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Evaluation of Epistemic Beliefs Self-Report Questionnaires in the Czech Middle School History Classroom[1]

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Abstract: *Epistemic beliefs are gaining increasing importance in social science education in Czechia. Recent literature has demonstrated findings linking epistemic beliefs with various academic skills, including achievement and reading comprehension. The present study aims to explore the epistemic beliefs of adolescents specific to the domain of history. The study reviews research literature on ontological changes in students' epistemic beliefs and their reasoning within the domain of history since the 1950s, with a particular focus on various models and measurement. The empirical part of the study investigates adapted self-report questionnaires on the epistemic beliefs of adolescents in Czech history classes in the upper grades of middle school. In the first step, the selected questionnaires were back-translated and refined by iterative sets of cognitive interviews. The finalised sets of items were administered in seventh-, eighth-, and ninth-grade classes (N = 303) in May and June 2021. The confirmatory factor analysis and follow-up correlational analysis demonstrated various degrees of support for the dimensions of the Epistemic and Ontological Cognition Questionnaire, for the dimension of Value of Integration Information, and for the dimension of Historical Methodology in Generating Historical Knowledge. Reading comprehension correlated positively with epistemic belief dimensions related to epistemic criteria of justification by multiple sources, the value of integration information, and historical methodology. Academic achievement in the form of the end-of-grade marks obtained in the subjects of history and Czech language did not show a consistent relationship with the epistemic beliefs. The potential practical and research uses of the self-report questionnaires that were investigated in regular classroom instructions are discussed.*

Keywords: *epistemic beliefs, history instruction, middle school, confirmatory factor analysis*

1. Introduction

The modern age of knowledge formation has transitioned to an environment that provides almost unlimited access to various sources of information and an accelerated flow of information in various forms (e.g. print, digital). However,

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information sources can vary in terms of their credibility. Therefore, learners are held to increased standards in processing information at a higher speed and evaluating the veracity of information sources. The contemporary challenges of educators deal with fostering learners' complex cognitive processes and teaching them to activate them when required as such processes are neither intuitive nor effortless (Sinatra et al., 2014). Strom et al. (2018) emphasised that individuals need to distinguish between what they know and what they actually believe. In the post-truth era, unreliable information (posts, comments, reports) is generated and propagated to the same extent as information deemed to be reliable. As Feucht (2017) aptly states, "No matter what knowledge people absorb and for what reasons, they may be asked to verify the credibility and relevance of incoming information before making an informed decision or encrypting it in long-term memory" (p. 8). This statement testifies to the importance of epistemic beliefs in processing information.

2. Epistemic beliefs

Bråten et al. (2011) emphasised that epistemic strategies were the focal point in constructing knowledge from a variety of sources. In the knowledge formation situation, an individual decides what information is attributed to the label of knowledge as they engage in the process of consideration of the extent to which uncertainty can be tolerated or whether they simply assess the degree of credibility in their information resource (Trevors et al., 2017). A characteristic feature of beliefs is the "degree of stability" (Louca et al., 2004, p. 59), which can be defined as the epistemic stance that individuals assume (the statement is true versus false), although the stance does not necessarily have to reflect their actual beliefs (e.g. whether there is any evidence or support for their claims). Murphy and Mason (2006) defined a "belief" as an idea that an individual wanted to be considered as true and did not require any verification, and which more closely resembles an opinion. In contrast to beliefs, a knowledge statement can be defined as a statement supported by evidence, which encompasses an evaluation of whether it is sufficient to treat the given statement as knowledge or not (Greene et al., 2016). According to some authors, epistemic beliefs are implicit rather than explicit (Chinn et al., 2011). However, expressing one's epistemic beliefs explicitly could be a marker of more organised and robust cognitive structuredness and conscious reflection, which indirectly relegates the less complex epistemic beliefs to becoming more implicit. In the middle ground view on this topic we can cite the statement that the activation of epistemic beliefs is "more or less automatic or conscious" (Kienhues et al., 2016; p. 326). In the context of domain generality and specificity, there is a consensus that epistemic

beliefs are multi-layered constructs (Buehl & Alexander, 2006; Muis et al., 2006). In general, this means that epistemic beliefs in mathematics or history can be both domain-specific (students may believe that knowledge certainty is achievable in mathematics but not in history) and domain-general. That having been said, epistemic beliefs on both of these domain levels can interact with each other (Hofer, 2001; Schommer-Aikins, 2004; Stahl & Bromme, 2007). Furthermore, some empirical studies have documented a link between students' epistemic beliefs and the key components of learning processes. The meta-analytic study by Greene et al. (2018), analysing 132 non-experimental studies counting up to 55,418 respondents, demonstrated a low but statistically significant correlation ($r = 0.16$, $p < 0.001$) between epistemic beliefs and various aspects of learning achievement, with stronger evidence for domain-specific beliefs than for domain-general beliefs. Therefore, the examination and development of students' epistemic beliefs in a domain-specific discipline (subject) could demonstrate stronger effects than investigating their epistemic beliefs in a domain-general context.

3. Models of Epistemic Beliefs

The research on epistemic beliefs, which focused on identifying developmental trajectories, began in the 1970s. Later, in the 1990s, researchers shifted their attention towards facilitating students' learning outcomes, such as understanding, reasoning, and academic performance (Hofer & Pintrich, 1997). Greene et al. (2018) presented a classification of four models of epistemic beliefs that included developmental, dimensional, academic discipline domains, and philosophically informed models.

Developmental models of epistemic beliefs (e.g. Perry, 1970; Kitchener & King, 1981; Kuhn & Weinstock, 2002) were based on the Piagetian tradition emphasising linear cognitive development. In various terminological nuances these models referred to three epistemic stances (Barzilai & Ka′adan, 2017): (1) in an objectivist stance (also referred to as realism, dualism, objectivism, or absolutism) knowledge is perceived as an objective and factual construct that can be directly extracted from the experience of external observable reality; (2) in a subjectivist stance (also referred to as relativism, subjectivism, or multiplism) knowledge is usually perceived as a unique and individual construct – for this reason, all perspectives on the same phenomenon can make the same contribution as there is no absolute truth; (3) in a criterialist stance (also referred to as contextualism, criterialism, evaluativism, or objectivism-subjectivism) knowledge is considered as an individual and social construct which can be subjected to evidence by establishing standards for evaluation.

Dimensional models of epistemic beliefs can be contrasted with the long-standing assumption of cognitive developmentalists stating that children are not capable of a learning experience that activates epistemic strategies. However, that assumption has been challenged as a group of researchers on epistemology (e.g. Schommer, 1990; Bendixen et al., 1998) introduced an argument stating that epistemic beliefs were multidimensional constructs and their development manifested itself in a non-linear fashion. In other words, an individual can hold naive beliefs in one dimension while holding sophisticated beliefs in another one. Schommer-Aikins (Schommer, 1990) probed this assumption by postulating five dimensions of epistemic beliefs: certainty (knowledge is absolute and static vs. knowledge is changing and dynamic), simplicity (knowledge is a set of isolated facts vs. knowledge is a set of coherent and complex concepts), source (knowledge comes from an external authority vs. knowledge is actively constructed by the individual), speed (the learning process is quick vs. the learning process is gradual), and control (the ability to learn is innate vs. the ability to learn is acquirable). On one hand, some researchers (e.g. Hofer & Pintrich, 1997) did not include the latter two dimensions in their theoretical framework, arguing that they were not sufficiently epistemic in their nature. On the other hand, other scholars produced a rich line of research inquiry based on Schommer-Aikins' five-dimensional model (e.g. Bendixen et al., 1998). The empirical research on dimensional models was originally based on the nature of science. Initially, dimensional models were associated with a domain-general approach which was reflected by self-report Likert type items such as "truth means different things to different people" (ibid.). Subsequently, the same group of researchers attempted to contextualise the questionnaire items in relation to specific disciplines, forming domain-specific approaches.

Academic discipline domain models of epistemic beliefs are based on a domain-specific approach. Scholars who took this approach to design relied mostly on interviews, but also designed self-report questionnaires that were used by many other researchers investigating epistemic beliefs who intended to conduct research on "connections with the understanding of discipline knowledge and specific actions in the discipline, such as scientific research, historical argumentation, or activities related to comprehension of expert texts" (Juklová, 2020, p. 42). The Discipline-Focused Epistemological Beliefs Questionnaire by Hofer (DFBEQ; Hofer, 2000) can be considered as a pioneering instrument in the domain-specific approach, and soon after its development other self-report questionnaires followed,

e.g. Epistemic Beliefs About Science (EBS; Conley et al., 2004), the Epistemic and Ontological Cognition Questionnaire (EOCQ; Greene et al., 2010), and the Justification for Knowing Questionnaire (JFK-Q; Ferguson et al., 2013). The budding research on problem solving and the critical thinking of experts in their respective field showed that experts' knowledge was primarily domain-specific rather than domain-general, which in turn provided substantial support for the utility of academic discipline domain models (Corbett & Trask, 2000; McLeod, 1992). Furhermore, this new research avenue revealed that epistemic beliefs can also be context- and situation-sensitive (Muis et al., 2016). Since problem solving and critical thinking became the centre of the foci on progressively disentangling the factors behind individuals' successful academic task completion, further evidence found differences between the epistemic stances of experts and novices and their successful completion of domain-specific tasks; for instance, experts used more effective strategies when interpreting texts (Shreiner, 2014). These findings corresponded to the results of qualitative surveys by Greene and Yu (2014), who reported substantial differences in epistemological stances between biology and history experts. In their study, biologists considered higher-order knowledge as viewing the importance of finding relations among key terms as relations, whereas historians considered higher-order knowledge as assuming an interpretationist view towards text resources. The consistency of the domain-specific expert knowledge was also consistent with the conclusions of a meta-analytical study by Greene et al. (2018), who concluded that in the domain of history individuals tended to justify their knowledge by authority, whereas in the domain of science individuals mostly relied on logical axioms in justifying their knowledge. Thus, in contrast to dimensional models that assume knowledge to be relatively stable and generalisable across various contexts, epistemic beliefs in academic discipline models are conceived of as multidimensional constructs determined contextually, and for that reason these emphasise nuances when solving certain problems specific to learning situations (see Barzilai & Weinstock, 2015). It must be noted that these results were mostly supported by the use of a qualitative methodology and not by self-report questionnaires.

Philosophically informed models of epistemic beliefs have more recently been called on by researchers who attempt to develop theoretical frameworks to integrate empirical findings on epistemic beliefs in educational psychology with the original work pertinent to philosophical frameworks (Chinn & Rinehart, 2016; Greene et al., 2008; Murphy et al., 2007). Many studies have pointed out

that educational psychology research has departed from philosophy, where the concepts of epistemology originated (Murphy, 2003). Juklová (2020, p. 52) stated that "personal epistemology is grounded in traditional philosophy" but goes on to explain that the contemporary view of personal epistemology stems from naturalised epistemology, which departed from theorising about the origins of knowledge towards examining specific and socially relevant questions related to the modes of justifying decision-making processes and became combined with social epistemology, which examines the processes of the construction and justification of knowledge depending on the specificity of a particular social context. Deng et al. (2011) also emphasised that because of knowledge being embedded within a sociocultural context, epistemic cognition was inevitably linked to the context of a given sociocultural group, which was backed by empirical studies (Bråten et al., 2014; Davoodi et al., 2020). In educational psychology research, the term 'epistemology' has predominantly focused on the construction of knowledge within a social context; however, Chinn and Rinehart (2016) suggested that from a philosophical perspective epistemology goes beyond knowledge construction and proposed a theoretical framework consisting of three components: Aims and values (A), Epistemic ideals (I), and Reliable epistemic processes (R; hence AIR). For instance, in their framework of philosophically-informed epistemology, they defined "epistemic virtues" that include epistemic goals, epistemic values, intellectual courage, or wisdom, to name a few which belong among Epistemic ideals (I). Kainulainen et al. (2019) elaborated further theoretically on the connection between the AIR model and the regular routine work of historians.

Among all the above-mentioned models, researchers agreed that the pivotal component of epistemology referred to the justification of knowledge. Some scholars posited the justification of knowledge as "the central question of philosophical epistemology" (Greene et al., 2008, p. 146). The component justification of knowledge of epistemology was also operationalised in self-report questionnaires (JFK-Q; similarly EOCQ).

4. Epistemic beliefs in the context of the history domain

In spite of the absence of one unifying concept of historical thinking (Puustinen & Khawaja, 2020), there is a consensus that expert historians use complex cognitive processes when engaging in thinking about the past (Smith, 2017). Freedman (2015, p. 357) stated that "scholars often define historical reasoning as constructing defensible interpretations of the

past events". Resource use and argumentation appeared as the two shared concepts across the models of historical thinking (Reisman et al., 2019). Both relate to well-founded knowledge and the outcomes of reliable processes. The research platform between the domain of history and pedagogical-psychological research on epistemic beliefs relates to habitual thinking that affects individuals' ability to process the remnants of the past (VanSledright & Reddy, 2014). Following developmental trajectories of change in students' reasoning can be traced back to the 1950s (Amherst History Project; Committee on the Study of History, 1969). Some researchers focused on bringing history as a school subject closer to academic history (Wineburg, 1991) while emphasising so-called metaconcepts[2] (Reisman et al., 2019). These metaconcepts include time, change, cause, empathy, evidence, and motives (Lee, 2005), opinion, explanation (VanSledright & Maggioni, 2016), evidence of argumentation (Lee & Shemilt, 2003), significance (Seixas, 1996), and the term 'epistemology' (Seixas, 1996; Wineburg, 2001). Although first-order concepts (also substantive concepts – historical facts) are an integral part of history instruction, metaconcepts primarily shape history and transform its understanding (Seixas & Morton, 2013).

Many authors have attempted to postulate that epistemic beliefs in history have a linear developmental trajectory; however, research findings do not support this assumption and demonstrate a more complex picture. In an analysis of the responses of 12-year-old students, Foster and Yaeger (1999) revealed that many respondents were capable of sophisticated historic thinking (e.g. criticising the origins of information, detecting authors' biases, and identifying gaps in evidence). VanSledright (2002) found that fifth-graders can already acquire the conceptual understanding that the nature of history is interpretative and investigative. Therefore, the process of cognitive development can begin at a much younger age than postulated by the developmental models. Greene and Yu (2014), in their qualitative inquiry of eighth-graders' responses, discovered both less sophisticated ("Most of the time you don't really have to know the person's perspective, you just have to know what happened to really know the history" [p. 18]) and more sophisticated epistemic positions ("If you don't know how [historical figures] were thinking back then and how they were feeling then… you won't be as good in history, because you kinda, you gotta know how they're thinking and know what they're feeling to really understand them" [p. 18]).

[2] Also second-order substantive knowledge (VanSledright & Limón, 2006) or advanced conceptual, principled knowledge beliefs (Greene & Yu, 2014), second-order procedural understandings (Lee & Ashby, 2000).

Stoel et al. (2017) demonstrated that the transition to more sophisticated stages of epistemology might dwell on a shifting perspective in understanding the methods and criteria for verification of the facts from opinions and their justification. In connection with the use of criteria in justification, Mason et al. (2010) discovered four basic criteria for justification: (1) information cannot be evaluated because the event happened a long time ago and no one was there; (2) scientists determine the truth; (3) truth is determined by comparing multiple sources; (4) truth is determined by scientific evidence. The criteria were summarised from the reactions of eighth-grade history students to the following question: "Try to explain why, that is, on the basis of what do you think that some information you read on the Internet is true, while other information is not true?" (p. 75).

Feucht (2017) asked fourth-grade students the following domain-general questions: "How can you check existing knowledge? How can you verify what you know? What knowledge sources do you use and why?" (p. 12). In total, he revealed eight criteria, for instance, age and experience (older people usually know more and more accurately than younger ones), domain-specific knowledge (the teacher knows more in the domain than parents vs. parents know more about general matters than the teacher), distance (at school the student asks the teacher, at home parents), the quality of explanations (the tendency to choose a teacher over parents, but also pointing to a parent when more time is devoted to an explanation), and more. Feucht (2017) also documented the use of eight independent (senses, thinking, one's own research, trial-and-error method, logic and argumentation, analogy, evidence and experience), and three dependent criteria (questioning, searching external sources, and a combination of the previous two) for knowledge verification.

Kuhn and Weinstock (2002) argued that the transition from objectivist to subjectivist epistemic positions would have an earlier onset in areas in which reasoning does not coincide with speech (aesthetics) and then later in areas related to reasoning and using judgments and justifications related to the externalised and objective world knowledge associated with the natural sciences (e.g. mathematics). On the contrary, the transition from a position of subjectivism towards criterialism will appear earlier in domains and areas based on objectified scientific research, as the individual would primarily recognise the possibility of evaluating theories using empirical evidence. Similarly, in the context of dimensional models, Barzilai and Weinstock (2015) showed empirically that uncertainty occurs earlier in the domain of history than biology.

5. The measures of epistemic beliefs in the history domain

Studies in the first decade of the new millenium can be considered as an important milestone in addressing epistemic beliefs in history (Maggioni et al., 2004, 2009). Liliana Maggioni and her colleagues defined a three-tier model of developing epistemic beliefs in history. The Beliefs in Learning and Teaching History Questionnaire (BLTHQ; subsequently BHQ – Beliefs in History Questionnaire; Maggioni, 2010), originally designed for primary school teacher students, built on previous models of epistemic cognition (Kitchener & King, 1981; Kuhn et al., 2000) and historical thinking (Lee & Shemilt, 2003; VanSledright, 2011; Wineburg, 2001). Subsequently, other researchers began to focus explicitly on operationalising the construction of epistemic beliefs in the domain of history through self-report questionnaires (Greene et al., 2010; Stoel et al., 2017; Wiley et al., 2020) or using interviews (Feucht, 2017; McCrum, 2013).

Since the first use of the BHQ questionnaire (Maggioni, 2010), scholars have developed more refined methods for investigating epistemic beliefs in history focused on a wide array of ages. The EOCQ was developed as a self-report questionnaire designed to assess epistemic beliefs in maths and history targeting a range of learners from middle school to graduate students (Greene et al., 2010). The tool was validated on a sample of 740 students (127 middle-schoolers, 173 high-schoolers, 305 undergraduates, and 135 graduate students) in the subjects of history and mathematics. It contained three dimensions: simple and certain knowledge, justification by authority, and personal justification.

The JFK-Q questionnaire expanded on the self-report questionnaire developed by Jeffrey Greene and his colleagues and added the dimension of justification by multiple sources (five items) with some modifications to the items for the original domains, with the intention being to implement it in the science domains. The JFK-Q self-report questionnaire was subsequently validated on a sample of Norwegian tenth-grade students (Ferguson et al., 2012; Ferguson et al., 2013; Bråten et al., 2013). It must be noted that some item modifications were found to be problematic, more specifically the two items added to the domain of justification by authorities (Ferguson & Bråten, 2013) "When I read something about science based on scientific research, then I believe it is correct"; "I believe in claims that are based on scientific research" (p. 59) as the items align more with concept justification by scientific evidence more than justification by authority as their conceptual distinction is grounded in empirical evidence (Mason et al., 2010).

In order to emphasise the recent focus of the field on the epistemological aspects of justification of knowledge by scientific evidence, the emerging instruments focus on revealing the process of using multiple sources of evidence that help to find the most correct information. One of the instruments assessing these aspects of epistemic beliefs in history is Value of Integration (VI; Wiley et al., 2020), a scale assessing beliefs about using multiple documents, which was validated using a sample of 553 first-year college students. The scale was also applied as a pre-test and post-test measure in three experiments focused on college students' epistemic beliefs, but the third experiment also included a sample of middle school students (aged 11 to 14 years; $N = 325$). Jennifer Wiley and her colleagues found positive significant correlation with the use of corroboration strategies ($r = 0.23$). Another instrument, a 26-item scale (six-point Likert) aimed at identifying less or more sophisticated epistemic beliefs on a sample of Dutch 11th- and 12th-grade students ($N = 922$) was developed by Stoel et al. (2017). The authors both adapted existing questionnaires and added several of their own items (Buehl, 2003). The authors presented the final version as a dimension of History Methodology (HISTM) which demonstrated sufficient psychometric properties (Cronbach's alpha = 0.79). The average students scored 4.61 points on the scale; the scale demonstrated a positive significant correlation with interest in history as a subject ($r = 0.35$) and with student marks in the subject of history ($r = 0.20$). Stoel et al. (2017) argued that the transition from less to more sophisticated epistemic stances was probably not based on changes in the understanding of what knowledge and knowing is but rather on a shift of their perspective in using methodological procedures in assessing the "truth".

6. Present study

The current study investigated the utility of the translated self-report questionnaires designed to measure middle school students' epistemic beliefs in the domain of history within the Czech classroom environment. The investigation procedure was divided into three stages. In the first stage, the selected self-report questionnaires were back-translated and refined by cognitive interviews. In the second stage, the refined self-report questionnaires were administered to middle school students in order to compare the theoretical and empirical structure of the composed factors. In the third stage, the students' epistemic beliefs were compared to their academic performance.

6.1 Sample

The current study was conducted in the Czech educational context. Participants were purposefully (non-randomly) recruited through regular

public secondary schools, with seventh-, eighth-, and ninth-graders being purposefully targeted. The schools were located in the North Bohemia region. The classroom teachers followed the researchers' protocol for administration and data collection carefully while conducting both the cognitive interviews and the data collection. The study was approved by the ethics committee of the local university's Review Board. All the participants were included in the study upon parental/guardians' consent being obtained. The informed consent form distributed to parents/guardians included the information that the participants were allowed to reject or discontinue their participation in the study at any time without incurring any penalty.

6.2 Methods and measurements

Epistemic beliefs. The authors selected four self-report questionnaires dealing with epistemic beliefs from the set of EOCQ (Greene et al., 2010) that were focused on the following dimensions: Certain and Simple Knowledge (CS, five items), Personal Justification (PJ, four items), Justification by Authority (JA, four items), and an added dimension from JFK-Q (Ferguson et al., 2013) called justification by Multiple Sources (MS, five items). These dimensions were most prominently used in the previous research on the epistemic beliefs and also related to academic achievement (Greene et al., 2018). All the items in the questionnaire were assessed on a six-point Likert scale. Furthermore, two additional scales were added to the pool of epistemic beliefs instruments EOCQ and JFK-Q in order to keep up with the current trend in epistemology focusing on the concepts of evaluating historical sources. Therefore, two additional dimensions were included in the validation study: a six-item scale on the Value of Integration when working with multiple documents (VI; Wiley et al., 2020) and a six-item scale on Historical Methodology in generating historical knowledge (HISTM; Stoel et al., 2017).

Demographics. In addition to the scales, basic information about the sample was obtained, including, the academic grade (seventh, eighth, ninth, other) and self-identified gender (male, female, other), which is displayed in more detail in Table 2.

Achievement. Following the example of similarly implemented studies (Belland et al., 2019; Zohar & David, 2008) documenting the link between school marks and the construct of epistemology in pedagogical-psychological research as a proxy of academic achievement, the end-of-grade marks in the subjects of Czech language and history (1-5, where 1 = the highest mark, 5 = the lowest mark) from the previous school year were obtained from the school registries. Furthermore, the students completed a reading passage on

a historical text (472 words) about Pizzaro and the Inca tribes (Kašpar, 1992) that was used in the previous study that piloted the instrument (N = 350, seventh- and eighth-grade participants) and a quasi-experimental study (for details see Říčan & Pešout, 2021). Kuder-Richardson Formula 21 estimated r = 0.61; the items had acceptable difficulty ranging between 0.20 and 0.80 (Chráska, 2002). The correlation to another reading comprehension test assigned to the students was strong (r = 0.585, p < 0.001). The text was followed by twelve multiple-choice comprehension questions with one correct answer and three distracters; the correct responses were summed up to generate a score ranging from zero to 12.

6.3 Procedure

Stage 1: Translation and cognitive interviews

In the first step of the first stage, the items were translated, following the guidelines of cross-cultural research practices (Klassen et al., 2009): (1) forward and back-translation, (2) involvement of bi- or multi-lingual individuals, (3) a reflection on whether the changes in the translations only reflect the consideration of sociocultural and linguistic differences and do not distort the original meaning of the research tool (meaning-based approach).

In the second step, we conducted cognitive interviews to assess the correctness of the translation and participants' understanding, also called 'reflective cognitive validity', that tested "whether respondents' cognitive processes during test performance mirrored those intended by test designers" (Karabenick et al., 2007, p. 140) and whether the participants' answers corresponded to the theoretical basis of the validity criteria (Woolley et al., 2004). The emphasis of the cognitive interviews was concentrated on cases of references to abstract concepts (e.g. facts, evidence, measurements). Karabenick et al. (2007) wrote that "... epistemic beliefs […] require considerable self-reflection and abstraction, which poses fundamental challenges regarding the constructive nature of what respondents – especially children – are capable of reporting about themselves" (p. 144).

In order to determine the ability of middle school pupils to understand the items in the tools used in this part of the survey, two rounds of cognitive interviews were conducted (9/2020, N = 19; 5/2021, N = 12). Both rounds took place on the grounds of the schools that the pupils were attending in the North Bohemia region. The legal representatives of the participants agreed to the interviews being conducted by approving the informed consent. The interviews were conducted by history teachers trained in conducting cognitive interviews. At first, the participants were asked to read the items out loud. A three-step procedure followed:

(1) Interpretation of the item (scale of acceptable interpretations of the item):

Questions: *What is the item asking? What does the item want to know from you? Could you tell me a little more about what the item means to you? Could you give me an example?*

(2) Coherent elaboration (scale of acceptable answers in the context of experiences, thoughts, and feelings).

Questions: *What thoughts/experiences/feelings come to mind after reading this item? Does the item remind you of something (association, experience, situation)?*

(3) Coherent choice of answers (consistency of answers in the context of coherent elaboration) including justification of the choice.

Questions: *Which answer would you choose? Could you explain why?*

Stage 2: Structural Validity

To establish the structural validity of the adapted measures, the researchers used CFA to compare the intended factor structure of the original scales to the data obtained in the Czech sample of 309 middle school students that was pooled from 14 schools (17 classes) in the North Bohemia region spanning the seventh to the ninth grade. The questionnaires were completed in paper-and-pencil format by 304 subjects; therefore five subjects were removed from further analysis. No imputation technique was used to deal with the missing data as the proportion of the missing data was large relative to the sample (up to 28%), very few additional variables were collected and the nature of the missingness was non-random, and the items that were administered towards the end of the data collection were omitted more often than the items administered at the beginning. All these reasons suggest that imputed data would produce biased estimates.

The descriptive analysis suggested that all the items demonstrated sufficient variance (SD < 0.85); all the item responses included values across the entire range from 1 to 6 (except for one item, HISTM.5, where the min. = 2) and low skewness, which all deemed the item to be acceptable.

The goodness-of-fit indices (Hu & Bentler, 1999) were used to determine the structural soundness of the models on the basis of collected data. Specifically, χ^2, *CFI*, *TLI*, *RMSEA*, *SRMR,* and their cutoff values were used to determine the plausibility of the models with regard to the use of the ordinal variables collected in the current study (Xia & Yang, 2019). The ordinal nature of the data collected by a Likert scale led to choosing the diagonally weighted least squares estimator to obtain less biased estimates (Li, 2015). In order to evaluate the loadings of all the items on dimensions, we refrained from using a common marker method of constraining the loading of the first item in a row. Instead, the variance of the latent variable was constrained,

and all item loadings were allowed to be freely estimated.

Since the EOCQ questionnaire comprises four dimensions: Certain and Simple Knowledge, (CS), Justification by Authority (JA), Personal Justification (PJ), and Multiple Sources (MS), the possibility of using a second-order model with a latent factor explaining all or some of the dimensions was also considered. However, in the first step, all the EOCQ dimensions and VI and HISTM were assessed separately, followed by testing the possibilities for higher-order latent variables.

Stage 3: Convergent and Criterion Validity

The scores in all the finalised epistemic beliefs scale dimensions were correlated to each other and compared to the students' achievement in the form of marks obtained and reading comprehension scores for the reading passage. The relationships between the academic achievement and the dimensions were overviewed by using a correlational matrix.

7. Results

Stage 1: Back-translation and Cognitive Interviews

The two back-translations of the self-report questionnaires were edited on the basis of the cognitive interviews that were conducted. 16 items were selected for major revisions and four for minor revisions. Specifically, several terms (e.g. history, facts, sources) were marked as potential causes of decreased comprehension, and therefore the terms and language of the items were revised and edited on the basis of age-appropriateness and the cultural specifics of the classroom context. At the same time a mini-dictionary of identified terms that appear in the items (fact, source of historical information, historian, statement, opinion, evidence) was added to the self-report questionnaires (see the Czech and English versions of the self-reported questionnaires in Table 1).

Stage 2: Structural Validity

In the next stage, the CFA tested the original factor structure on the dataset collected from the sample of middle school students. The individual scales converged as single dimensions of epistemological beliefs. However, in nearly every scale, one or two items were eliminated as they did not meet the criteria for a sufficient loading value (≥ 0.30), with the exception of the JA and VI dimensions, in which all items were retained (see Table 5). The eliminated items included: EOCQ.1, EOCQ.5, EOCQ.10, EOCQ.18, HISTM.1, and HISTM.4. The factor analysis also revealed that the item EOCQ.13 has a negative loading on the PJ dimension, which warrants edits in item reinterpretation.

Table 5 displays the goodness-of-fit indices for every individual dimension

except for the eliminated items. Since two items were removed from the CS dimension, which resulted in a just identified model, the loading of item EOCQ.2 that demonstrated the highest loading was constrained and the model rerun to obtain the estimate. The model for the CS dimension resulted in an optimal fit. A similar procedure was applied to the PJ dimension, constraining the loading of item EOCQ.11. However, the model for PJ dimensions did not result in an acceptable fit [$\chi^2_{(2)}$= 5.838, p = 0.016 *CFI* = 0.896, *TLI* = 0.688, *RMSEA* = 0.128, p_{RMSEA} = 0.06, *SRMR* = 0.046] and for that reason its final version is not reported in Table 4. The reported EOCQ.2 and EOCQ.11 loadings on the CS and PJ dimensions, respectively, were taken from the model prior to the constrained models. Furthermore, the CFA also revealed that in the MS dimension one indicator (*TLI* = 0.833) raised concerns with regard to its structural validity. All the other models resulted in an acceptable fit.

Stage 3: Convergent and Criterion Validity

The finalised dimensions were correlated to each other and the achievement variables (Table 6). Four comments on the displayed results of significant correlations were noteworthy. First, the correlation table revealed a bundle of intercorrelations among CS, JA, and PJ. While the CS dimension is correlated with the two other dimensions positively (r = 0.17–0.27), the JA and PJ dimensions were correlated negatively (r = -0.14). However, these correlations demonstrated a low strength of association. Second, a second bundle of even intercorrelations occurred among the dimensions of MS, VI, and HISTM. The moderate positive associations suggested some conceptual overlap among the constructs that were assessed (r = 0.36–0.64). Third, the JA dimension also manifested a positive relationship (r ~ 0.25) to the two dimensions VI and HISTM that related to the relevance of evaluating knowledge of history on the basis of multiple sources of information. Fourth, supporting evidence that epistemic beliefs also related to academic achievement emerged in the data that was presented by inspecting the students' epistemic beliefs in relation to their performance in comprehension of the historical passage. While the CS dimension correlated negatively to the comprehension performance (r = -0.21), the three constructs that measure the dimensions related to the importance of using multiple sources of information showed positive correlations (r ~ 0.20). Moreover, a weak but negatively significant correlation (r = -0.16) was also demonstrated for the MS dimension and the students' grades. Those students with higher grades in Czech language demonstrated an increased tendency to use multiple sources in assessing the value of knowledge.

8. Discussion

The current study inspected the measurement properties of back-translated self-report scales assessing six dimensions of epistemic beliefs in history among middle school students. Following the recommendations of Greene et al. (2018), the selected dimensions focused on domain-specific knowledge. In three stages, the study demonstrated that epistemic beliefs can be assessed by self-report questionnaires and discusses three major findings that can be summarised in two methodological and developmental recommendations for further research. The study showcased that self-report measures of epistemic beliefs could be successfully adapted to the Czech middle school classroom environment.

First of all, the back-translations of the items were checked by conducting cognitive interviews with a selected sample following the cross-cultural practice of adopting scales used in other languages and cultures (Karabenick et al., 2007; Klassen et al., 2009). This resulted in a final Czech version of the six scales accompanied by a mini-dictionary included in the instructions. The factor structure of the items closely corresponded with the originally intended dimensions of the scales (Greene et al., 2010; Stoel et al., 2017; Wiley et al., 2020). The final scale versions were reduced as on the evidence of the CFA several items did not contribute to structurally robust assessment. In most cases, the elimination of items excluded one or two items from a scale and this did not have a larger impact on the structural properties of the assessment method. In the case of the CS dimension, despite two discarded items the additional constraint on the model helped verify the structural properties of the scale, which resulted in an optimal fit. In the case of the PJ dimension, the item elimination resulted in three item scales that were not sufficient for examining the structural validity of the scale. Despite the attempts to constrain the parameters of the model, the scale did not demonstrate sufficient parameters for an acceptable fit. The MS dimension demonstrated acceptable fit even after one item from its original version had been eliminated; however, not all indicators were in line with the results, which warrant some caution and further investigation for the future use for the scale. The HISTM dimension demonstrated an acceptable fit despite one item being removed because of small loadings. Both the VI and JA dimensions showed a good and optimal fit, respectively, without having any items removed. It must be noted, however, that in terms of self-report epistemic belief measures, the prior studies reported factor loadings and psychometric indices, especially item consistency indices, that tended to be lower, specifically among younger

populations (Říčan et al., 2022). In school age, epistemic beliefs are still in a stage of development, causing incoherent and contradictory beliefs which could potentially jeopardise the efforts to reliably capture the assumed belief constructs. Wiley et al. (2020) stated that there is a possibility that middle school students "are responding with an acquiescence bias due to lacking explicit beliefs to guide their responses to the scale items" (p. 12). Furthermore, despite the fact that the cognitive interviews attempted to dispel most of the language inclarities, the conceptual complexity presents a language challenge in formulating fairly complicated meanings using simple words. Therefore, future item revisions are necessary, especially for the items that were excluded from the final factor analyses. Future studies using this set of items are strongly recommended to inspect their item analysis and perhaps factor structure and determine whether all the items contribute coherently to the construct assessment.

Second, the lack of structural changes in the validated scales within the structural validity stage supported the idea that the original meanings and interpretation of the translated scales can be preserved. Furthermore, the scale intercorrelations suggested additional support for construct validity among the epistemic belief scales that were investigated. Firstly, the moderate intercorrelations among the MS, VI, and HISTM dimensions corroborated the focus of all three scales on assessing the epistemic criteria of the use justification by multiple sources. Specifically, the MS dimension explains the extent to which an individual believes a statement can be verified by multiple sources of information. Despite the fact that the psychometric properties of the scale may bring some words of caution, the scale demonstrated some potential for a valid measurement method. The VI dimension assesses whether a statement can be verified by finding a causal explanation in tracable evidence in multiple sources. Again, the current study evidenced that the scale might potentially be used as a valid measure of a specific part of epistemic beliefs. Moreover, the HISTM dimension assesses whether a statement can be verified by appraising a domain-specific procedure. The scale demonstrated sufficient structural validity. Additionally, the weak but significant correlations among the CS, JA, and PJ dimensions supported the finding that the dimensions were distinct but conceptually close. That supports the conceptual proximity of the constructs developed by Greene et al. (2010). Interestingly, the CS dimension was positively related to both the JA and PJ dimensions, whereas the JA and PJ dimensions were negatively correlated to each other. Higher scores in the CS dimension suggested that the individual beliefs the knowledge is certain and simple.

The JA dimension explains the extent to which an individual believes that the truth (knowledge) can be determined by authority and other external social figures (e.g. parents, teachers, or a textbook). In contrast, the PJ dimension explains the extent to which an individual believes that truth (knowledge) can be determined by inner logic based on one's own observations, experience, and reasoning. Attempts to find a common shared latent factor were only partially successful for the JA and PJ dimensions, and therefore the dimensions need to be viewed as individual concepts. Furthermore, the JA dimension demonstrated excellent fit and psychometric properties as a standalone tool; however, the PJ dimension requires some further item revisions and possibly the addition of some extra items. Future research can follow up on searching for underlying relationships among the suggested constructs and explain the nuanced views of the complexityof epistemic beliefs. The current study concludes that a structurally more complex view of the relationship among the epistemic belief concepts that were investigated might be required.

Third, on the basis of the previous findings the current study attempted to find a relationship between measured epistemic beliefs and academic achievement (Greene et al., 2018). Four out of six of the domains that were explored were related to students' reading comprehension scores for a history text. Interestingly, CS related negatively to text comprehension, as expected, but no significant correlation was found with regard to student marks. This may suggest that the domain of reading comprehension might require belief in the need for a more complex and interpretive meaning of what is true. MS, VI, and HISTM all demonstrated a positive relationship with text comprehension. This suggests that holding beliefs about the importance of using multiple sources for verifying information might be in a relationship with reading comprehension performance. Future experimental studies can examine causal effects to further the arguments that promoting epistemic beliefs can have positive effects on academic achievement. In contrast, a significant relationship between History and Czech language marks was lacking, except for the MS dimension, which was related to students' end-of-grade marks in Czech language. This relationship could be attributed to the fact that success in the subject Czech language arts might be based on being a keen reader and familiarity with many literary sources. Therefore, the tendency to search for multiple sources of information can be reflected in the belief that the quantity of information sources could help an individual to find the value of statement. The lack of a relationship between the epistemic beliefs and end-of-grade history marks could simply address the fact

that the end-of-grade marks are based on school- and teacher-specific criteria and the underlying epistemic concepts might not be apparent unless history-based inquiry projects are more emphasised in Czech history classrooms. The JA dimension demonstrated the strongest potential for a solid measurement tool supported by all the indicators that were observed. However, the follow-up correlations make the concept more difficult to interpret. On one hand, there was a negative correlation with personal justification, but on the other hand positive significant correlations related to CS, VI, and HISTM, the two constructs concentrated on using justifications based on multiple documents (mainly VI) and the dimension focusing on historical methodology (HISTM). Therefore, the concept might have some developmental significance, as integrating multiple documents and following historical methodology will be dictated by following authorities in the early stages of epistemological development, as observed in the current sample of middle schoolers. However, as the learners' historical knowledge grows deeper and becomes individualised through their developing their own perspective on historical facts and comprehension of them, we might observe that their judgments may succumb to their personal positions based on cross-comparing multiple sources and their concentration on the views of authorities will slowly wane. A study observing the developmental trajectory of the construct interrelations would provide a more empirically grounded support for the nuances in the developmental interactions among the concepts of epistemic beliefs in knowledge of history.

In addition, the developmental trajectories can be contingent on specific individual differences such as gender. However, the current study did not show any statistically significant differences between the genders. Future studies that focus on the individual differences between students that include a larger pool of demographic variables are warranted.

9. Limitations and future directions

The current study also had multiple limitations that could be pointed out by the fact that it used only a limited selection of self-report scales on the concepts of epistemic beliefs. A more complex view on epistemic beliefs would be preferable, either by increasing the numbr and variety of the scales and items or by conducting a more qualitatively focused research study. Most current evidence is based on self-report scales that might limit a broader view on the phenomena of epistemic beliefs and their manifestations from the developmental perspective and learning sciences (Sosu & Gray, 2012). An approach that triangulates the data sources could provide

greater insight into the complex area of epistemology research. Schraw (2013) lists six methodological approaches (questionnaires, interviews, vignettes, essays, concept maps, and multidimensional scaling methods) that can be used to identify epistemic beliefs. Only one of the above approaches was used in this study and it would be most appropriate for the results of this study to triangulate (validate) them with other approaches, even when based on the dangers of social desirability in the genesis of responses (Bartels & Magun-Jackson, 2009). We also call for investigation of the links between epistemic beliefs and essential aspects of learning and teaching processes, which was not conducted in this study (problem-solving ability, argumentation, learning approaches, self-regulated learning, metacognition, proper use of research approaches, etc.). Furthermore, the self-report questionnaires were taken from a foreign and thus different socio-cultural environment and interpretations related to the educational policy and cultural practices, and nuances in intellectual understanding of the world can be inherent in culture and language (Hamamura et al., 2008). The VI and HISTM scales were validated on high school students in their original versions. Thus, an explanation is offered that middle school students cannot use a tool primarily developed to address the multidimensional concept of epistemic beliefs in the adult population, as their own understanding of knowledge – their epistemic beliefs – changes and evolves with age (Pirttilä-Backman & Kajanne, 2001). Also, despite the rigorous methodological approach to translating individual items and conducting cognitive interviews, it is possible that there has been a significant shift between the original and translated versions. It can be speculated that the interpretation of the meaning of individual items, especially for middle school students, is heavily burdened by context. Cam et al. (2012) attribute low values of internal consistency to cultural differences and poor translation. The insufficient internal consistency of some scales should also be further explored by evaluating other reliability criteria (e.g. test-retest, item-response theory) or by adding items. The current study was limited by time and resources; however, future investigations need to cover a larger conceptual spectrum of epistemic beliefs in history education to provide a more nuanced picture of what criteria are used in knowledge justification in middle school populations (see qualitative studies – Feucht, 2017; Mason et al., 2010). The study was also limited by the sample in terms of size, location, and convenience sampling. Only a specific region was selected; therefore, the findings of the current study should be interpreted accordingly. The psychometric properties of quantitative self-report questionnaires continue to

be discussed, as does the variability of empirical findings across studies and contexts (Greene et al., 2018).

10. Conclusions and recommendations

The present empirical study focused on the measurement of epistemic beliefs in the domain of history. Structural validity was determined through confirmatory factor analysis and convergent validity of individual dimensions of epistemic beliefs by scale intercorrelations and comparison to performance achievement.

On the basis of the original model of Kintsch, Perfetti et al. (1999) proposed a theory of document representation (Documents Model Framework, DMF – also Britt et al., 1999; Multiple Document Comprehension, MDC – Bråten & Strømsø, 2010) that extended the original two levels by an intertext layer, which refers to the mental representation of meta-information such as authors, characteristics of text sources, and ratings of text reliability or quality (Wiley et al., 2009). Bråten et al. (2011) subsequently put the construct of epistemic beliefs into the multiple document comprehension framework. As the authors further add, students with less sophisticated epistemic beliefs (knowledge is certain and unchanging without the need to justify knowledge on the basis of multiple sources) use superficial learning strategies when working with multiple documents and seek a single truth while not paying attention to the author of the source.

Hofer (2004) revealed that the tendency to perceive knowledge as a certain and simple construct is related to a cursory search for sources (low need to search for evidence, low integration of information across multiple sources) and a low level of metacognitive monitoring. Similarly, Bråten and Strømsø (2010) revealed a higher rate of use of metacognitive strategies (planning, monitoring, and regulation) in individuals who tended to justify knowledge on the basis of reasoning, rules of inquiry, evaluation, and integration through multi-source work. Iordanou et al. (2019) demonstrated that those individuals who are convinced of the need to justify claims with knowledge based on critical thinking, research rules, evaluation, and integration of information from multiple sources showed a higher level of metacognitive thinking when working with contradictory claims.

The importance of the topic (creating a coherent mental representation when working with multiple sources) is underlined by the monothematic third issue of the journal *Educational Psychologist* from 2017 (Models of Multiple Text Comprehension), while the role of epistemic beliefs is emphasised in individual contributions. The above-mentioned research studies illustrate the importance of reasoning knowledge based

on multiple sources with multiple aspects of effective learning, while the present study demonstrated the predictive potential of three self-assessment scales based on this principle in relation to reading comprehension of a single text (r = 0.17, 0.26, 0.21) and in relation to assessment in Czech language (r = -0.16). The current study indicated the possibility of using the self-report scales presented here to determine the epistemic beliefs of seventh-to-ninth-graders and invites future researchers focused on academic achievement and higher-order thinking to include the study of adolescents' epistemic beliefs in their line of research inquiry.

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ŘÍČAN, J., PEŠOUT, O. Analýza sebeposuzovacích dotazníků zjišťujících epistemická přesvědčení žáků druhého stupně ZŠ ve vyučovacím předmětu dějepis

Výzkum v oblasti epistemických přesvědčení v rámci vyučovacích předmětů vycházejících ze sociálních disciplín nabývá v České republice na významu. Současná literatura dokládá vazbu mezi epistemickými přesvědčeními a rozmanitými aspekty učení zahrnujícími akademickou výkonnost a porozumění čtenému. Předkládaná studie je zaměřena na zjišťování epistemických přesvědčení žáků 2. stupně ZŠ v doméně historie. V úvodu je čtenář seznámen s výzkumem v této oblasti od počátku 50. let 20. století s akcentem na modely epistemických přesvědčení a způsoby měření. Cílem empirické části práce bylo zjistit vlastnosti čtyř adaptovaných sebeposuzovacích dotazníků zaměřených na epistemická přesvědčení žáků druhého stupně v doméně historie. V prvním kroku byly vybrané sebeposuzovací dotazníky přeloženy způsobem doporučovaným při kroskulturních výzkumech s následnou dvoukolovou realizací kognitivních interview. Hlavní studie proběhla v květnu a červnu roku 2021 na vzorku N = 303 žáků sedmých, osmých a devátých tříd. Konfirmační faktorová analýza následovaná korelační analýzou demonstrovaly rozmanité stupně podpory pro vybrané dimenze sebeposuzovacího dotazníku EOCQ, pro škálu zaměřenou na ocenění procesu integrace a pro škálu zaměřenou na ocenění významu metodologických procedur při generování historické znalosti. Porozumění čtenému pozitivně korelovalo s epistemickými dimenzemi zaměřenými na ocenění odůvodňování znalosti na základě více zdrojů, na ocenění procesu integrace a významu metodologických procedur. Hodnocení z předmětů dějepis a český jazyk a literatura neprokázalo konzistentní vazby s dimenzemi epistemických přesvědčení. V závěru jsou navrhována praktická a metodologická doporučení při užití sebeposuzovacích dotazníků v kontextu běžné třídní praxe.

Klíčová slova: *epistemická přesvědčení, didaktika dějepisu, druhý stupeň ZŠ, konfirmační faktorová analýza*

Appendix

List of Tables:

Table 1 The finalised back-translated wording of the items and the original version

Code	EN version (items & scales)	CZ version (items & scales)
Epistemic and Ontological Cognition Questionnaire (1st, 2nd, 3rd dimensions) + Justification for Knowing Questionnaire (4th dimension)		
	Simple and Certain Knowledge	**Jistá a jednoduchá znalost**
EOCQ.1	In history, the truth means different things to different people.*	Co je v dějepise pravda, znamená pro různé lidi odlišné věci.*
EOCQ.2	To know history well, you need to memorise what you are taught.	Abych dobře uměl dějepis, je nutné si zapamatovat všechno, co se učím.
EOCQ.3	In history, what is a fact today will be a fact tomorrow.	V dějepise platí, že co je pravdou dnes, bude pravdou i zítra (fakta se v průběhu času nemění).
EOCQ.4	Historians' knowledge of the facts about history does not change.	Znalosti historiků o dějepisných faktech zůstávají stejné.
EOCQ.5	History is so complex that humans will never really understand it.*	Dějiny jsou tak složité, že jim lidé nikdy pořádně neporozumí.*
	Justification by Authority	**Odůvodňování autoritou**
EOCQ.6	If a historian says something is a fact, I believe it.	Pokud o něčem historik řekne, že je to fakt, věřím tomu.
EOCQ.7	Things written in history textbooks are true.	Informace napsané v učebnicích dějepisu jsou pravdivé.
EOCQ.8	I believe everything I learn in history class.	Věřím všemu, co se učím v hodinách dějepisu.
EOCQ.9	If a history teacher says something is a fact, I believe it.	Pokud o něčem učitel dějepisu řekne, že je to fakt, věřím tomu.
	Personal Justification	**Osobní odůvodňování**
EOCQ.10	In history, everyone's knowledge can be different because there is no one absolutely right answer.	V dějepise se mohou znalosti každého lišit, protože neexistuje jen jedna správná odpověď.
EOCQ.11	In history, if you believe something is a fact, no one can prove to you that you are wrong.	Pokud jsem o nějaké události v minulosti přesvědčený/á, že se odehrála nějakým způsobem, nikdo mně nemůže dokázat, že se mýlím.
EOCQ.12	In history, what is a fact depends upon a person's point of view.	To, co je v dějinách fakt, záleží jen na tom, co si člověk myslí (jen na jeho úhlu pohledu).
EOCQ.13	Historical knowledge is all factual and there are no opinions.*	Dějepisné znalosti jsou všechny faktické a není zde prostor pro žádné názory.*
	Justification by Multiple Sources	**Odůvodňování více zdroji**
EOCQ.14	To be able to trust knowledge claims in natural science texts, I have to check various knowledge sources.	Abych uvěřil/a dějepisnému textu, musím si k tomu přečíst další zdroje dějepisných informací.
EOCQ.15	To detect incorrect claims in texts about natural science, it is important to check several information sources.	Abych nalezl/a v dějepisných textech chybná tvrzení, je důležité si ověřit, co uvádějí jiné zdroje dějepisných informací.

EOCQ.16	I can never be sure about a claim in natural science until I have checked it with at least one other source.	Nikdy si nemohu být jistý/á tvrzením o minulosti, dokud ho nemohu porovnat alespoň s jedním dalším zdrojem dějepisných informací.
EOCQ.17	Just one source is never enough to decide what is right in natural science.	K rozhodnutí o pravdivosti dějepisné informace jeden zdroj nikdy nestačí.
EOCQ.18	To decide whether something I read about natural science is correct, I have to check whether it is in accordance with other things I have read or heard about natural science.	Když si přečtu něco o minulosti, tak je to pravda, jen když to souhlasí s tím, co jsem už předtím o tom četl/a nebo slyšel/a.
	Epistemic beliefs about the value of engaging in the integration of information when constructing historical explanations in a multiple-document context	
VI.1	To understand the causes of historical events, you need to connect evidence using reasoning.	Abych pochopil/a příčiny dějinných událostí, musím propojovat důkazy.
VI.2	History is best understood by acting like a detective and connecting all the known facts.	Studium dějin je podobné, jako když se detektiv snaží dát všechna známá fakta dohromady.
VI.3	When you read about history, you should have the most trust in explanations based on evidence.	Když si čtu o dějinách, tak bych měl/a nejvíce důvěřovat vysvětlením, která jsou podpořená důkazy.
VI.4	When you read about history, you have to check what other sources say.	To, co si přečtu o dějinách, musím zkontrolovat s dalšími zdroji dějepisných informací.
VI.5	To find out whether what you read is accurate, you should compare multiple sources.	Chci-li zjistit, že to, co čtu o dějinách, je pravdivé, měl/a bych to porovnat s dalšími zdroji dějepisných informací.
VI.6	When you read about something new in history, you have to think about other things you have learned about the topic.	Když si čtu něco nového o dějinách, musím přemýšlet, co už o tom vím.
HISTM	**Dimension focusing on historical methodology**	
HISTM.1	History is an appropriate subject to develop inquiry skills.	Dějepis je dobrý předmět k tomu, abych se naučil/a, jak věci zkoumat.
HISTM.2	In history education it is important that you learn to support your reasoning with evidence.	Ve výuce dějepisu je důležité naučit se uvažovat na základě důkazů (podložit své názory důkazy).
HISTM.3	History is a critical inquiry about the past.	Historie jako věda je o kritickém zkoumání minulosti (rozbor a hodnocení informací z více úhlů pohledu).
HISTM.4	In history you must learn to deal with conflicting evidence.	Ve výuce dějepisu je nutné naučit se pracovat s protichůdnými důkazy
HISTM.5	In history there are various methods to assess the reliability of historical accounts.	Historie jako věda má různé možnosti (metody), jak ověřit důvěryhodnost různých tvrzení o událostech v minulosti.
HISTM.6	A good historical account discusses multiple perspectives on the past.	Správné tvrzení o události v minulosti bere v úvahu různé pohledy na tuto událost.

Note: * These items were worded in a manner opposite to the other items.

Table 2 Demographics of the sample to which the back-translated instruments of epistemic beliefs about history were administered

		7th grade	8th grade	9th grade	All grades
N		101	129	79	309
Gender					
	females	42	75	40	157
	male	49	43	20	112
	NAs	10	11	19	47
Language EOG					
	"1"	27	20	9	56
	"2"	32	34	21	85
	"3"	6	21	12	39
	"4"	2	3	1	6
History EOG					
	"1"	20	25	14	59
	"2"	30	28	22	80
	"3"	13	20	5	38
	"4"	3	3	2	8
	"5"	1	0	0	1

Table 4 Goodness-of-fit indicators of the final model solutions across all dimensions of assessed epistemological beliefs

Model	*N*	$\chi 2$	*df*	*p*	*CFI*	*TLI*	*RMSEA*	$P_{RMSEA} < 0.05$	*SRMR*	Alpha
Certain and Simple Knowledge (CS)	301	1.571	1	0.210	0.994	0.982	0.044	0.366	0.025	0.48
Justification by Authority (JA)	297	2.222	2	0.329	1.000	1.004	0.000	0.662	0.012	0.79
Personal Justification (PJ)	297	0.000	0	Model is just identified						0.47
Justification by Multiple Sources (MS)	290	20.159	2	< 0.001	0.944	0.833	0.177	0.001	0.046	0.67
Value of Integration (VI)	231	19.953	9	0.018	0.945	0.909	0.073	0.168	0.050	0.60
Historical Methodology (HISTM)	226	9.771	5	0.082	0.945	0.972	0.065	0.283	0.039	0.59

Table 3 Item descriptors of the scales of epistemic beliefs in history that were administered

Items	***N***	***Min***	***Max***	***Mean***	***SD***	**Skew***
EOCQ.1	303	1	6	2.33	0.94	0.76
EOCQ.2	302	1	6	3.94	1.24	-0.13
EOCQ.3	302	1	6	3.19	1.36	0.22
EOCQ.4	303	1	6	3.20	1.15	0.10
EOCQ.5	300	1	6	3.38	1.22	0.28
EOCQ.6	302	1	6	3.62	1.05	-0.51
EOCQ.7	299	1	6	3.89	1.04	-0.53
EOCQ.8	300	1	6	3.95	1.16	-0.41
EOCQ.9	300	1	6	4.04	1.13	-0.61
EOCQ.10	301	1	6	4.52	1.05	-0.55
EOCQ.11	297	1	6	3.48	1.27	0.11
EOCQ.12	302	1	6	3.31	1.21	0.03
EOCQ.13	301	1	6	3.84	1.17	-0.17
EOCQ.14	293	1	6	4.12	1.05	-0.42
EOCQ.15	293	1	6	4.57	0.93	-0.80
EOCQ.16	291	1	6	4.31	1.06	-0.71
EOCQ.17	292	1	6	4.49	1.07	-0.74
EOCQ.18	291	1	6	4.06	1.01	-0.71
VI.1	236	1	6	4.31	1.00	-0.74
VI.2	235	1	6	4.14	1.06	-0.61
VI.3	236	1	6	4.67	1.03	-1.08
VI.4	236	1	6	4.36	1.01	-0.87
VI.5	235	1	6	4.15	0.98	-0.62
VI.6	232	1	6	4.50	0.97	-1.06
HISTM.1	233	1	6	4.33	1.04	-0.47
HISTM.2	230	1	6	4.47	1.00	-0.84
HISTM.3	235	1	6	4.09	1.06	-0.66
HISTM.4	234	1	6	4.09	1.20	-0.32
HISTM.5	234	2	6	4.46	0.86	-0.53
HISTM.6	234	1	6	4.54	1.00	-0.81

Note: * Skewness was computed by adjusted Fisher-Pearson standardised moment.

Table 5 Standardised factor loadings and standardised errors of all the items on their respective dimensions

Dimensions	CS (Certain and Simple Knowledge)		JA (Justification by Authority)		PJ (Personal Justification)	
Items	std. coef.	std. error	std. coef.	std. error	std. coef.	std. error
EOCQ.1*	0.194	0.070	-	-	-	-
EOCQ.2	0.313	0.052	-	-	-	-
EOCQ.3	0.345	0.044	-	-	-	-
EOCQ.4**	0.743	0.135	-	-	-	-
EOCQ.5*	-0.187	0.091	-	-	-	-
EOCQ.6	-	-	0.624	0.062	-	-
EOCQ.7	-	-	0.659	0.060	-	-
EOCQ.8	-	-	0.779	0.065	-	-
EOCQ.9	-	-	0.714	0.064	-	-
EOCQ.10*	-	-	-	-	0.092	0.092
EOCQ.11	-	-	-	-	0.512	0.162
EOCQ.12	-	-	-	-	0.476	0.145
EOCQ.13			-	-	-0.328	0.109
EOCQ.14	-	-	-	-	-	-
EOCQ.15	-	-	-	-	-	-
EOCQ.16	-	-	-	-	-	-
EOCQ.17	-	-	-	-	-	-
EOCQ.18*	-	-	-	-	-	-
VI.1	-	-	-	-	-	-
VI.2	-	-	-	-	-	-
VI.3	-	-	-	-	-	-
VI.4	-	-	-	-	-	-
VI.5	-	-	-	-	-	-
VI.6	-	-	-	-	-	-
HISTM.1	-	-	-	-	-	-
HISTM.2	-	-	-	-	-	-
HISTM.3	-	-	-	-	-	-
HISTM.4*	-	-	-	-	-	-
HISTM.5	-	-	-	-	-	-
HISTM.6	-	-	-	-	-	-

Dimensions	MS (Multiple Sources)		VI (Value of Integration)		HISTM (Historical Methodology)	
Items	std. coef.	std. error	std. coef.	std. error	std. coef.	std. error
EOCQ.1*	-	-	-	-	-	-
EOCQ.2	-	-	-	-	-	-
EOCQ.3	-	-	-	-	-	-
EOCQ.4**	-	-	-	-	-	-
EOCQ.5*	-	-	-	-	-	-
EOCQ.6	-	-	-	-	-	-
EOCQ.7	-	-	-	-	-	-
EOCQ.8	-	-	-	-	-	-
EOCQ.9	-	-	-	-	-	-
EOCQ.10*	-	-	-	-	-	-
EOCQ.11	-	-	-	-	-	-
EOCQ.12	-	-	-	-	-	-
EOCQ.13	-	-	-	-	-	-
EOCQ.14	0.538	0.072	-	-	-	-
EOCQ.15	0.553	0.063	-	-	-	-
EOCQ.16	0.610	0.072	-	-	-	-
EOCQ.17	0.625	0.073	-	-	-	-
EOCQ.18*	0.267	0.071	-	-	-	-
VI.1	-	-	0.495	0.082	-	-
VI.2	-	-	0.471	0.088	-	-
VI.3	-	-	0.340	0.085	-	-
VI.4	-	-	0.446	0.083	-	-
VI.5	-	-	0.426	0.081	-	-
VI.6	-	-	0.528	0.080	-	-
HISTM.1	-	-	-	-	0.370	0.063
HISTM.2	-	-	-	-	0.597	0.080
HISTM.3	-	-	-	-	0.637	0.084
HISTM.4*	-	-	-	-	0.213	0.098
HISTM.5	-	-	-	-	0.394	0.067
HISTM.6	-	-	-	-	0.495	0.080

Notes: All items demonstrated significant factor loadings ($p < 0.05$); * items that were removed from the final model because of small loadings (the factor loadings presented here are drawn from the last model before their elimination)

Table 6 The correlations among academic achievement and the validated constructs of epistemic beliefs within the sample of middle school students that was obtained

	CL	HI	RC	CS	JA	PJ	MS	VI
HI	0.68***							
RC	0.19*	-0.15						
CS	0.13	0.13	-0.21**					
JA	-0.01	-0.05	0.02	0.27***				
PJ	0.02	0.05	-0.08	0.17**	-0.14*			
MS	-0.16*	-0.08	0.17**	0.05	0.04	0.04		
VI	-0.05	-0.04	0.26***	0.13	0.24***	-0.08	0.47***	
HISTM	0.01	0.03	0.21**	0.10	0.26***	-0.12	0.36***	0.64***

Notes: CL – end-of-grade mark in Czech language; HI – end-of-grade mark in history; RC – reading comprehension; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$