addition, they follow theoretical courses at a teacher training institute for the induction phase.
2. The index ranges from zero to 100, and higher scores indicate that the text is easier to read.
3. Null hypotheses (H_0) represent a situation in which no between-group differences exist. A Type I error means that an H_0 that is true is rejected. If $p < \alpha$, the probability of making a Type I error is considered sufficiently small to reject H_0 . The probability of a Type II error, failing to reject a false H_0 , is represented by β . When testing whether two groups are equal, like here, H_0 and H_1 are swapped: The question is whether H_1 (i.e., a difference between groups) can be rejected. The probabilities of Type I error and Type II error are similarly swapped, so that testing whether $p < \alpha$ makes

no sense. The usual solution is to test whether $p < \beta$ with $\beta = 20\%$ (Nickerson, 2000).

4. See Footnote 1 in chapter “Formation of Teachers’ Knowledge and Beliefs During Teacher Education” on page 6 for a description of the German teacher education system.
5. For the test of the null hypothesis, we tested on the 20% level.

References

- Acquah, E. O., Tandon, M., & Lempinen, S. (2016). Teacher diversity awareness in the context of changing demographics. *European Educational Research Journal, 15*(2), 218–235.
- Alexander, P. A., & Dochy, F. J. (1995). Conceptions of knowledge and beliefs: A comparison across varying cultural and educational communities. *American Educational Research Journal, 32*(2), 413–442.
- Allcott, H., Gentzkow, M., & Yu, C. (2019). Trends in the diffusion of misinformation on social media. *Research & Politics, 6*(2), 1–8.
- Andiliou, A., Ramsay, C. M., Murphy, P. K., & Fast, J. (2012). Weighing opposing positions: Examining the effects of intratextual persuasive messages on students’ knowledge and beliefs. *Contemporary Educational Psychology, 37*(2), 113–127.
- Bandura, A. (1997). *Self-self efficacy: The exercise of control*. Freeman.
- Blömeke, S. (2012). Does greater teacher knowledge lead to student orientation? The relationship between teacher knowledge and teacher beliefs. In J. König (Ed.), *Teachers’ pedagogical beliefs* (pp. 15–35). Waxmann.
- Blömeke, S., Suhl, U., Kaiser, G., & Döhrmann, M. (2012). Family background, entry selectivity and opportunities to learn: What matters in primary teacher education? An international comparison of fifteen countries. *Teaching and Teacher Education, 28*(1), 44–55.
- Borko, H., Davinroy, K. H., Bliem, C. L., & Cumbo, K. B. (2000). Exploring and supporting teacher change: Two third-grade teachers’ experiences in a mathematics and literacy staff development project. *The Elementary School Journal, 100*(4), 273–306.
- Braddock, K., & Dillard, J. P. (2016). Meta-analytic evidence for the persuasive effect of narratives on beliefs, attitudes, intentions, and behaviors. *Communication Monographs, 83*(4), 446–467.
- Bromme, R., & Goldman, S. R. (2014). The public’s bounded understanding of science. *Educational Psychologist, 49*, 59–69.
- Buehl, M. M., Alexander, P. A., Murphy, P. K., & Sperl, C. T. (2001). Profiling persuasion: The role of beliefs, knowledge, and interest in the processing of persuasive texts that vary by argument structure. *Journal of Literacy Research, 33*(2), 269–301.
- Buehl, M. M., & Beck, J. S. (2015). The relationship between teachers’ beliefs and teachers’ practices. In H. Fives & M. Gregoire Gill (Eds.), *International handbook of research on teachers’ beliefs* (pp. 66–84). Routledge.
- Castro, A. J. (2010). Themes in the research on preservice teachers’ views of cultural diversity: Implications for researching millennial preservice teachers. *Educational Researcher, 39*(3), 198–210.
- Chambliss, M. J., & Garner, R. (1996). Do adults change their minds after reading persuasive text? *Written Communication, 13*(3), 291–313.
- Civitillo, S., Juang, L. P., & Schachner, M. K. (2018). Challenging beliefs about cultural diversity in education: A synthesis and critical review of trainings with pre-service teachers. *Educational Research Review, 24*, 67–83.
- Cochran-Smith, M. (2020). Teacher Education for Justice and Equity: 40 Years of Advocacy. *Action in Teacher Education, 42*(1), 49–59.
- Cochran-Smith, M., Ell, F., Grudnoff, L., Haigh, M., Hill, M., & Ludlow, L. (2016). Initial teacher education: What does it take to put equity at the center? *Teaching and Teacher Education, 57*, 67–78.
- Cochran-Smith, M., & Villegas, A. M. (2016). Preparing teachers for diversity and high-poverty schools: A research-based perspective. In *Teacher education for high poverty schools* (pp. 9–31). Springer, Cham.
- Cochran-Smith, M., & Zeichner, K. M. (Eds.). (2005). *Studying teacher education: The report of the AERA Panel on Research and Teacher Education*. Lawrence Erlbaum Associates Publishers; American Educational Research Association.
- Cohen, J. (1988). The effect size index: d. *Statistical Power Analysis for the Behavioral Sciences, 2*, 284–288.
- Daraz, L., Morrow, A. S., Ponce, O. J., Beuschel, B., Farah, M. H., Katabi, A., . . . Ding, J. F. (2019). Can patients trust online health information? A meta-narrative systematic review addressing the quality of health information on the internet. *Journal of General Internal Medicine, 34*, 1884–1891.
- Depaepe, F., Verschaffel, L., & Kelchtermans, G. (2013). Pedagogical content knowledge: A systematic review of the way in which the concept has pervaded mathematics educational research. *Teaching and Teacher Education, 34*, 12–25.
- Dignath, C., Meschede, N., Kunter, M., & Hardy, I. (2020). Entwicklung eines Fragebogens zur Erfassung von Überzeugungen Lehramtsstudierender zum Unterrichten in heterogenen Klassen: Befunde zur Kriteriumsvalidität und Veränderungssensitivität [A questionnaire to assess preservice teachers’ beliefs about teaching in heterogeneous classes: Findings on criterion validity and instructional sensitivity]. *Psychologie in Erziehung und Unterricht, 67*(3), 194–211.
- Döhrmann, M., Kaiser, G., & Blömeke, S. (2012). The conceptualisation of mathematics competencies in the international teacher education study TEDS-M. *ZDM—International Journal on Mathematics Education, 44*, 325–340.
- Dole, J. A., & Sinatra, G. M. (1998). Reconceptualizing change in the cognitive construction of knowledge. *Educational Psychologist, 33*(2–3), 109–128.
- Ell, F., Haigh, M., Cochran-Smith, M., Grudnoff, L., Ludlow, L., & Hill, M. F. (2017). Mapping a complex system: What influences teacher learning during initial teacher education? *Asia-pacific Journal of Teacher Education, 45*(4), 327–345.
- Ferrero, M., Konstantinidis, E., & Vadillo, M. A. (2020). An attempt to correct erroneous ideas among teacher education students: The effectiveness of refutation texts. *Frontiers in Psychology, 11*, Article 2704.
- Fives, H., & Buehl, M. M. (2012). Spring cleaning for the “messy” construct of teachers’ beliefs: What are they? Which have been examined? What can they tell us? In K. R. Harris, S. Graham, T. Urdan, S. Graham, J. M. Royer, & M. Zeidner (Eds.), *APA Educational psychology handbook: Individual differences and cultural and contextual factors* (Col. 2, pp. 471–499). APA.

- Flesh, R. (1948). A new readability yardstick. *Journal of Applied Psychology, 32*, 221–233.
- Garner, R., Alexander, P. A., Gillingham, M. G., Kulikowich, J. M., & Brown, R. (1991). Interest and learning from text. *American Educational Research Journal, 28*(3), 643–659.
- Gay, G. (2015). Teachers' beliefs about cultural diversity: Problems and possibilities. In H. Fives & M. G. Gill (Eds.), *International handbook of research on teachers' beliefs* (pp. 436–452). Routledge.
- Gregoire-Gill, M., Ashton, P. T., & Algina, J. (2004). Changing preservice teachers' epistemological beliefs about teaching and learning in mathematics: An intervention study. *Contemporary Educational Psychology, 29*(2), 164–185.
- Guzzetti, B., & Hynd, C. (1998). *Theoretical perspectives on conceptual change*. Erlbaum.
- Hachfeld, A., Hahn, A., Schröder, S., Anders, Y., & Kunter, M. (2015). Should teachers be colorblind? How multicultural and egalitarian beliefs differentially relate to aspects of teachers' professional competence for teaching in diverse classrooms. *Teaching and Teacher Education, 48*, 44–55.
- Henderson, M., Selwyn, N., & Aston, R. (2017). What works and why? Student perceptions of 'useful' digital technology in university teaching and learning. *Studies in Higher Education, 42*(8), 1567–1579.
- Hill, H. C., & Chin, M. (2018). Connections between teachers' knowledge of students, instruction, and achievement outcomes. *American Educational Research Journal, 55*(5), 1076–1112.
- Hofer, B. K. (2002). Epistemological world views of teachers: From beliefs to practice. *Issues in Education, 8*(2), 99–149.
- Hynd, C. (2003). Conceptual change in response to persuasive messages. In G. M. Sinatra & P. R. Pintrich (Eds.), *Intentional conceptual change* (pp. 291–315). Erlbaum.
- IBM Corp. (Released 2017). *IBM SPSS Statistics for Windows, Version 25.0*. IBM Corp.
- Kagan, D. M. (1992). Implication of research on teacher belief. *Educational Psychologist, 27*(1), 65–90.
- Kammerer, Y., Keck, D., & Staraschek, E. (2019). Effects of a short classroom intervention on students' identification of contradictions in an Internet forum text: Interaction with reading comprehension skills. *Computers & Education, 138*, 46–56.
- Kardash, C. M., & Scholes, R. J. (1995). Effects of preexisting beliefs and repeated readings on belief change, comprehension, and recall of persuasive text. *Contemporary Educational Psychology, 20*(2), 201–221.
- Kendeou, P., & Van Den Broek, P. (2005). The effects of readers' misconceptions on comprehension of scientific text. *Journal of Educational Psychology, 97*(2), 235–245.
- König, J., Blömeke, S., Paine, L., Schmidt, B., & Hsieh, F.-J. (2011). General Pedagogical Knowledge of future middle school teachers. On the complex ecology of teacher education in the United States, Germany, and Taiwan. *Journal of Teacher Education, 62*(2), 188–201.
- König, J., & Pflanzl, B. (2016). Is teacher knowledge associated with performance? On the relationship between teachers' general pedagogical knowledge and instructional quality. *European Journal of Teacher Education, 39*(4), 419–436.
- Kunter, M., Klusmann, U., Baumert, J., Richter, D., Voss, T., & Hachfeld, A. (2013). Professional competence of teachers: Effects on instructional quality and student development. *Journal of Educational Psychology, 105*(3), 805–820.
- Leporati, B. R., Bach, P., & Hong, L. (2019). Learning to evaluate sources: Comparing teaching modalities and student outcomes. *Libraries and the Academy, 19*(2), 233–252.
- Levin, B. B. (2015). The development of teacher beliefs. In H. Fives & M. Gregoire Gill (Eds.), *International handbook of research on teachers' beliefs* (pp. 48–65). Routledge.
- Limón, M. (2001). On the cognitive conflict as an instructional strategy for conceptual change: A critical appraisal. *Learning and Instruction, 11*(4–5), 357–380.
- MacFarlane, K., & Woolfson, L. M. (2013). Teacher attitudes and behavior toward the inclusion of children with social, emotional and behavioral difficulties in mainstream schools. *Teaching and Teacher Education, 29*, 46–52.
- Maier, J., & Richter, T. (2014). Fostering multiple text comprehension: How metacognitive strategies and motivation moderate the text-belief consistency effect. *Metacognition and Learning, 9*(1), 51–74.
- Malinen, O. P., Savolainen, H., Engelbrecht, P., Xu, J., Nel, M., Nel, N., & Tlale, D. (2013). Exploring teacher self-efficacy for inclusive practices in three diverse countries. *Teaching and Teacher Education, 33*, 34–44.
- Markova, M., Pit-Ten Cate, I., Krolak-Schwerdt, S., & Glock, S. (2016). Preservice teachers' attitudes toward inclusion and toward students with special educational needs from different ethnic backgrounds. *The Journal of Experimental Education, 84*(3), 554–578.
- McAllister, G., & Irvine, J. J. (2002). The role of empathy in teaching culturally diverse students: A qualitative study of teachers' beliefs. *Journal of Teacher Education, 53*(5), 433–443.
- McClelland, G. H., & Judd, C. M. (1993). Statistical difficulties of detecting interactions and moderator effects. *Psychological Bulletin, 114*(2), 376.
- Muis, K. R., Etoubashi, N., & Denton, C. A. (2020). The catcher in the lie: The role of emotions and epistemic judgments in changing students' misconceptions and attitudes in a post-truth era. *Contemporary Educational Psychology, 62*, Article 101898.
- Murphy, P. K. (2001). Teaching as persuasion: A new metaphor for a new decade. *Theory into Practice, 40*(4), 224–227.
- Murphy, P. K., & Alexander, P. A. (2004). Persuasion as a dynamic, multidimensional process: An investigation of individual and intraindividual differences. *American Educational Research Journal, 41*(2), 337–363.
- Murphy, P. K., & Mason, L. (2006). Changing knowledge and beliefs. *Handbook of Educational Psychology, 2*, 305–324.
- National Center for Education Statistics. (2018). *Total number of school teachers and percentage distribution of school teachers, by race/ethnicity, school type, and selected school characteristics (Schools and Staffing Survey, Teacher Data Files)*. https://www.che.sc.gov/CHE_Docs/executivedirector/RecommendedReadings/Status_and_trends2018.pdf
- Nickerson, R. S. (2000). Null hypothesis significance testing: A review of an old and continuing controversy. *Psychological Methods, 5*(2), 241–301.
- Osioma, I., & Moscovici, H. (2008). Profiling the beliefs of the forgotten teachers: An analysis of intern teachers' frameworks for urban science teaching. *Journal of Science Teacher Education, 19*, 285–311.

- Pajares, M. F. (1992). Teachers' beliefs and educational research: Cleaning up a messy construct. *Review of Educational Research*, 62(3), 307–332.
- Richardson, V. (1996). The role of attitudes and beliefs in learning to teach. In J. Sikula (Ed.), *Handbook of research on teacher education* (pp. 102–119). Macmillan.
- Richardson, V. (Ed.). (2002). *Handbook of research on teaching*. American Educational Research Association.
- Roose, I., Vantieghem, W., Vanderlinde, R., & Van Avermaet, P. (2019). Beliefs as filters for comparing inclusive classroom situations. *Contemporary Educational Psychology*, 56, 140–151.
- Scheufele, D. A., & Krause, N. M. (2019). Science audiences, misinformation, and fake news. *Proceedings of the National Academy of Sciences*, 116(16), 7662–7669.
- Shulman, L. S. (1986). Paradigms and research programs for the study of teaching. In M. C. Wittrock (Ed.), *Handbook of research on teaching* (pp. 1–36). Macmillan.
- Silverman, S. K. (2010). What is diversity? An inquiry into preservice teacher beliefs. *American Educational Research Journal*, 47(2), 292–329.
- Sinatra, G. M., Kardash, C. M., Taasoobshirazi, G., & Lombardi, D. (2012). Promoting attitude change and expressed willingness to take action toward climate change in college students. *Instructional Science*, 40(1), 1–17.
- Sinatra, G. M., & Lombardi, D. (2020). Evaluating sources of scientific evidence and claims in the post-truth era may require reappraising plausibility judgments. *Educational Psychologist*, 53, 1–12.
- Skott, J. (2015). The promises, problems, and prospects of research on teachers' beliefs. *International Handbook of Research on Teachers' Beliefs*, 1, 37–54.
- Southerland, S. A., Sinatra, G. M., & Matthews, M. R. (2001). Belief, knowledge, and science education. *Educational Psychology Review*, 13(4), 325–351.
- Stanovich, K. E., & West, R. F. (2008). On the relative independence of thinking biases and cognitive ability. *Journal of Personality and Social Psychology*, 94(4), 672.
- Statistisches Bundesamt [Federal Statistical Office Germany]. (2018). *Bevölkerung und Erwerbstätigkeit. Bevölkerung mit Migrationshintergrund – Ergebnisse des Mikrozensus 2017* [Population and employment. Population with migration background – Results from the sample census 2017]. Wiesbaden.
- Thacker, I., Sinatra, G. M., Muis, K. R., Danielson, R. W., Pekrun, R., Winne, P. H., & Chevrier, M. (2019). Using persuasive refutation texts to prompt attitudinal and conceptual change. *Journal of Educational Psychology*, 112(6), 1085–1099.
- Thibaut, L., Knipprath, H., Dehaene, W., & Depaepe, F. (2018). The influence of teachers' attitudes and school context on instructional practices in integrated STEM education. *Teaching and Teacher Education*, 71, 190–205.
- Thompson, A. G. (1992). Teachers' beliefs and conceptions: A synthesis of the research. In D. A. Grouws (Ed.), *Handbook of research on mathematics teaching and learning: A project of the National Council of Teachers of Mathematics* (pp. 127–146). Macmillan.
- Valcke, M., Sang, G., Rots, I., & Hermans, R. (2010). Taking prospective teachers' beliefs into account in teacher education. In P. Peterson, E. Baker, & B. McGaw (Eds.), *International encyclopedia of education* (pp. 622–628). Elsevier.
- Valkenburg, P. M., Peter, J., & Walther, J. B. (2016). Media effects: Theory and research. *Annual Review of Psychology*, 67, 315–338.
- Van den Bergh, L., Denessen, E., Hornstra, L., Voeten, M., & Holland, R. W. (2010). The implicit prejudiced attitudes of teachers: Relations to teacher expectations and the ethnic achievement gap. *American Educational Research Journal*, 47(2), 497–527.
- Vaughn, A. R., & Johnson, M. L. (2018). Communicating and enhancing teachers' attitudes and understanding of influenza using refutational text. *Vaccine*, 36(48), 7306–7315.
- Vosniadou, S. (2001). What can persuasion research tell us about conceptual change that we did not already know? *International Journal of Educational Research*, 35(7), 731–737.
- Voss, T., Kunter, M., & Baumert, J. (2011). Assessing teacher candidates' general pedagogical/psychological knowledge: Test construction and validation. *Journal of Educational Psychology*, 103(4), 952–969.
- Wolfe, M. B., & Williams, T. J. (2017). Poor metacognitive awareness of belief change. *The Quarterly Journal of Experimental Psychology*, 71, 1898–1910.
- Yzer, M. (2017). Theory of reasoned action and theory of planned behavior. In P. Rössler (Ed.), *The international encyclopedia of media effects* (pp. 1–7). John Wiley & Sons.

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