Gender comparisons of pupils' self-confidence in mathematics learning

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The paper analyzes pupils' self-confidence in mathematics, which involves pupils' mathematical beliefs about themselves, and beliefs about achievement in mathematics, in Finnish elementary school. The research described consists of a survey on mathematical beliefs of about 3000 fifth-graders and seventh-graders. Results showed that mathematical beliefs about oneself could be divided, based on the indicator used, into three factors: self-confidence, success orientation, and defense orientation. The fifth-graders had higher self-confidence than the seventh-graders. Additionally, boys in both grades had remarkably higher self-confidence in mathematics than girls.

Affect has been a topic of interest in mathematics education research for different reasons. One branch of study has focused on the role of emotions in mathematical thinking generally, and in problem solving in particular. Another branch has concentrated on the role of affect in learning, and yet another on the role of affect in the social context of the classroom. Affective variables can be seen as indicative of learning outcomes or as predictive of future success (McLeod, 1992).

The concept 'belief'

Pupils' beliefs about themselves as learners of mathematics are strongly connected with their general attitudes toward the discipline in question.

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Mathematics has been for centuries a highly valued discipline in school, and therefore, pupils consider success in mathematics important. It has been observed that pupils' beliefs about mathematics and about themselves as mathematics learners have a central role in pupils' learning and success in mathematics (e.g. Schoenfeld, 1992).

The importance of beliefs is earning more and more recognition in mathematics education; this is in concordance with the constructivist understanding of teaching and learning. Here we understand beliefs with Schoenfeld (1992) as "an individual's understandings and feelings that shape the ways that the individual conceptualizes and engages in mathematical behavior"(p. 358).

Mathematical beliefs and mathematics learning form a circular process: On one hand, how mathematics is taught in class influences gradually pupils' beliefs in mathematics. On the other hand, beliefs influence how pupils receive mathematics instruction in class. A pupil's mathematical beliefs act as a filter influencing all their thoughts and actions concerning mathematics. Mathematical beliefs are often divided into four main components: beliefs about mathematics, beliefs about oneself as a mathematics learner/applier, beliefs about teaching mathematics, and beliefs about learning mathematics (e.g. Lester et al., 1989). Self-confidence belongs to the second category.

Some earlier results on beliefs

Of mathematical beliefs about oneself, the most studied ones are, among others, self-confidence, self-efficacy and success expectations as well as their connections with success. Several studies have shown that beliefs about oneself have a remarkable connection with success in mathematics (e.g. Hannula & Malmivuori, 1997; House 2000). For example, in the study of Hannula and Malmivuori (1997) the observation was made that of ninth-graders' mathematical beliefs, self-confidence correlated statistically significantly with success in the mathematics test they used. However, the issue of causality is more problematic (see e.g. Chapman, Tunmer & Prochnow, 2000; Linnanmäki, 2002).

Often one tries to approach mathematical beliefs using comparisons of girls' and boys' results. Among others, in the test of Pehkonen (1997), boys in grade 9 were more interested in mathematics and had more confidence in themselves than girls. According to results of the same study, girls were, however, more ready to cooperate with other pupils and to practice with more tasks than boys. Similar results have been found also in other studies (e.g. Stipek & Gralinski, 1991). These results are supported also by the study of Vanayan et al. (1997) that showed that

already in grades 3 and 5 boys estimated themselves to be better in mathematics than girls. Teenage girls' weaker self-confidence in mathematics compared to boys' has also been reported in several publications, e.g. in Bohlin (1994) and Leder (1995). Also mathematics anxiety seems to be more general among girls than among boys (e.g. Hembree, 1990; Frost, Hyde & Fennema, 1994).

The focus of the paper

The focus of this paper is to describe pupils' mathematical beliefs about themselves, and to consider them in relation to their mathematical achievement. Especially, we concentrate on comparison of girls' and boys' beliefs and achievement.

Method

The study is a part of a research project "Understanding and Self-Confidence in Mathematics" financed by the Academy of Finland (project #51019). The project has targeted grades 5-8, and contains in the beginning a large survey with a statistical sample from the Finnish pupil population of grade 5 and grade 7 with 150 school classes and altogether 3057 pupils. The classes were randomly selected, and they represented geographically the whole Finland. The sample consisted of 1154 fifth-graders and 1903 seventh-graders, the number of girls and boys were about the same. The aim of the large survey was to get reliable information to be generalized in Finnish circumstances.

The survey was implemented at the end of the year 2001, and the information gathered was deepened with interviews and classroom observations in spring 2002. In this paper we are going to concentrate on the results of the survey part of the study. Interview and observation results are dealt with in other papers (e.g. Maijala, 2004).

Indicator

The research group planned a questionnaire especially for this project. Its aim was to measure both pupils' calculation skills in fractions and decimals, and their understanding of the concepts "density of rational numbers" and "infinity". Additionally we measured pupils' self-efficacy regarding the tasks and their mathematical beliefs. The questionnaire was a compound of five areas: a pupil's background information, 19 mathematical tasks, a pupil's expectation of success before doing the task, a pupil's evaluation of success after doing the task, and an indicator for his

mathematical beliefs. The questionnaire was administered within a normal mathematics lesson (45 minutes) by the teacher. Some examples of the mathematical tasks used in the questionnaire were, as follows:

Task 5. Write the largest number that exists. How do you know that it is the largest?

Task 6c. Calculate 2 * 0.8.

Task 7. How many numbers are there between numbers 0.8 and 1.1?

The first one (task 5) aimed to uncover pupils' understanding on infinity of natural numbers. The second task (task 6c) measured their skills on decimal calculation. With the third one (task 7) we were teasing out what kind of conceptions they have on the density of rational numbers.

Some results connected to the concept "infinity" have been reported in an earlier paper (cf. Hannula et al., 2002). Here we will concentrate on the results of self-confidence in mathematics. Furthermore, connections of the pupils' beliefs are studied with their (self-reported) latest marks in mathematics and with their achievement in mathematical tasks of the questionnaire. Grade and gender are used as background variables.

The indicator used (belief scale) contained 25 statements of beliefs about oneself in mathematics. Of these items, ten were taken from the self-confidence subscale of the Fennema-Sherman mathematics attitude scales (cf. Fennema & Sherman, 1976), and the other 15 items measured pupils' beliefs about themselves as mathematics learners, and beliefs about success. The wording of the statements is given in Table 1 describing the factor solution. The pupils answered on a 5-point Likert-scale (from totally disagree to totally agree).

The sum variables made from beliefs have been considered mainly without classifications, but, if needed, three groups in achievement (weak, average, good) were formed. The sum scores of the mathematics tasks in the test were divided, as follows: a quarter from the weakest part, a quarter from the best part, and half of the pupils between these formulated their own group. The data of the fifth-graders and the seventh-graders was dealt with both together and separated. The results are reported mainly with all pupils together, but if there are significant differences between the grades, they are mentioned separately.

Data analysis

Data analysis concerning beliefs began with factor analysis. Next the connections of the sum variables, made from the factors obtained, with

gender, grade level, mathematics marks and the test score were considered. Parametric tests, such as *t*-test, were used, and the results were checked, if needed, with corresponding nonparametric tests.

The questionnaire used in research was tested with some pupils from grade 5 and 6 in autumn 2001, and some small changes were made. Since the mathematical tasks in the questionnaire were the same for both grades (grade 5 and 7), it is clear that the task scores of the seventh-graders were remarkably higher than those of the fifth-graders. In the case of self-confidence, the belief scale seemed to form a very unified, and therefore, reliable part, since its statements were factorized in several different solutions on the same factor.

The research participants formed a large and covering sample of fifth-graders and seventh-graders in Finland. Therefore, results can be generalized to the whole Finland.

Results

The first steps in analyzing the data gathered were to grade the mathematical tasks, and to factorize the belief scale. Using factor analysis we wanted to single out the latent dimensions in beliefs.

Factorized mathematics beliefs

Factor analysis resulted in the case of both grades a very similar structure. The program suggested five factors, when using the criteria "eigenvalue bigger than one", whereas according to the Cattell scree-test the proper number of factors seemed to be 3 to 5. Therefore, several different factor solutions were experimented, and finally the three-factor solution was chosen.

Favoring a three-factor solution, there were the following facts: In all factor solutions, the ten Fennema-Sherman statements were loaded in the first factor. Therefore in the four- and five-factor solutions, there were left only two or three statements for the last factors. Additionally, the Cronbach alphas for the last factors in question were very low. Furthermore, the three-factor solution explained almost as much of the variance as e.g. the five-factor solution.

The three-factor solution was further elaborated. Because of their low communalities (< 0.30), five statements were removed from the combined data and from the seventh-graders' data. In the case of fifth-graders, two additional statements were removed. In other points the structures were very similar, and therefore, we concentrate here to consider only the factorization made from the combined data.

Table 1. *The three-factor solution on the mathematics beliefs of the indicator*

Factors and statements	Loading	Communalities
SELF-CONFIDENCE (alpha 0.89)		
16. I am not the type who is good in mathematics.	-0.770	0.647
20. I am not very good in mathematics.	-0.761	0.639
8. Mathematics is difficult to me.	-0.755	0.637
5. I am able to get a good mark in mathematics.	0.726	0.597
6. Mathematics is my weakest school subject.	-0.726	0.574
22. I can do also difficult mathematics tasks.	0.677	0.534
11. I believe that I would do also more difficult mathematics.	0.653	0.463
19. I trust in myself in mathematics.	0.643	0.514
24. I know that I can be successful in mathematics.	0.588	0.539
1. I am sure that I can learn mathematics.	0.578	0.492
SUCCESS ORIENTATION (alpha 0.55)		
25. For me the most important in learning mathematics is to understand.	0.623	0.442
17. I prepare myself carefully for the tests.	0.601	0.373
14. In mathematics one succeeds with diligence.	0.590	0.355
15. For me it is very important to get a good mark in mathematics.	0.570	0.396
2. I am anxious before mathematics tests.	0.443	0.373
DEFENCE ORIENTATION (alpha 0.56)		
4. I don't like to reveal others, if I don't understand something in mathematics.	0.679	0.477
3. In mathematics one doesn't need to understand everything, when one only gets good marks in tests.	0.580	0.403
23. I fear often to embarrass myself in mathematics class.	0.572	0.397
12. I answer in mathematics class only, if I am compelled to.	0.556	0.360
9. I don't like tasks that I am not able to solve immediately.	0.495	0.331

In Table 1, one can see the three-factor structure with loadings and communalities. The three factors together explain 48 % of the variance. In the first factor, the central point is clearly self-confidence in mathematics, and therefore, we name the factor *Self-confidence*; it explains 26 % of the variance.

The second factor contains, among others, preparation for tests, importance of getting a good mark, and importance of understanding topics. The name of the factor will thus be *Success orientation*, and it explains 12 % of the variance. One should note that the factor contains many types of willingness to succeed – on one hand desire to understand topics, and on the other hand, desire for success in tests.

The third factor contains statements that are combined with the fear of embarrassment and avoidance-behavior in mathematics class. The factor was named *Defense orientation*, and it explains 10 % of the variance.

There was a statistically significant difference between the grades 5 and 7 in self-confidence and in success orientation in the way that the fifth-graders had higher means than the seventh-graders in both factors.

The boys had in the combined data and in the seventh grade data statistically significantly ($p < 0.001$) higher self-confidence than the girls,

but in success and defense orientation there were no statistically significant differences. In the case of the fifth-graders, there was a statistically significant ($p < 0.001$) difference in addition to self-confidence also in success orientation: boys are more strongly success-oriented than girls. When examining more carefully the self-confidence factor, significant differences between boys and girls in the combined data could be found in all ten statements, in favor of boys. The differences between fifth-grade boys and girls were not similarly clear, although boys in total had a higher success orientation score.

Correlations between sum variables

Achievement in mathematics was measured with the last mathematics marks and the tasks in the questionnaire (a sum variable). They form with the three factors the five sum variables: self-confidence, success orientation, defense orientation, school mark (not a sum variable), and task score. In order to acquire a holistic view, the correlations between the variables are firstly considered.

As one may observe from Table 2, self-confidence and defense orientation correlate negatively. Additionally, school marks and task scores correlate strongly with each other. Self-confidence has the strongest correlation with success in mathematics, but also defense orientation has some negative correlation with success. The significance of correlations was checked with a random sample on 15 %, which confirmed the validity of correlations.

Table 2. *Correlations between the five variables in the combined data ($N \approx 3000$)*

	Success orientation	Defense orientation	School marks	Task score
Self-confidence	0.156*	-0.397*	0.538*	0.346*
Success orientation		0.003	0.022	-0.030
Defense orientation			-0.248*	-0.212*
School marks				0.489*

Note. * Correlation is statistically significant, $p < 0.001$

Self-confidence correlates statistically significantly with all other sum variables. Success orientation is in connection only with self-confidence, whereas the rest of the three variables seem to form a solid structure with self-confidence. It is worthwhile noting that defense orientation has a negative connection with other sum variables. In Figure 1, the information of Table 2 is presented as a graph of correlating variables.

Thus the three variables (task score, self-confidence, school marks) seem to form a solid core. These three are interacting with each other strongly.

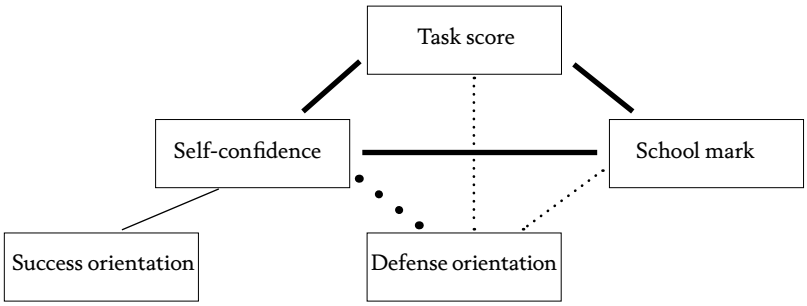

Figure 1. *The relationships between statistically significantly correlating variables (the thicker line means the stronger correlation, negative correlation is marked with a broken line)*

Mathematics achievement and mathematical beliefs

The school marks and the task scores correlated strongly as we could see in Table 2. Additionally, when examining the results concerning them, they seemed to be very similar. Therefore, we are going to present the results concerning achievement in mathematics only on the basis of the school mark variable. In the case of school marks in mathematics, there were statistically significant differences between different achievement groups (weak, average, good) in self-confidence and defense orientation: The weak pupils had a remarkably weaker self-confidence and a stronger

Table 3. *The relationship between school marks and mathematics beliefs*

		School marks in mathematics									
		Weak			Average			Good			
Factors	gender	mean	SD	N	mean	SD	N	mean	SD	N	*p*
Self- confidence	boy	3,2	0,65	338	3,7	0,62	441	4,3	0,56	614	0,000**
	girl	2,7	0,72	354	3,2	0,65	457	3,8	0,67	563	0,000**
Success orientation	boy	3,6	0,72	338	3,7	0,64	440	3,6	0,63	614	0,187
	girl	3,7	0,69	353	3,6	0,64	457	3,7	0,61	563	0,014*
Defence orientation	boy	2,7	0,76	337	2,4	0,70	441	2,2	0,71	614	0,000**
	girl	2,7	0,75	353	2,5	0,68	457	2,3	0,67	563	0,000**

Note. ** Statistically significant, $p < 0{,}001$. * Statistically significant, $p < 0{,}05$.

defense orientation than the good pupils, and the average pupils were between these.

In addition, one may observe in Table 3 that gender differences in self-confidence were clear in all three achievement groups. Average girls had their self-confidence on the same level as weak boys, whereas good girls had almost as strong self-confidence as average boys. We were interested in focusing on this result, since some earlier results point out that there is no difference in self-confidence of high achieving girls and boys (e.g. Minkkinen, 2001).

Therefore, we decided to take a still smaller group of good girls (the criteria: school mark [1] is 10), and to compare them with the corresponding group of boys. From Table 3 one may observe that the difference in self-confidence between girls and boys stayed on the same level as in the whole data. Therefore, even the best girls don't reach boys in self-confidence. The gender difference was even bigger when comparing those boys and girls who succeeded best in the test.

Table 4. *Self-confidence of the highest achieving (mathematics mark 10) girls and boys.*

	Gender	N	mean	SD	*p*
Self-confidence	boy	137	4.4	0.45	
	girl	101	4.0	0.50	0.000**

Note. ** Statistically significant, $p < 0{,}001$

Conclusion

According to this study, boys seem to have clearly stronger self-confidence in mathematics in grades 5 and 7 than girls. In addition, the fifth-graders had stronger self-confidence in mathematics than seventh-graders. Of the belief factors, self-confidence correlated most strongly both with the last mathematics mark and with the task scores. Weak pupils had the weakest self-confidence and the strongest defense orientation, good pupils other way around, and average pupils were between these. This pattern was found in both grades and genders. A strong connection between self-confidence (and other beliefs about oneself) and mathematical achievement has been found also in earlier research (i.a. Tartre & Fennema, 1995; Hannula & Malmivuori, 1997; Malmivuori & Pehkonen, 1996).

The biggest gender difference was found in self-confidence: boys had remarkably higher self-confidence than girls. And the difference stayed

on equal level also when comparing the most skillful girls and boys with each other.

The main result of the study is the difference between boys' and girls' self-confidence as well as the connections of self-confidence and defence orientation with mathematics achievement. According to Stuart (2000), the lack of self-confidence can lead to mathematics anxiety that can be seen as a fear to become embarrassed and as avoidance behaviour during mathematics lessons. The art and way how mathematics is taught might, according to him, influence whether a pupil experiences success and whether his "mathematical self-confidence" will develop.

Regarding the origin of these differences in beliefs, we stress that achievement alone cannot explain them. There exist research results that a teacher's mathematics beliefs are in connection with his pupils' beliefs, and thus with their success in mathematics (e.g. Crater & Norwood, 1997; Philippou & Christou, 1997). It seems that class-level factors are more relevant to girls' than to boys' self-confidence (Hannula & Malmivuori, 1997). Teachers' beliefs about mathematics teaching and learning have been seen to influence how their pupils experience studying mathematics. In other words, teachers' beliefs direct their classroom performance that influences their pupils' beliefs about mathematics. However, it should be admitted that this is a simple generalization, since there are many other influencing factors in teaching situation. (Crater & Norwood, 1997) For example, beliefs of a pupil's family and peers may also influence his beliefs, and thus his self-confidence in mathematics (Stuart 2000).

In changing pupils' mathematics-related beliefs, e.g. improving self-confidence one should take into account all possible factors. Influencing only one factor will probably not change pupils' beliefs about mathematics and about themselves.

Further studies would be needed e.g. on the phenomena, whether teaching methods have connection with mathematics-related beliefs, and what kind of teaching methods will enable best experiences of success for all kind of pupils, from the weakest to the most gifted. Additional new research is needed to explain, why boys have better self-confidence in mathematics than girls, and how girls' beliefs about mathematics and about themselves as learners of mathematics can be improved.

References

Bohlin, C. F. (1994). Learning style factors and mathematics performance: sex-related differences. *International Journal of Educational Research*, 21 (4), 387-398.

Chapman, J. W., Tunmer, W. E. & Prochnow, J. E. (2000). Early reading-related skills and performance, reading self-concept and the development of academic self-concept: a longitudinal study. *Journal of Educational Psychology*, 67, 145-152

Crater, G. & Norwood, K. (1997). The relationship between teacher and student beliefs about mathematics. *School Science & Mathematics*, 2, 62-67.

Fennema, E. & Sherman, J. A. (1976). Fennema-Sherman mathematics attitudes scales. *JSAS Catalog of Selected Documents in Psychology*, 6, 31 (Ms. No. 1225).

Frost, L. A., Hyde, J. S. & Fennema, E. (1994). Gender, mathematics performance, and mathematics related attitudes and affect: a meta-analytic synthesis. *International Journal of Educational Research*, 21 (4), 373-385.

Hannula, M. S. (2004). *Affect in mathematical thinking and learning.* Annales Universitatis Turkuensis (Ser. B, Tom. 273). Faculty of Education, University of Turku.

Hannula, M. S. & Malmivuori, M. L. (1997). Gender differences and their relation to mathematics classroom context. In. E. Pehkonen (Ed.), *Proceedings of the 21st Conference of the International Group for the Psychology of Mathematics Education* (Vol 3, pp. 33-40). University of Helsinki.

Hannula, M. S., Maijala, H., Pehkonen, E. & Soro, R. (2002). Taking a step to infinity: student's confidence with infinity tasks in school mathematics. In S. Lehti & K. Merenluoto (Eds.), *Third European Symposium on Conceptual Change – A Process Approach to Conceptual Change* (pp. 195-200). Faculty of Education, University of Turku.

Hembree, R. (1990). The nature, effects, and relief of mathematics anxiety. *Journal for Research in Mathematics Education*, 21 (1), 33-46.

House, J. (2000). Student self-beliefs and science achievement in Ireland: findings from the third international mathematics and science study (TIMMS). *International Journal of Instructional Media*, 27 (1), 107-115.

Leder, G. (1995). Equity inside the mathematics classroom: fact or artifact? In W. G. Secada, E. Fennema & L. B. Adaijan (Eds.), *New directions for equity in mathematics education*. Cambridge University Press.

Lester, F. K., Garofalo, J. & Kroll, D. L. (1989). Self-confidence, interest, beliefs, and metacognition: key influences on problem-solving behavior. In D. McLeod & V. Adams (Eds.), *Affect and mathematical problem solving* (pp. 75-88). New York: Springer-Verlag.

Linnanmäki, K. (2002). *Matematikprestationer och självuppfattning, en uppföljninggsstudie I relation till skolspråk och kön*. [Mathematical proficiency and self-concept; a longitudinal study with an attention to language and gender]. Åbo Akademi University Press.

Maijala, H. (2004). *How does classroom teaching in mathematics look like in Finland?* Submitted to Educational Studies in Mathematics.

Malmivuori, M.-L. & Pehkonen, E. (1996). Mathematical beliefs behind school performances. In L. Puig & A. Gutierrez (Eds.), *Proceedings of the 20th PME Conference* (Vol. 3, pp. 305-311). University of Valencia.

Minkkinen, J. (2001). *Lyhyttä vai pitkää matematiikkaa? Tutkimus tyttöjen ja poikien lukion matematiikkavalinnan perusteluista ja valintaan yhteydessä olevista tekijöistä* [General or advanced mathematics? A study on reasons behind girls' and boys' mathematics selection and on connected factors] (master's thesis). Department of Teacher Education, University of Turku.

Pehkonen, E. (1997). Learning results from the viewpoint of equity: boys, girls and mathematics. *Teaching Mathematics and its Applications*, 16 (2), 58-63.

Philippou, G. & Christou, C. (1997). A study of teachers´ conceptions about mathematics. In. E. Pehkonen (Ed.), *Proceedings of the 21st Conference of the International Group for the Psychology of Mathematics Education* (Vol 4, pp. 9-16). University of Helsinki.

Schoenfeld, A. (1992). Learning to think mathematically: problem solving, metacognition and sense making in mathematics. In A. D. Grows (Ed.), *Handbook of research on mathematics learning and teaching* (pp. 334-370). New York : Macmillan.

Stipek, D. & Gralinski, H. (1991). Gender differences in children's achievement-related beliefs and emotional responses to success and failure in mathematics. *Journal of Educational Psychology*, 83 (3), 361-371.

Stuart, V. (2000). Math curse or math anxiety? *Teaching Children Mathematics*, 6 (5), 330-335.

Tartre, L. & Fennema, E. (1995). Mathematics achievement and gender: a longitudinal study of selected cognitive and affective variables. *Educational Studies in Mathematics*, 28, 199-217.

Vanayan, M., White, N., Yuen, P. & Teper, M. (1997). Beliefs and attitudes toward mathematics among third- and fifth-grade students: a descriptive study. *School Science & Mathematics*, 97 (7), 345-351.

Notes

1 In Finland 10 is the best mark in school; the other ones are 9, 8, 7, 6, 5, 4 where 4 is unsatisfactory.

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Sammanfattning

I artikeln analyseras finska grundskolelevers självförtroende i matematik, vilket även omfattar elevernas uppfattningar om matematik och om framgång i matematik. Forskningsdata baseras på en survey om matematiska uppfattningar med ca. 3000 elever i årskurs fem och sju. Resultaten pekar på att de matematiska uppfattningarna, enligt det använda instrumentet, kan särskiljas i tre faktorer: *självförtroende*, *framgångsinriktning* och *försvarsinriktning*. Eleverna i årskurs fem hade högre självförtroende än eleverna i årskurs sju. Dessutom hade pojkarna påtagligt högre självförtroende än flickorna i båda årskurserna.