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Finnish students' conceptions of giftedness and intelligence in basic education

Sonja Laine[a], Elina Kuusisto [b] and Kirsi Tirri[a]

[a]Faculty of Educational Sciences, University of Helsinki University of Helsinki, Helsinki, Finland; [b]Faculty of Education and Culture, Tampere University, Tampere University, Tampere, Finland

ABSTRACT

There is a lack of research on students' conceptions of giftedness and intelligence, despite recognition of their influence on real-life factors such as achievement and motivation. This paper presents a cross-sectional mixed methods study that investigated Finnish students' (age 6–16 years; $N = 1282$) implicit conceptions of giftedness and intelligence and the mindsets underlying such conceptions. More particularly, the study aimed to investigate how giftedness and intelligence are constructed and understood in the minds of students and how students' mindsets are actualized in their descriptions of giftedness and intelligence. The results indicated that, from very early on, students differentiate between the two concepts. Giftedness and intelligence were both seen as malleable, but views on giftedness were more fixed than were conceptions of intelligence. Both age- and school-related differences were found in students' conceptions. Furthermore, the study demonstrated differences in conceptions of giftedness and intelligence between growth- and fixed-mindset students.

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Finnish students; conceptions; mindset; giftedness; intelligence; mixed method

The present study focuses on two relevant ability concepts in the field of education – giftedness and intelligence – and their differences in the minds of students. More particularly, the study examines students' implicit conceptions of and mindsets (growth versus fixed) about giftedness and intelligence. There already exists extensive research evidence on students' mindsets about intelligence and their effect on achievement, learning, motivation, and wellbeing. However, only a small number of studies have examined domain-specific differences between the concepts of 'intelligence' and 'giftedness' in students' implicit conceptions and mindsets. Furthermore, few earlier studies have compared students' implicit conceptions and mindsets. This research seeks to fill these gaps.

Even though the field of (gifted) education has been criticized for its lack of consensus over definitions, giftedness is increasingly viewed as domain-specific and developmental (e.g., Gagné, 2010; Subotnik et al., 2011). The early stages of giftedness research were dominated by domain-general models (Kaufman & Sternberg, 2008). In these models, pioneers of the field, such as Terman (1926), equated giftedness with a high natural intellectual ability (IQ) measurable with specific instruments. However, not all researchers were comfortable with this equation, and domain-specific models of giftedness were developed (Kaufman & Sternberg, 2008). Gardner's (1983, 1999) theory of multiple intelligences is good example of this type of model. In his theory, Gardner (1983, 1999) defined eight different kinds of intelligences, including logical-mathematical intelligence and inter- and

CONTACT Sonja Laine sonja.laine@helsinki.fi

intrapersonal intelligences. Gardner's model (1983, 1999), which used the terms intelligence and giftedness synonymously, thus attempted to broaden the scope of intelligence from logic-mathematical, i.e., IQ-related, areas to several other domains. Later, developmentally oriented giftedness and intelligence models were developed (Kaufman & Sternberg, 2008). These models emphasize that giftedness or intelligence do not represent a fixed state of being; rather, they are strongly affected by both intrapersonal and environmental factors. Personal variables that are believed to contribute to the development of giftedness includes factors such as motivation, mindset, task commitment, passion, and interest (Dweck, 2006, 2009; Gagné, 2005, 2010; Subotnik et al., 2011), whereas culture, important persons, and available provision form the environmental context (Gagné, 2005, 2010). In this study, we define giftedness as domain-specific and developmental (Laine & Tirri, 2021) and intelligence as a developmental subdomain of giftedness that primarily emphasizes logic-mathematical and linguistic aspects (Gagné, 2005, 2010; Gardner, 1983, 1999; Subotnik et al., 2011).

The present study focuses on students' implicit conceptions of both giftedness and intelligence and their mindsets about these notions. *Implicit conceptions*, private and informal theories existing in the minds of individuals, are important, as they are influential in real life situations (Sternberg et al., 2010; Sternberg & Zhang, 1995; Zhang & Sternberg, 1998). Implicit conceptions are culturally dependent and considerably affect, for example, which abilities are seen as gifts and which people are considered gifted (Freeman, 2005). Furthermore, the way students define intelligence affects their methods and criteria for judging whether they see themselves or their peers as intelligent (Dweck & Leggett, 1988; Kinlaw & Kurtz-Costes, 2003; Zhang et al., 2019).

Dweck's (2000) theory on *mindsets* about the nature of basic qualities such as intelligence focuses on the developmental aspect of intelligence and, more specifically, on children's beliefs about its malleability. Thus, mindsets are one part of students' overall implicit conceptions. According to this theory, individuals can adhere to a fixed mindset (entity theory) and believe that intelligence is stable and unchangeable or to a growth mindset (incremental theory) and believe that intelligence is changeable and can be developed. Students' intelligence mindsets have been widely studied, as they are considered to influence achievement, motivation, goals, and behaviors (Blackwell et al., 2007; Dweck, 2000; Kinlaw & Kurtz-Costes, 2003 Romero et al., 2014). Previous studies have found that a growth mindset is associated with students' persistence, resilience, enjoyment of difficult tasks, higher school achievement, and concentration on learning goals (e.g., Aronson et al., 2002; Blackwell et al., 2007; Gouëdard, 2016, 2021). Yeager et al., 2016; Yeager et al., 2019; Yeager & Dweck, 2012, 2020), whereas a fixed mindset is linked with maladaptive responses, avoiding challenges, and failing to achieve one's own potential (e.g., Dweck & Yeager, 2019; Mueller & Dweck, 1998). Furthermore, mindsets have been found to be domain-specific in nature (Dweck, 2000; Kuusisto et al., 2017; Puusepp et al., 2019), meaning that a person can hold an entity view toward one construct and an incremental view toward the other. Earlier research on domain-specific mindsets has concentrated, for example, on mathematical, language, sport, and creative mindsets. The present study aims to compare mindsets about two central ability concepts: giftedness and intelligence. Domain specificity also indicates that a person's mindset can vary in different giftedness areas; in other words, a student may consider themselves incapable of developing mathematical talents but capable of improving their skills in sport. However, this remains an under-researched topic that requires further investigation.

Students' implicit conceptions of and mindset about giftedness and intelligence

Dweck (2002) has observed that critical changes occur in children's ability conceptions during their school years. When children reach the age of 7–8 years, they become increasingly interested in ability (Dweck, 2002). At that age, children begin to compare their academic achievement to that of their peers, whereas earlier such comparisons are more connected with social and behavioral concerns. At this age, children's definitions of ability also develop, and ability becomes clearly distinguished as its own domain; it is separated from social-moral qualities ("goodness vs. badness"). Dweck further notes that this comparison begins to affect children's self-evaluation of their own

ability. This is also the age at which children begin to understand that ability might be a stable personal quality (Dweck, 2002). At the age of 10–12 years, children start to separate effort and ability into individual factors, and ability is more often seen as fixed rather than malleable. However, not all students adopt this entity view. Moreover, at this age, children begin to view ability and intelligence as a capacity rather than set of skills and knowledge. In general, children's ability conceptions begin to be integrated into a more general meaning system rather than remaining separate, isolated beliefs (Dweck, 2002).

Most of the work related to multiple aspects of children's conceptions of intelligence addresses two basic questions: "What is intelligence?" and "How stable is intelligence?" (Kinlaw & Kurtz-Costes, 2003). However, only a small number of earlier studies have directly investigated students' own definitions of terms such as "giftedness" or "intelligence." Prior research has found that younger children tend to define intelligence in terms of possessing knowledge, whereas older children include the ability to use knowledge or process information in their definitions. Thus, older children's definitions are more elaborated and more exclusively linked to cognitive traits (Henderlog & Lepper, 1999, as cited in Kinlaw & Kurtz-Costes, 2003). Younger children are also more likely to include social skills in their definitions (Yussen & Kane, 1985, as cited in Kinlaw & Kurtz-Costes, 2003). Furthermore, according to Kinlaw and Kurtz-Costes (2003), when children acquire more information, their concepts also become more precise and detailed, more closely approximating those of adults. However, there is evidence that implicit conceptions of intelligence do not change during early elementary school years; rather, the change occurs later in elementary school (Kinlaw & Kurtz-Costes, 2007).

Prior research comparing mindsets about giftedness and intelligence indicates that, among American, Finnish, and Chinese students, giftedness is understood as more fixed and intelligence as more malleable (Kuusisto et al., 2017; Makel et al., 2015; Zhang et al., 2019). In addition, as Dweck (2009, p. 312) remarks, it is likely that the "word 'gift' itself implies that no effort is involved . . . and it is something that is bestowed upon the lucky few." Moreover, even though these studies have found a positive correlation between giftedness and intelligence mindsets, the concepts of giftedness and intelligence are not considered synonymous. For instance, Tan et al. (2019) found that intelligence was related to school and non-school intelligence, motivation, knowledge and learning, smartness, ability, and skills, whereas giftedness was related to intelligence and smartness, motivation, high ability, and academic achievement. Nonetheless, the same study also found that students do not always distinguish between intelligence and giftedness (Tan et al., 2019). Despite Tan et al.'s research, there remains a clear lack of research comparing implicit conceptions of giftedness and intelligence.

In addition, only a small number of studies have focused on connecting students' mindsets with their wider conceptions of intelligence and giftedness. In their study, Mueller and Dweck (1997 reported in Dweck, 2000, p. 61) asked college students to define intelligence. The study indicated that students with fixed mindset were more likely than those with growth mindset to define intelligence as an inherent capacity or potential, whereas students holding growth mindset more often defined intelligence as a person's skills and knowledge. Furthermore, research conducted with 5th graders demonstrated that students holding fixed mindset defined intelligence simply as smartness or IQ, whereas students with growth mindset emphasized knowledge and effort (Mueller & Dweck, 1998; Dweck, 2000). More recently, Tan et al.'s (2019) research indicated that students adhering to a growth mindset were more likely than students subscribing to fixed mindset to perceive intelligence as knowledge- and learning-related and changeable through learning.

The Finnish context

The context of the study is the Finnish educational system and more specifically its nine years of basic education (comprehensive school). In the year they turn seven, children begin their school path in elementary school, where they study from 1st to 6th grade. After elementary school, students

continue their studies for three more years at lower secondary school (7th to 9th grades). Teachers at the elementary level are responsible for teaching all the school subjects except for foreign languages, whereas secondary school teachers are subject teachers specialized in teaching single subjects. All teachers working in comprehensive education are highly educated: elementary teachers have completed master's degrees in education, while subject teachers hold a master's degree in their main subject combined with university-level pedagogical studies (Tirri, 2014).

Equality and inclusiveness are central values in Finnish educational policy (Arnesen et al., 2007). Finnish students are educated in inclusive classrooms, and teachers are expected to tailor their teaching to the needs of different students, acknowledging students' individual characteristics, requirements, and interest (Kuusisto et al., 2021; Laine & Tirri, 2021). The national *Core Curriculum for Basic Education 2014* (FNBE [Finnish National Board of Education], 2014) emphasizes differentiated teaching as the pedagogical basis of education. However, inclusion is often understood more narrowly as referring simply to students with disabilities and special educational needs (Laine & Tirri, 2021), with the strongest support directed to special education (Niemi, 2012). Altogether, equality in terms of educational outcomes has been stressed more than the pursuit of individual excellence (Hotulainen & Schofield, 2003). In this (egalitarian) atmosphere, giftedness and intelligence have not been defined in any formal educational documents.

Aims of the present study

This paper presents the results of a cross-sectional, mixed method study that aimed to explore Finnish students' conceptions of and mindsets concerning giftedness and intelligence and the connections between them. We also study age-related variations in students' conceptions and mindsets, as prior research points to the influence of developmental differences (Dweck, 2002). Moreover, we collect data from two different schools located in a higher and lower socioeconomic area. This decision was based on earlier findings that have shown mindset interventions to be more effective and helpful for disadvantaged students, such as those with a low socioeconomic status (Yeager et al., 2019). Thus, our aim was to discover whether any baseline differences existed in students' conceptions and mindset about giftedness and intelligence in two different school environments.

The research questions were as follows:

1. What are Finnish students' implicit conceptions of giftedness and intelligence, and what kind of age- and school-related differences can be identified? (Qualitative)
2. What are Finnish students' mindsets regarding giftedness and intelligence, and what kind of age- and school-related differences can be identified? (Quantitative)
3. How are Finnish students' mindsets manifested in their descriptions of giftedness and intelligence? (Mixed)

Data and methods

Participants

The participants ($N = 1282$; $n_{\text{School A}} = 642$; $n_{\text{School B}} = 640$) in this research were students from two comprehensive schools in Helsinki, the capital city of Finland. All students from 1st grade to 9th grade participated to the study (see Table 1). Most identified themselves either as female ($n = 642$, 50%) or male ($n = 630$, 49%). The students' age ranged from 6 to 16 years ($M = 11.06$; $SD = 2.7$). The native language of the majority was Finnish ($n = 957$, 75%; $n_{\text{School A}} = 560$, 89%; $n_{\text{School B}} = 397$, 62%). The response rate in School A was 92 percent (grades 1–6: 93%, grades 7–9: 91%) and, in School B, 72 percent (grades 1–6: 81%, grades 7–9: 61%).

School A is a teacher-training school where many student teachers perform their teaching practicum. It is located in a middle-class district (Vilkama et al., 2014). By contrast, School B is a

Table 1. Number of participating students in School A and B.

Grade level	School A *n*	School B *n*	Total *N*
1	58	80	138
2	60	68	128
3	71	64	135
4	68	49	117
5	68	49	117
6	64	74	138
7	81	99	180
8	84	79	163
9	88	78	166
Total	642	640	1282

multicultural school in a lower socioeconomic area. In School A, special education services were offered to 5.5 percent of students in elementary school (grades 1–6) and to two percent of lower-secondary school students (grades 7–9), while in School B special education services were offered to 16 percent of students. In addition, School B offered preparatory education to newcomers.

Procedure

This research is a mixed-method study employing a convergent model (Creswell, 1999) in which qualitative and quantitative data were gathered at the same time with the same questionnaire. Furthermore, the qualitative and quantitative data were weighted equally, and results were interpreted together. The first part of the questionnaire (qualitative) asked the participants to describe the meaning of giftedness and intelligence, while the second part (quantitative) asked them to evaluate items of scales measuring beliefs about the nature of intelligence and giftedness. Students from 1st to 2nd grade answered the questionnaire in an interview, in which a researcher asked the questions and wrote down the answers. Students from 3rd grade onwards answered the survey under the supervision of their teachers. Third grade students completed a paper version, and from 4th grade onwards students answered the online version of the questionnaire. Research permission was requested from the municipality of Helsinki, principals, student guardians and the students themselves. Participation was voluntary, and students were able to withdraw from the research at any stage of the procedure. The study is part of larger project that was reviewed and approved beforehand by the University of Helsinki Ethical Review Board.

Instruments and data analysis

Qualitative part

Students' conceptions of giftedness and intelligence were examined via two questions. Schoolchildren aged 6–12 years were asked to answer the following questions: "Your friend says 'I am intelligent.' What do you think the word intelligence means?" and "Your friend says 'I am gifted.' What do you think the word giftedness means?" In turn, adolescent students (aged 13–16) were asked to continue the following sentences: "Everyone of us has an idea of what intelligence and giftedness are. In my opinion, intelligence is … In my opinion, giftedness is … " The length of the students' answers varied from a few words to several sentences.

The students' descriptions were analyzed using deductive-oriented content analysis (Elo & Kyngäs, 2008). Their aggregate statements served as the unit of analysis, with all statements analyzed utilizing a classification framework based on earlier research on Finnish teachers' conceptions of giftedness (Laine et al., 2016). The deductive framework included two main categories and nine subcategories: giftedness/intelligence as a phenomenon (multidimensional, difference from others,

fixed, malleable) and characteristics of the gifted/intelligent person (cognitive features, creative features, motivational features, personal strengths, success). In the analysis, all categories were coded from every aggregate statement, as presented in the following example:

> It is a skill, I mean that *you are good at many things* that you have not practiced. (School A, 5th grade student)
>
> Main category: Giftedness as a phenomenon (see Table 2)
> - Subcategory 1: Multidimensional ("*you are good at many things*")
> - Subcategory 2: Fixed ("that you have not practiced")

As Laine et al. (2016) conducted their study among adults, we were interested in the applicability of their categories to the data in our present study. We were also open to the possibility that some new categories might occur. Thus, after conducting the deductive analysis, all content that failed to conform to the original categories was analyzed inductively to determine the need for new content categories, as demonstrated in the following example:

> They are gifted as in *receive lots of gifts*. Their mum and dad are rich so they *can buy them*. (School A, 2nd grade)
>
> Main category: Additional expressions (see Table 3)
> - Subcategory: etymological belief ("receive lots of gifts . . . can buy them)

The inductive phase revealed that students used many general competence statements, such as "the gifted are good at something" or "intelligent people have skills." These phrases were later named and coded under the subcategory "general competence" and added below to the main category "characteristics of the gifted/intelligent."

The first author coded the entire dataset. Then, to increase reliability, the second author coded 10 percent of the data. Using Cohen's Kappa coefficient, intercoder reliability was calculated separately for giftedness and intelligence and for every 10 subcategories (See Table 2). Cohen's kappa-values were between .615 and 1.000, indicating good reliability and sufficient agreement between the coders (Cohen, 1960).

Quantitative part

Students' beliefs about the nature of giftedness and intelligence were studied with Dweck's (2000) Implicit Theories of Intelligence Scale. Since the word "intelligence" can be replaced with other qualities, we replaced it with "giftedness" to measure that trait. Dweck's scale contains both positive incremental items and negative entity items, but Dweck recommends using the negative items to avoid an overly optimistic view of people's mindsets with which incremental items have been associated with (Dweck, 2000; Kuusisto & Tirri, 2013; Laine et al., 2016). Dweck's instrument has been developed for use among subjects over 10 years old. Consequently, only 4th–9th grade

Table 2. Kappa values.

Subcategory	Number of coding categories	κ for giftedness	κ for intelligence
Multidimensional	3	.824	.615
Fixed	3	.948	1.000
Difference from others	4	.908	.796
Malleable	4	.905	1.000
General Competence	3	.885	.744
Personal strength	6	.932	.761
Cognitive characteristics	6	.816	.925
Motivational characteristics	5	1.000	.663
Creative characteristics	4	1.000	.811
Success	1	NA*	.788

* In 127 segments, the first coder did not identify any instances of this subcategory, while the second coder found one.

Table 3. Main categories of school children's and adolescents' conceptions of giftedness and intelligence.

	Number of students referring to the category			
	Giftedness ($n = 1123$)		Intelligence ($n = 1105$)	
	n	%	*n*	%
Phenomenon	**672**	**59.8**	**282**	**25.5**
1. Multidimensional	595	53,0	246	22,3
2. Fixed	159	14.2	9	0.8
3. Difference from others	48	4.3	18	1.6
4. Malleable	36	3,2	27	2.4
Characteristics	**790**	**70.3**	**901**	**81,5**
1. General competence	651	58.0	184	16.7
2. Personal strength	77	6.9	82	7.4
3. Cognitive characteristics	66	5.9	781	70.7
4. Motivational characteristics	13	1.2	8	0.7
5. Creative characteristics	9	0.8	35	3.2
6. Success	8	0.7	22	2.0

students evaluated four negatively worded entity items measuring implicit beliefs about intelligence and four items measuring giftedness (Kuusisto et al., 2017). The items were rated using a six-point Likert scale (1 = strongly agree, 6 = strongly disagree), with 1.0–3.5 indicating probable fixed-mindset tendencies and 3.6–6.0 growth-mindset tendencies (Zhang et al., 2019, 2020). Examples of the items included the following statements: "You have a certain amount of intelligence/giftedness, and you really cannot do much to change it" and "You can learn new things, but you cannot really change your basic intelligence/giftedness." Cronbach's alpha values for the scales were high both for mindsets concerning intelligence (.859) and for mindsets concerning giftedness (.915), indicating good reliability. Statistical analyses were conducted with IBM SPSS Statistics 28.0. A paired samples t-test was utilized to investigate whether students' scores differed in *mindsets concerning giftedness and intelligence*. Further, multivariate analysis of covariance (MANCOVA) was performed to study whether students from School A and B representing diverse age groups (10–15-year-olds, i.e., 4^{th}– 9^{th} graders) differed in their *mindsets concerning giftedness* and *intelligence*, while controlling for native language (non-Finnish vs. Finnish).

Triangulation of qualitative and quantitative data

The qualitative and quantitative analyses were triangulated for 4^{th}–9^{th} grade students. The data mixing followed a convergent model (Creswell, 1999, 2015). Mindset orientation information was combined with each student's qualitative categories, illustrating their descriptions of these concepts. Crosstabulation and Chi square tests were utilized to identify statistically significant associations between qualitative conceptualizations and mindset orientations.

Results

Research question 1: students' conceptions of giftedness and intelligence

Deductive content analysis

Ultimately, 1123 students from a total of 1352 participants attempted to define giftedness. The remainder either skipped the question ($n = 106$) or answered, "I don't know" ($n = 113$). In turn, 1105 students attempted to define intelligence, 107 students skipped the question and 140 answered, "I don't know." All the categories included in the deductive coding framework were identified in the students' descriptions of giftedness and intelligence (see Table 3).

As Table 3 illustrates, giftedness as a phenomenon was most often seen as *multidimensional* ($n = 595$). Moreover, the majority of students understood giftedness as domain specific ($n = 446$), for example being very good or talented at something, rather than domain general ($n = 93$), i.e., being good at everything. Some of the students also described giftedness by naming different

areas of this quality ($n = 159$). The following example illustrate multidimensionality in students' answers:

> In my opinion giftedness means that you are really good at something. For example, you can be a really good singer with a good voice. (School A, 5th grade)

A closer examination of the areas of giftedness revealed that the arts and physical education ($n = 147$) were mentioned more often than theoretical subjects (e.g., math and languages) ($n = 42$). *Multidimensionality* was also found in the definitions of intelligence ($n = 282$); however, it appeared less frequently in the responses. In contrast to giftedness, intelligence was more often seen as domain general ($n = 179$) than domain specific ($n = 65$). Furthermore, intelligence was more connected with theoretical subjects ($n = 68$) than the arts and physical education ($n = 9$).

Students' definitions revealed that giftedness was seen as more *fixed* ($n = 159$) than *malleable* ($n = 36$), since students remarked that giftedness was innate ($n = 77$), that things came naturally ($n = 40$), and that practice was not required ($n = 45$). *Malleable* ($n = 36$) beliefs were less present, and this category was signaled primarily by indicating that giftedness was a quality that could be developed ($n = 30$). From the following examples, the first demonstrates a fixed view and the second a malleable view:

> It means that you have natural talent at something, and because of that, it is easier to learn and understand new things connected to that subject. You can't control your giftedness; it is naturally in all of us. (School A, 8th grade)

> It is a result of hard practice and training. (School B, 9th grade)

Furthermore, in their definitions of intelligence, only a small number of students indexed the categories *fixed* ($n = 9$) and *malleable* ($n = 27$).

Students also defined giftedness through the *characteristics of gifted people* ($n = 790$). Most often, students described giftedness through *general competence statements* ($n = 651$), such as the gifted are good at something ($n = 302$), they master something ($n = 279$), or they possess skill or skills in something ($n = 110$). The gifted were also viewed in terms of their *personal strengths* ($n = 77$), of which social-moral competencies were the most frequently mentioned ($n = 71$):

> Gifted means that you are friendly and kind to others. (School B, 6th grade)

Intelligence was most often described in terms of the *characteristics of an intelligent person* ($n = 901$), with *cognitive features* ($n = 781$) the most frequently mentioned subcategory. Intelligence concerned smartness and wisdom ($n = 330$), knowledge and knowing ($n = 272$), thinking skills ($n = 163$), and understanding ($n = 131$). By contrast, effortlessness of learning and doing ($n = 44$) was mentioned less frequently. The following example illustrates cognitive features in the students' responses:

> In my opinion, intelligence is about being smart, you know a lot of different things and you can solve different kind of problems. (School B, 6th grade)

When *cognitive features* were described under the definitions of giftedness ($n = 66$), they most often concerned effortlessness of learning and doing ($n = 36$) and intelligence ($n = 19$). The following example illustrates cognitive features in the students' responses:

> Giftedness is that you learn things fast or you master them already in advance. (School A, 7th grade)

Creative and *motivational* features as well as *success* were only minimally present in students' definitions of giftedness and intelligence. However, creativity and motivational features were more present in conceptions of intelligence than in giftedness.

Inductive content analysis

Even though all the categories in the coding framework were identified in the students' responses, many expressed additional views on giftedness and intelligence. Inductive analysis was utilized to

Table 4. Additional expressions of students' conceptions of giftedness and intelligence.

	Number of students referring to the category			
	Giftedness ($n = 1123$)		Intelligence ($n = 1105$)	
	n	%	n	%
Additional expressions	**200**	**17.8**	**139**	**12.6**
1. Etymological belief	58	5.2	0	0
2. Good and important thing	30	2.7	42	3.8
3. All are gifted/intelligent	16	1.4	11	1.0
4. Luck/lucky	15	1.3	0	0
5. Critical view	9	0.8	8	0.7
6. Singular expressions	76	6.8	69	6.2

analyze the data that was not coded in the first deductive phase. Table 4 illustrates the additional categories that we identified.

The largest additional subcategory among the conceptions of giftedness was *etymological beliefs* ($n = 57$). This means while defining giftedness the children used expressions derived from the word "gift." For example, gifted was defined as a person who receives and bestows many presents. Second, giftedness ($n = 30$) and intelligence ($n = 42$) were described as *important and beneficial*. Third, some students expressed the idea that *all are gifted* ($n = 16$) and *intelligent* ($n = 11$). Furthermore, some students viewed the gifted ($n = 15$) as lucky. In addition, some students also expressed critical views, such as the following:

> Giftedness is not a scientifically proven thing. (School B, 9th grade)

> Intelligence is useless. (School B, 8th grade)

The subcategory "Singular expressions" was required for statements that were mentioned just a few times and were rather challenging to define. The following examples illustrate expressions coded into this subcategory:

> Intelligent is quite normal, a bit good and a bit bad. (School B, 4th grade)

> Generous. (School A, 4th grade)

Age-related differences

Our large cross-sectional dataset of different age students enabled us to explore age-related differences in students' conceptions. We divided the students into three groups: 1st–3rd grade students, 4th–6th grade students, and 7th–9th grade students. We used Crosstabulation and Chi square tests to investigate statistically significant associations between conceptions and age groups.

Giftedness. In all age groups, multidimensionality and general competence were the dominant conceptions of giftedness. Multidimensionality was, however, more present in older students' responses, especially in the statements of students in grades 4–6 (χ^2 (2) = 41.099; $p < 0.001$). Closer examination revealed that from 4th grade onwards domain-specific conceptions were more common than in earlier grades (χ^2 (2) = 41.222; $p < 0.001$), whereas domain-general views were mentioned most rarely by students in grades 7–9 (χ^2 (2) = 28.985; $p < 0.001$). Furthermore, it is worth noting that while fixed views were rare in the youngest students' responses, they became more common in 4th to 6th grade and were already manifested in 25 percent of students' responses in grades 7–9 (χ^2 (2) = 56.884; $p < 0.001$). Malleable views also began to appear more often in student responses these later grades (χ^2 (2) = 10.050; $p < 0.01$).

However, compared to older students' responses, 1st–3rd grade students more often described giftedness via personal strengths (χ^2 (2) = 36.341; $p < 0.001$), mainly stating that the gifted were good, kind friends. By contrast, older students, especially 4th–6th grade students, used more general competence statements (χ^2 (2) = 41.487; $p < 0.001$) than did the youngest students. In turn,

cognitive characteristics were mentioned slightly more frequently among students in grades 7–9 (χ^2 (2) = 12.848; $p < 0.01$).

Etymological beliefs were most present among the youngest students and were entirely absent from the responses of 7th–9th grade students (χ^2 (2) = 85.426; $p < 0.001$). Furthermore, 1st–3rd grade students' responses also included more singular expressions than did those of older students (χ^2 (2) = 24.681; $p < 0.001$). Moreover, 1st–3rd grade students were most likely to offer the response "I don't know." Indeed, 80 of the total 113 "I don't know" responses came from this age group.

Intelligence. In all age groups, intelligence was connected most strongly to cognitive characteristics. Nevertheless, students at the elementary level mentioned cognitive characteristics slightly more often than did students at secondary school (χ^2 (2) = 18.256; $p < 0.001$). Closer examination further revealed that younger students more often referred to smartness and wisdom (χ^2 (2) = 88.290; $p < 0.001$) and knowledge and knowing (χ^2 (2) = 18.256; $p < 0.01$), whereas the oldest students were more likely to define intelligence through thinking skills (χ^2 (2) = 43.184; $p < 0.001$) and understanding (χ^2 (2) = 18.762; $p < 0.001$).

Multidimensional aspects (χ^2 (2) = 24.218; $p < 0.001$) and, specifically, domain-general views (χ^2 (2) = 18.769; $p < 0.001$) were more present in elementary school students' responses than in the responses of older students. Moreover, malleable views (χ^2 (2) = 7.677; $p < 0.05$) and fixed views began to emerge in secondary school students' responses (χ^2 (2) = 8.168; $p < 0.05$), even though these occurrences remained rare. Furthermore, using additional expressions (χ^2 (2) = 27.797; $p < 0.001$), such as referring to intelligence as a good and important quality (χ^2 (2) = 36.149; $p < 0.001$), was most common among the oldest students.

School-related differences

Giftedness. In both schools, multidimensionality and general competence statements dominated the students' definitions of giftedness. However, students from School A mentioned multidimensional aspects (χ^2 (1) = 31.050; $p < 0.001$) and general competence statements (χ^2 (1) = 21.453; $p < 0.001$) more often than did students from School B. Similarly, both fixed (χ^2 (1) = 20.875; $p < 0.001$) and malleable (χ^2 (1) = 8.207; $p < 0.01$) views and cognitive characteristics (χ^2 (1) = 4.120; $p < 0.05$) were more present in the responses of students from School A. By contrast, students from School B referred to personal strengths more often (χ^2 (1) = 10.058; $p < 0.001$) than did their counterparts from school A.

Intelligence. Students from school A mentioned cognitive characteristics slightly more often than did students from School B (χ^2 (1) = 11.078; $p < 0.01$). Closer examination revealed that students from School A were more likely to mention knowledge and knowing (χ^2 (1) = 18.885; $p < 0.001$), thinking skills (χ^2 (1) = 18.803; $p < 0.001$) and understanding (χ^2 (1) = 8.468; $p < 0.01$), whereas students from School B tended to refer to smartness and wisdom (χ^2 (1) = 13.868; $p < 0.001$). Furthermore, students from School A mentioned creativity (χ^2 (1) = 7.072; $p < 0.01$) and success factors (χ^2 (2) = 10.506; $p < 0.01$) more often than did students from School B.

Research question 2: students' mindsets regarding intelligence and giftedness

Mindsets regarding giftedness and intelligence among 4th–9th grade students at Schools A and B were studied with Dweck's (2000) inventory. As Table 5 demonstrates, these students mainly held a growth mindset. However, intelligence was seen as slightly more malleable than giftedness

Table 5. Psychometric properties of the Dweck's inventory.

Grades	Variables	Items	α	N	M	SD	Min	Max	Correlation
4–9	4 Mindset regarding giftedness	4	.915	878	3.63	1.37	1	6	–
4–9	3 Mindset regarding intelligence	4	.859	878	4.03	1.22	1	6	.530**

**$p < .01$

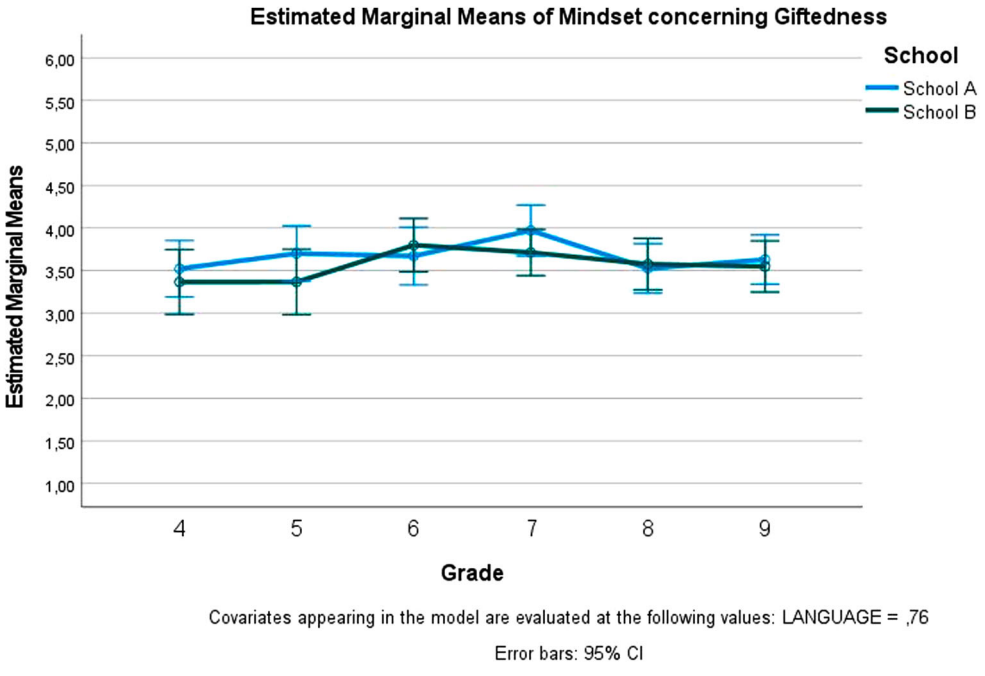

Figure 1. *Mindset concerning giftedness* among 4th–9th grade students in Schools A and B.

($t(877) = 9.246$, $p < .001$, $d = .312$), which is in line with earlier results (Kuusisto et al., 2017; Makel et al., 2015; Zhang et al., 2019). Mindsets concerning giftedness and intelligence correlated moderately (.53) (Tabachnick & Fidell, 2013).

The multivariate analysis of covariance (MANCOVA) indicated statistically significant differences for both dependent variables, mindset concerning giftedness and intelligence, as a whole between Schools A and B (Pillai's Trace = 0.030, $F(2) = 13.303$, $p < .001$, $\eta_p^2 = .03$,) and between the different age groups (Pillai's Trace = 0.081, $F(10) = 7.280$, $p < .001$, $\eta_p^2 = .04$) after controlling for native language (Pillai's Trace = 0.027, $F(2) = 11.697$, $p < .001$, $\eta_p^2 = .03$). However, there was no interaction between school and age. More specifically, students' scores at Schools A and B ($F(1) = 23.863$, $p < .001$, $\eta_p^2 = .03$) and in the various age groups ($F(5) = 12.638$, $p < .001$, $\eta_p^2 = .07$) differed in their *mindset concerning intelligence* but not in their mindset concerning giftedness. Native language played a statistically significant role in both mindset scores ($F_{\text{giftedness}}(1) = 15.625$, $p < .001$, $\eta_p^2 = .02$; $F_{\text{intelligence}}(1) = 19.656$, $p < .001$, $\eta_p^2 = .02$). This can be explained by the negative wording of Dweck's items, which can be especially challenging for non-native speakers. However, another possible explanation is that the two ability concepts have different connotations in the non-native speakers' mother tongues.

Students tended to display a growth mindset concerning giftedness in both schools and across ages (see Figure 1 for means and confidence intervals). By contrast, students in School A ($M = 4.17$, $SE = .06$, CI [4.06, 4.28]) were more likely than students in School B ($M = 3.68$, $SE = .0631$, CI [3.65, 3.88], $p < .001$) to hold a growth mindset regarding intelligence. In addition, 4th and 5th grade students in both schools (School A: $M_{4th} = 3.89$, $SE = .14$, CI [3.61, 4.17], $M_{5th} = 3.62$, $SE = .14$, CI [3.34, 3.98]; School B: $M_{4th} = 3.28$, $SD = .165$, CI [2.96, 3.60], $M_{5th} = 3.34$, $SE = .17$, CI [3.02, 3.67]) differed from other students ($p < .05$), with the results suggesting, especially at School B, that they were less convinced than older students of the malleability of intelligence, as Figure 2 illustrates.[1] However,

[1]NOTE: Levene's test for mindset concerning intelligence was significant ($p < .001$). Thus, we reran the main comparisons, the school and age differences in mindsets, with a non-parametric Kruskal-Wallis H test and series of Mann-Whitney U tests, and even though there was the unequal (error) variance, these non-parametric tests confirmed the main findings.

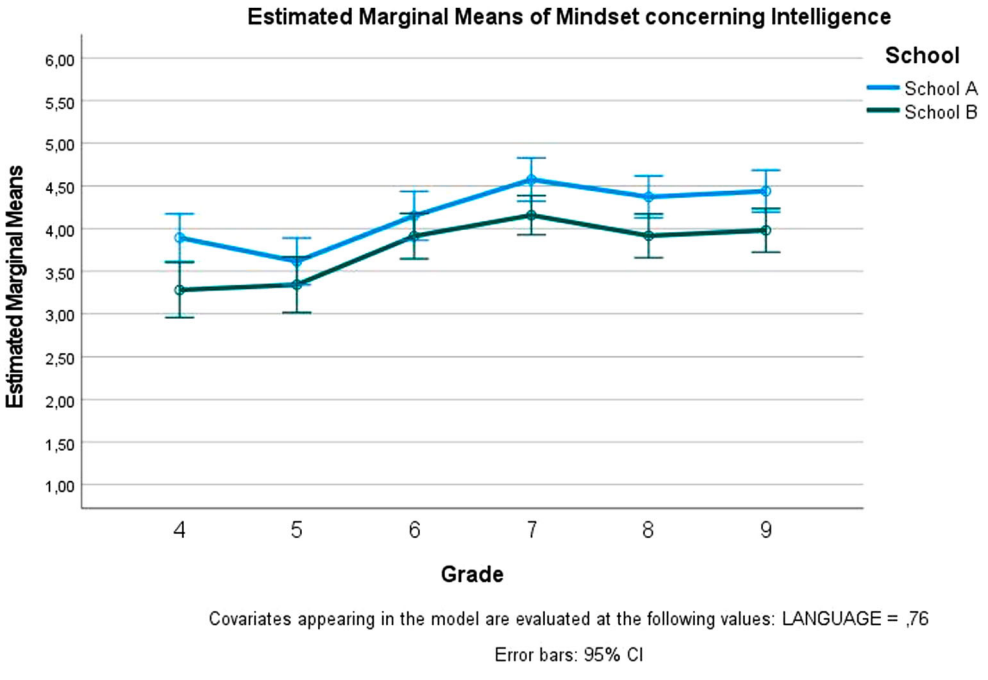

Figure 2. *Mindset concerning intelligence* among 4th–9th grade students in Schools A and B.

the coefficient determination of the models was low (between .02 - .07), indicating low explanatory power.

Research question 3: manifestation of students' mindsets in their descriptions of intelligence and giftedness

Table 6 present the means and number of participants displaying each mindset orientation for 4th–9th grade students.

Mindset orientation was subsequently combined with each student's qualitative categories. All students who failed to answer both the quantitative and qualitative parts of the questionnaire were removed at this point. A total of 824 students answered both parts in relation to giftedness, while a total of 816 students responded to both in regard to intelligence (see Table 7).

Giftedness

As Table 8 indicates, both students with a fixed mindset orientation and those with a growth mindset orientation primarily defined giftedness via its multidimensional aspects and with the use of general competence statements. A statistically significant correlation was found between

Table 6. Mindset orientations of 4th–9th grade students.

		Mindset orientation 4–9 grade students			
		M (SD) (scale 1–6)	*N* = 878	School A	School B
Fixed mindset	(min 1, max 3.5)				
	Giftedness	2.49 (.744)	450 (51%)	218 (48%)	232 (55%)
	Intelligence	2.66 (.690)	314 (36%)	114 (25%)	200 (47%)
Growth mindset	(min 3.75, max 6)				
	Giftedness	4.83 (.684)	428 (49%)	235 (52%)	193 (45%)
	Intelligence	4.79 (.654)	564 (64%)	339 (75%)	225 (53%)

Table 7. Main categories of conceptions of giftedness and intelligence based on students' representative mindset orientation.

	Mindset orientations							
	Giftedness ($n = 1114$)				Intelligence ($n = 1094$)			
	Growth ($n = 649$)		Fixed ($n = 465$)		Growth ($n = 767$)		Fixed ($n = 327$)	
	n	%	n	%	n	%	N	%
Phenomenon	**383**	**59.0**	**288**	**61.9**	**192**	**25.0**	**90**	**27,5**
1. Multidimensional	359	55.3	242	52.0	175	22.8	74	22.6
2. Fixed	58	8.9	100	21.5	4	0.5	5	1.5
3. Difference from others	16	2.5	32	6.9	12	1.6	6	1.8
4. Malleable	26	4.0	10	2.2	18	2.3	9	2.8
Characteristics	**477**	**73.5**	**309**	**66.5**	**646**	**84.2**	**245**	**74.9**
1. General competence	401	61.8	247	53.1	131	17.1	53	16.2
2. Personal strength	50	7.7	31	6.7	69	9.0	24	7.3
3. Cognitive characteristics	28	4.3	37	8.0	552	72.0	214	65.4
4. Motivational characteristics	8	1.2	1	0.2	5	0.7	3	0.9
5. Creative characteristics	5	0.8	1	0.2	30	3.9	5	1.5
6. Success	5	0.8	3	0.6	15	2.0	7	2,1
Additional expressions	**123**	**19.0**	**77**	**16.6**	**93**	**12.1**	**36**	**11**
1. Etymological belief	41	6.3	17	3.7	0	0	0	0
2. Good and important thing	13	2.0	19	4.1	30	3.9	12	3.7
3. All are gifted/intelligent	9	1.4	7	1.5	9	1.2	1	0.3
4. Luck/lucky	11	1.7	4	0.9	0	0	0	0
5. Critical view	5	0.8	4	0.9	4	0.5	4	1.2
6. Rest singular expressions	50	7.7	26	5.6	50	6.5	18	5.5

mindset orientation and the categories "Multidimensional" (χ^2 (1) = 11.546; $p < 0.001$), "Fixed" (χ^2 (1) = 14.687; $p < 0.001$), "Malleable" (χ^2 (1) = 7.567; $p < 0.01$), and "Difference from others" (χ^2 (1) = 6.281; $p < 0.05$). This result indicates that students with a fixed mindset were more likely than growth-oriented students to express fixed views in their descriptions of giftedness and more often differentiated between gifted students and others while defining giftedness. By contrast, students with a growth mindset were more likely than fixed-mindset students both to express malleable views in their descriptions of giftedness and to address multidimensionality in their responses.

Table 8. Main categories of conceptions of giftedness and intelligence based on students' representative mindset orientation.

	Mindset orientations							
	Giftedness ($N = 824$)				Intelligence ($N = 816$)			
	Growth ($n = 406$)		Fixed ($n = 418$)		Growth ($n = 532$)		Fixed ($n = 284$)	
	n	%	N	%	n	%	n	%
Phenomenon	**284**	**70.0**	**267**	**63.9**	**131**	**24.6**	**79**	**27,8**
1. Multidimensional	262	64.5	221	52.9	115	21.6	63	22.2
2. Fixed	58	14.3	99	23.7	4	0.8	5	1.8
3. Difference from others	14	3.4	31	7.4	10	1.9	5	1.8
4. Malleable	24	5.9	9	2.2	17	3.2	8	2.8
Characteristics	**320**	**78.8**	**276**	**66.0**	**440**	**82.7**	**216**	**76.1**
1. General competence	289	71.2	224	53.6	97	18.2	45	15.8
2. Personal strength	12	3.0	25	6.0	55	10.3	21	7.4
3. Cognitive characteristics	19	4.7	37	8.9	381	71.6	183	64.4
4. Motivational characteristics	6	1.4	0	0.0	4	0.8	3	1.1
5. Creative characteristics	2	0.5	1	0.2	13	2.4	2	0.7
6. Success	3	0.7	3	0.7	13	2.4	6	2.1
Additional expressions	**48**	**11.8**	**65**	**15.6**	**75**	**14.1**	**33**	**11,6**
1. Etymological belief	3	0.7	11	2.6	0	0	0	0
2. Good and important thing	13	3.2	19	4.5	29	5.5	12	4.2
3. All are gifted/intelligent	8	2.0	7	1.7	8	1.5	1	0.4
4. Luck/lucky	5	1.2	3	0.7	0	0	0	0
5. Critical view	5	1.2	4	0.9	3	0.6	4	1.4
6. Rest singular expressions	17	4.2	21	5.0	35	6.6	15	5.3

In addition, growth-mindset students more often described the characteristics of the gifted than did students with a fixed mindset (χ^2 (1) = 16.832; $p < 0.001$). More specifically, a statistically significant connection was found between mindset and the category "general competence" (χ^2 (1) = 27.131; $p < 0.001$), indicating that growth-mindset students were slightly more likely to express general competence views. On the other hand, students with a fixed mindset were more likely to refer to cognitive characteristics (χ^2 (1) = 5.659; $p < 0.05$) and personal strengths (χ^2 (1) = 4.395; $p < 0.05$) than were their growth-mindset peers. In particular, fixed-mindset students displayed a greater tendency to mention characteristics related to ease of learning and doing (χ^2 (1) = 6.656; $p < 0.01$).

Intelligence

Both growth- and fixed-mindset-oriented students viewed intelligence mainly in terms of the different *characteristics of an intelligent person.* However, fixed-mindset-oriented students were less likely than their growth-mindset counterparts to mention these characteristics (χ^2 (1) = 5.195; $p < 0.05$). Moreover, we found that fixed-mindset-oriented students were slightly less likely to mention cognitive characteristics than were growth-oriented students (χ^2 (1) = 4.472; $p < 0.05$). Motivated by prior research (Mueller & Dweck, 1997, as cited in Dweck, 2000; Tan et al., 2019), we conducted a closer examination of the category "cognitive characteristics" and its subcategories. We discovered that growth-oriented students more often mentioned matters related to thinking skills (χ^2 (1) = 17.493; $p < 0.01$) than did those students with a fixed mindset.

Discussion

Summary of the results

This study investigated Finnish students' implicit conceptions and mindsets regarding giftedness and intelligence. The results were in line with earlier Finnish studies (Kuusisto et al., 2017; Laine et al., 2016; Laine et al., 2016), as they indicated that comprehensive school students often view giftedness as domain specific (in our qualitative results) and developmental (in our quantitative results). Further, our results confirm the findings of earlier studies that giftedness is considered more of a fixed trait than is intelligence (Kuusisto et al., 2017; Makel et al., 2015; Zhang et al., 2019), as indicated in both the qualitative and quantitative results. First, in their open definitions, the students were far more likely to express fixed views when defining giftedness rather than intelligence. Second, our quantitative findings demonstrated that even though most participants held a growth mindset toward both concepts, intelligence was seen as more malleable than giftedness.

We used our large qualitative dataset to further examine the differences between the concepts of "giftedness" and "intelligence" in the minds of students. We found that elementary-school-aged children already differentiated between these two concepts, and from very early on intelligence was considered to relate more to cognitive characteristics, whereas giftedness was seen as connected to general competence factors, such being good or skillful at something. This might at least partly explain the domain-specific differences in implicit beliefs found between giftedness and intelligence. Moreover, giftedness was rarely connected to intelligence by our participants, a finding which contrasts strongly with the findings of Tan et al.'s (2019) study.

The results nevertheless further supported previous findings (Henderlog & Lepper, 1999, as cited in Kinlaw & Kurtz-Costes, 2003) on age-related differences in students' definitions of intelligence. Younger students were more likely to refer to possession of knowledge and knowing, whereas older students tended to highlight elaborated cognitive traits, such as thinking skills and understanding. In this study, similar kinds of age-related differences were found in the students' conceptions of giftedness: the youngest students were more likely to highlight the personal strengths of the gifted, seeing them as good, kind friends, and they also displayed a greater tendency to express

etymological conceptions. This indicates that, in early elementary years, conceptions of giftedness remain nascent and underdeveloped. However, in our study, from 4th to 6th grade onwards, students' conceptions began to differ from these responses, as they started to express more general competence statements and accept the domain specific nature of giftedness and cognitive traits. Moreover, from 4th grade onwards, fixed views began to occur with greater frequency, becoming quite common at the secondary school level. Similarly, our quantitative findings demonstrated that in grades 4 and 5 students were also the most skeptical about the malleability of intelligence. This is partly in line with Dweck's (2002) notion of the changes that occur when children are 10–12 years old (most adopt entity beliefs), as our study indicated that there is an obvious growth in entity beliefs at that age. Nevertheless, most students continue to hold incremental beliefs.

Our study also identified some differences between School A and School B, which were located in different socio-economic areas, as evidenced by the percentage of Finnish-speaking students and the number of students with special educational needs. Students' conceptions of intelligence in School A were slightly more elaborated than those of students from School B. This result might be due to the larger number of non-native students in School B: such conceptual definitions are more challenging for non-native speakers, and written expression often requires greater effort. In addition, we discovered that that a fixed mindset concerning intelligence was more common in School B than in School A, although this result can be partly explained by the negative wording of the instruments we used, as they are more difficult to comprehend for non-native speakers. Nonetheless, this result is also in line with earlier notions of students at risk, who especially require and benefit from growth mindset interventions (Paunesku et al., 2015; Yeager et al., 2019).

Finally, this study examined differences in implicit conceptions between growth and fixed mindset students. The results demonstrated that students with a growth mindset concerning intelligence were more likely to emphasize cognitive (especially thinking skills) characteristics than were students with fixed views. This is in line with earlier research (Mueller & Dweck, 1998; as cited in Dweck, 2000; Tan et al., 2019) demonstrating that expressions of knowledge are associated with incremental theories of intelligence (a growth mindset). This study was the first to illuminate differences in implicit conceptions of giftedness between students with different mindset orientations. The results indicated that students with a fixed mindset are more likely to express fixed views, draw comparisons between the gifted and non-gifted, and highlight cognitive characteristics (mainly the effortlessness of learning) in their descriptions than are students with a growth mindset. Thus, these results suggest that it is possible to recognize students' mindsets related to giftedness from the way they openly define the concept.

This research provides valuable information on students' conceptions of giftedness and intelligence. Few qualitative studies exist on comprehensive school students' conceptions of giftedness and intelligence, and studies comparing conceptions of these two concepts are extremely scarce. Furthermore, there is a severe lack of research combining implicit conceptions and mindsets. Moreover, students' mindsets are studied in different countries around the world using the same instrument, without considering cultural and linguistic differences in conceptions such as giftedness and intelligence. Fundamental cultural and linguistic differences in how these concepts are defined and viewed could profoundly affect research findings on the mindsets of schoolchildren and adults. These cultural and linguistic differences might also influence the ways in which mindset interventions work in different settings and the transferability of a research design effective in some culture to another context.

Trustworthiness and limitations

To increase the trustworthiness and reliability of this research, we have described the analysis process in as much detail as possible, including direct quotes to illustrate the nature of the data. In addition, we presented the size of the categories formed from the qualitative data in order to

demonstrate to the reader which conceptions were the most frequently cited. In addition, interrater reliability was calculated to increase the reliability of the categorization.

The large dataset in this study allowed us to reveal some important trends in students' conceptions. In the qualitative analysis phase, we soon reached data saturation, after which few new conceptions emerged. Therefore, we are confident that we captured the full range of different conceptions used by students in these age groups. Moreover, our large dataset allowed us to compare in detail different conceptions and their occurrence. However, the qualitative responses were short oral or written answers that the students produced by themselves. Thus, in-depth interviews might provide a broader perspective on students' conceptions of giftedness and intelligence.

Finally, the study contains a number of limitations. The first concerns missing data: the response rate was lower at school B than school A, especially at the secondary-school level. At school B, it was more challenging to acquire study permission from parents, to persuade teachers to provide students with time to respond to the survey during the school day, and, finally, to encourage students to participate in the study. By contrast, due to its close connection with the local university, School A was more accustomed to research collaboration, and, for example, parents had already provided general consent for their children to participate in research. Furthermore, some missing data concerned students' non-responses or carelessness in responses, which is connected with student engagement. Students who failed to answer all the questions reported in this study were removed from our final dataset.

The second limitation relates to the challenges of measuring the mindset of young children. Dweck's scale was developed to measure the mindset of students aged 10 years and onwards (Dweck, 2000). However, in our study, the youngest students were only seven years old. Consequently, we utilized 10 items from Gunderson et al.'s (2013) scale to study the mindsets of the youngest children (1st–3rd grade 7–9-year-olds). However, during the interviews we noticed that many 1st–2nd grade students struggled to understand the items, and teachers of 3rd graders shared the same view. Despite these observations, we performed both exploratory and confirmatory factor analyses for the scale and calculated the alpha values to check the reliability of the items. However, our suspicions were confirmed, as the results were unsatisfactory, indicating low reliability and internal consistency. Similar challenges with Gunderson et al.'s (2013) scale had been identified in an earlier study on Finnish and Estonian 4th grade students by Aus et al. (2020). As a result, we ultimately decided not to utilize Gunderson et al.'s scale in the present study; thus, the mindsets of the 1st– 3rd grade students were not obtained, nor were we able to triangulate the quantitative and qualitative results for this age group. Consequently, the measurement of young students' mindsets remains a challenging task to be tackled in future studies.

To conclude, our results support Makel et al.'s notion (2015) that schools should more closely examine students' beliefs, especially those concerning giftedness, and should more systematically advocate a developmental view of this quality. The results of the present study indicate that students might benefit from early interventions (before and during 4th grade) to emphasize the malleability of personal characteristics such as giftedness and intelligence in order to develop a beneficial mindset concerning learning. Furthermore, students require support from their learning environments, and pedagogical approaches such as growth mindset pedagogy (Rissanen et al., 2019; Rissanen et al., 2021) may offer a useful way to pursue that goal.

Disclosure statement

No potential conflict of interest was reported by the author(s).

ORCID

Elina Kuusisto http://orcid.org/0000-0001-5003-547X

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