

Research Article

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Fourth Grade Students' Cognitive Structures Regarding "Values": Application of the Word Association Test*

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Abstract

With the help of the Word Association Test (WAT), the present study aimed to reveal elementary school fourth grade students' cognitive structures regarding the values to be taught in relation to the learning areas within the scope of the course of social studies. The participants in the study were elementary school fourth grade students. In the research process, seven values such as respect, tolerance, love, responsibility, solidarity, benevolence and patriotism, which were all determined as the values to be taught to the students within the scope of the curriculum of the elementary school fourth grade course of social studies, were presented to the students at the end of the teaching process. The students were asked to write down the words that they associated at once with the seven key concepts in 1-minute. The data collected were recorded in a table of frequencies including the key concepts and words, and in the light of the data in this frequency table, mind maps showing the students' cognitive structures were formed. The results obtained via the examination of the connections and associations between the words and the key concepts in these mental maps demonstrated that the students produced the most words regarding the values of respect and tolerance and the least words regarding the value of solidarity. In addition, the students with a cut-off point of 50+ were found to associate the values of love, respect and tolerance with each other and the value of responsibility with the "job-duty".

Keywords

Word Association Test; Social Studies; Elementary School; Value Education; Cognitive Structure

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Social studies education aims to help individuals firstly understand themselves and their physical and social environment, then develop positive values and attitudes towards themselves and their environment and eventually transform their knowledge and values into action (Doğanay, 2007). Parallel to this, in the course of social studies, which is a reflection of social studies education at schools, the purpose is to teach life-related information to individuals and to help them acquire the related skills and values. In this respect, the scope of the course of social studies includes teaching values and moral principles, which are necessary for individual life as well as for social life (Akbaş, 2008). Equipment of individuals with the values and skills which will prepare them for their future lives and which will help them make moral decisions and demonstrate ethical behaviors when necessary is reported to be among the fundamental goals of the related curricula (Ekşi, 2003). Thus, with the influence of developments and changes throughout the world, the Ministry of National Education (MoNE) made changes in curricula in 2005 and gave great importance to value education in the revised curricula. In the curriculum, values were among the most focused subjects. In this respect, in the curriculum, value was defined as “Common thoughts, goals, ethical principles or beliefs accepted to be necessary by most of the members of a social group or society to maintain their existence, unity and functions” (Özgüven, 1999). In addition, the curriculum of the course of social studies also covered comprehensive explanations and various approaches regarding how to teach values (MoNE, 2005).

Table 1

The values in the 2018 curriculum of social studies

Justice	Being scientific	Honesty	Respect
Giving importance to family unity	Being hardworking	Aesthetic	Love
Independence	Solidarity	Equality	
Peace	Freedom	Thrift	
Patriotism	Benevolence	Responsibility	

In the 2018 curriculum of social studies includes 18 values –are *justice, being scientific, honesty, respect, giving importance to family unity, being hardworking, aesthetic, love, independence, solidarity, equality, responsibility, peace, freedom, thrift, patriotism, benevolence*- supposed to be taught directly. In addition, in the curriculum, the goal of value education was explained in detail as follows: “The goal is to help students develop a healthy, consistent and balanced personality. For this purpose, it is important for individuals to become multifaceted via the value education. Also, values, which have an important role in shaping individuals’ attitudes and behaviors contribute to healthy and balanced development of students.” (MoNE, 2018). Moreover, determining the extent to which students acquire the target skills, values, knowledge and attitudes in their education process is important to overcome the related deficiencies. Therefore, traditional approaches to measurement and evaluation have been replaced by alternative measurement and evaluation approaches and techniques. Alternative measurement and evaluation techniques cover all types of evaluation except for traditional measurement-evaluation tools including multiple-choice tests which have single correct choice (Bahar, Nartgün, Durmuş & Bıçak, 2006). Among alternative measurement and evaluation techniques, the Word Association Test (WAT) allows

revealing students' cognitive structures regarding a certain subject or concepts. This makes it possible for teachers not only to determine their students' background knowledge about that subject with the use of WAT before the lesson but also to evaluate the teaching process by applying it at the end of the lesson. Also, it can be used before and after the lessons to reveal the current conceptual change.

With the application of WAT, students are allowed a certain period of time to report the concepts they associate with the key concepts presented to them. It is thought that the words reported by students in response to the concepts that are found in their long-term memory demonstrate not only the connections between the concepts in their cognitive structures and but also the semantically close relations between all the concepts revealed. An increase in these close relations show that there are strong connections between two concepts and that these two concepts will associate one another during remembrance (Bahar & Özatlı, 2003).

According to the related literature, it is seen that the Word Association Test is used to reveal (i) students' cognitive structures regarding a certain subject, (ii) their misconceptions and (iii) their conceptual changes. When the studies involving the use of WAT are examined, it could be stated that these studies were mostly carried out in the fields of science education. There is little research conducted in other fields (Kaya & Taşdere, 2016; Bahar, Johnstone & Sutcliffe, 1999; Bahar & Özatlı, 2003; Nakiboğlu, 2008; Ercan, Taşdere & Ercan, 2010; Bahar & Kılınç, 2001; Işıklı, Taşdere & Göz, 2011; Şimşek, 2013; Kurt & Ekici, 2013a; Kurt & Ekici, 2013b; Ekici & Kurt, 2014; Deveci, Çengelci & Gürdoğan Bayır, 2014; Balbağ, 2018a; Balbağ 2018b; Gündoğan & Gültekin, 2018). In this respect, the present study is considered to be important as it proves WAT to be a measurement and assessment tool that can be applicable for various purposes in different fields. In addition, the study is also thought to help teachers and researchers develop different perspectives as it will provide data different from those to be provided by other measurement and assessment techniques. Value education has become one of the attention-drawing fields in which a number of studies have been conducted. Almost all courses and curricula cover values. Obviously, there is little research on values within the scope of the course of social studies (Aladağ & Yılmaz, 2014; Aydemir & Ulu Kalın, 2018; Çetin & Ünsal, 2019; Dinç, Sezer, Üztemur & İnel, 2018; Deveci, Çengelci & Gürdoğan Bayır, 2014; Er Tuna, 2018; İnel, Akar & Üztemur, 2016; Karatekin & Elvan, 2016; Öztürk & Yılmaz Özcan, 2017; Ünal & Er, 2017). On the other hand, there is no research on elementary school students' cognitive structures regarding values. The fact that there is almost no research conducted on values at elementary school level despite such great importance of values makes it necessary to examine values within the scope of cognitive structure and conceptual meaning. The reason is that determining students' cognitive structures and misconceptions is thought to develop the cognitive structure and to result in conceptual change in the teaching and learning process. Accordingly, it is believed that revealing students' cognitive structures regarding values by using WAT, an alternative measurement and assessment technique, will make important contributions to the related literature in terms of both content and the data collection technique used.

The purpose of the present study was to reveal elementary school fourth grade students' cognitive structures and misconceptions regarding the goals to be achieved within the scope of the course of social studies with the help of the Word Association Test (WAT), an alternative measurement and evaluation technique.

Methodology

The study was carried out using the survey model, one of quantitative research methods. Survey models are research approaches aimed at describing past or present situations as they exist, and attempt to define events, individuals or objects under investigation within their own circumstances and as they exist (Karasar, 2009). In this respect, the present study was designed as a survey model since the purpose was to reveal the students' cognitive structures regarding values.

Participants

The participants of the study were 93 volunteering fourth grade students attending a public elementary school in the city of Eskişehir. The parents of these students belonged to the average socio-economic class. Of all the participants, 48 of them were female students, and 45 of them were male students.

Data Collection Process

In the study, the Word Association Test (WAT) was used as the data collection tool. According to Schmidt (1997), for the purpose of determining misconceptions, interviews, multiple-choice tests, open-ended questions, concept maps and word association test can be used individually or together. WAT was applied at the end of the process of teaching seven values (Respect, Tolerance, Love, Responsibility, Solidarity, Benevolence, Patriotism) which were all determined as the ones to be taught to the students within the scope of the curriculum of the fourth grade course of social studies. Before the application process, the students were informed about WAT and provided with examples of different applications of WAT. Following this, the students were allowed a 1-minute duration and asked to write down the words they thought to be associated with the key concepts. Each key concept in the data collection tool was written on a separate piece of paper. The students were requested to write down the first words that came into their minds in relation to the key concept in the allocated period of time. A sample page was follows:

Tolerance -----
Tolerance -----
Tolerance |-----
Tolerance -----
Tolerance -----
Related sentence: -----

Data Analysis

The data collected in the study were recorded in a frequency table including the key concepts and the associated words. In the light of the data presented in the frequency table, the mind maps revealing the elementary school fourth grade students' cognitive structures were obtained. While forming the mind maps, the cut-off technique developed by Bahar, Johnstone & Sutcliffe (1999) was used. The cut-off point refers to

a certain number (like the frequencies of 50-40-30 or 35-25-15) lower than the number of the most frequent associated words reported for any key concept in the Words Association Test. The responses found to be higher in number than a certain frequency are written down in the first part of the concept map. Following this, the cut-off point was decreased in accordance with certain ranges, and this process continues until all the key words appear in the concept map. In the interpretation phase of the data, in order to get the cognitive structure, the number of the words written down for each key concept given in the test was determined, and a frequency table showing not only the words or concepts produced for each of the key concept but also the frequency of these words and concepts. Based on this frequency table, mind maps were formed. Consequently, the connections between the key concepts and the associated words were interpreted via the mind maps prepared.

Another dimension of the study was the analyzing the sentences that the students wrote for each concept in WAT. The students were asked to make a sentence in relation to each concept. Then these sentences of the students were examined with respect to the meanings of the sentences and the information given in the sentences. In their study, Ercan, Taşdere and Ercan (2010) classified the sentences for analysis as follows: sentences including scientific information, non-scientific and superficial information, and misconceptions. However, as the key concepts given in the present study were abstract, the sentences were classified with a little change as follows: sentences including scientific information, sentences including non-scientific and/or superficial information, and irrelevant sentences and/or sentences including misconceptions.

In order to increase the reliability and transferability of the study (Yıldırım & Şimşek, 2008), the research findings were presented without making any interpretations, and the sentence categories formed via the Word Association Test were supported with direct quotations. For the purpose of transferring the reliability, the data and the results obtained via the use of different sources were subjected to cross-check (Patton, 2002). In this respect, in the study, triangulation of the data diversity and source was done, by using the “Word Association Test” (collecting related concepts and words) and sentences (checking the relation of the usage and mean of the words in a sentence). And the consistency of the data collected from the students were analyzed and compared. Also, in order to increase the reliability of the study, another researcher was asked for cooperation in all the phases of the research process from the preparation of the data collection tools to the interpretation and reporting of the findings. In this process, the data were analyzed separately, and the necessary corrections were done in line with the related feedback received.

Findings and Interpretations

The findings obtained in the study have been presented using a frequency table for each concept and figures showing the connections.

Table 2

The frequencies of the words associated with the key concepts

Key Concepts	Frequency (f)
Respect	226
Tolerance	247
Love	162
Responsibility	110
Solidarity	71
Benevolence	144
Patriotism	131

When Table 2 is examined, it is seen that tolerance was the value associated most with words and that solidarity was the one least associated with words. Table 3 presents the associated words higher than the cut-off point.

Table 3

The associated words higher than the cut-off point

Key Concepts	Respect	Tolerance	Love	Responsibility	Solidarity	Benevolence	Patriotism
Associated Words	Love	Respect	Family	Job	Benevolence	Love	Love
	Tolerance	Love	Happiness	Family	Love	Benevolence	Homeland
	Family	Family	Respect	Homework	Respect	Respect	Respect
	Elders	Goodness	Tolerance			Tolerance	
	Friendship	Friendship				Solidarity	
	Sincerity	Happiness					

When Table 3 is examined, it is seen that the students generally associated one given concept with another given one. This shows that the values included in the curriculum were related to each other. For the purpose of revealing the students' cognitive structures regarding the key concepts, the words associated with the words were examined, and the concept maps obtained via this analysis have been presented in Figure 1 considering the cut-off points.

Cut-off point of 50 and higher: As can be seen in Figure 1, the students associated the value of "responsibility" with the words of job-task and the value of "love" with the word of family. In addition, it was seen that the students associated the values of "tolerance", "love" and "respect" with one another.

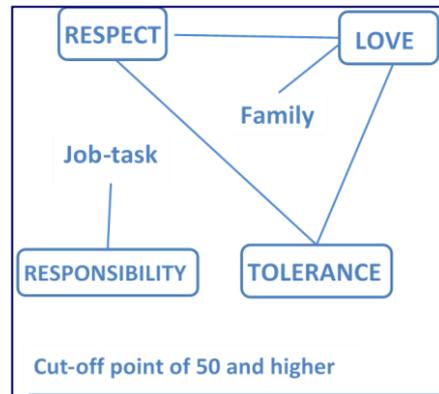


Figure 1. Concept map formed for the cut-off point of 50 and higher

Cut-off point between 40-49: As can be seen in Figure 2, the students associated the values of “love”, “respect” and “tolerance” with each other, and they associated the word of “family” with the values of “respect” and “love”. Also, different from the concept map formed for the cut-off point of 50 or higher, the value of “solidarity” was reported for the Word map formed for the cut-off point between 40-49. In addition, it was seen that the students associated the value of “solidarity” with “benevolence”.

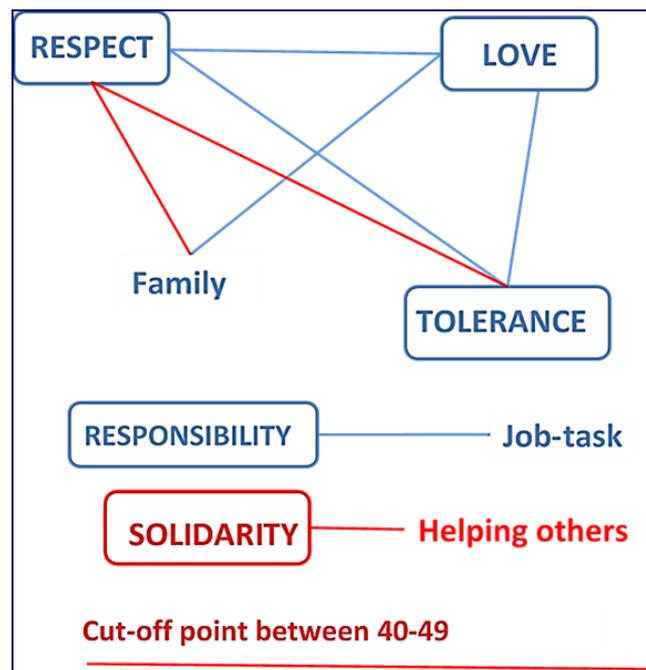


Figure 2. Concept map formed for the cut-off point between 40-49

Cut-off point between 30-39: In Figure 3, the students made associations using a number of new values and words according to the concept map formed for the cut-off point between 40-49. The students associated the value of “respect” with the words of elders and friends besides the word of family. In this range of cut-off point, the students also mentioned the values of “patriotism” and “benevolence”. They associated the values of “patriotism” and “benevolence” with the value of love. In addition, they associated the value of “benevolence” with the word of helping others.

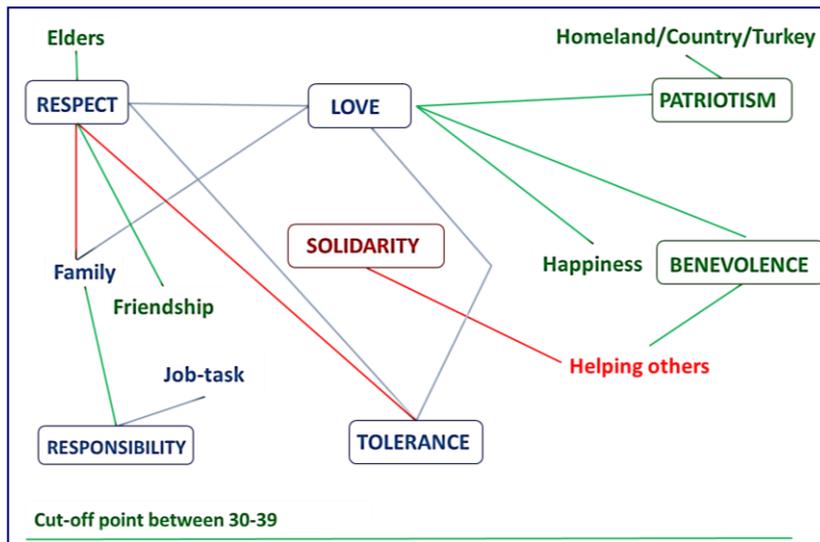


Figure 3. Concept map formed for the cut-off point between 30-39

Cut-off point between 20-29: As can be seen in Figure 4, the students formed a concept map for all the values found in the Word Association Test. When the concept map was examined, it was seen that the students associated the value of “responsibility” with homework and that they associated the value of “tolerance” with the words of goodness, family, friendship and happiness and with the value of “benevolence”. Also, for the cut-off point between 20-29, they associated the value of “respect” with sincerity and honest and associated the value of “patriotism” with the words of Atatürk and soldier. In addition, it was found that different from the others, the students associated all the values with each other in this part.

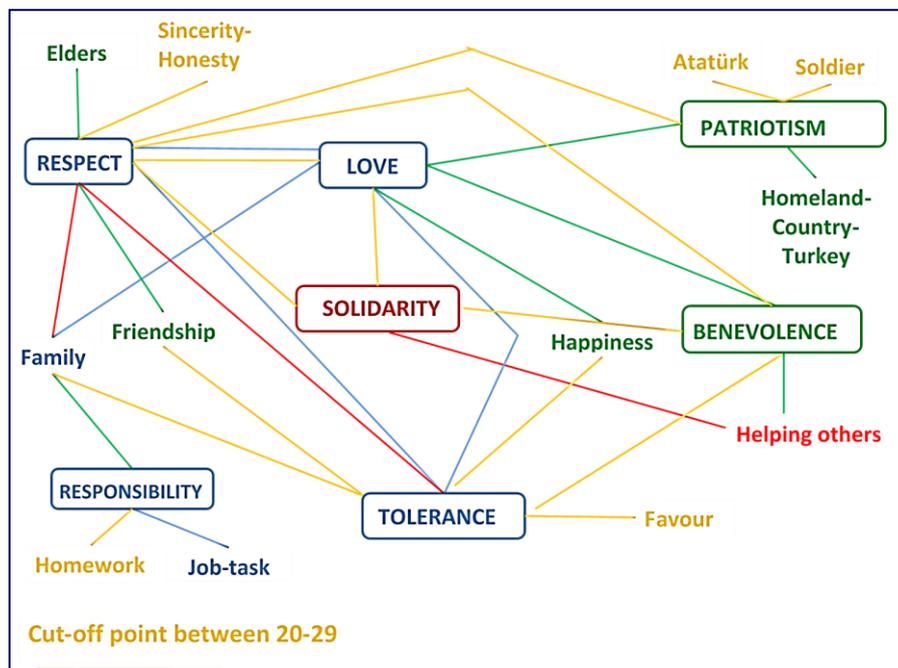


Figure 4. Concept map formed for the cut-off point between 20-29

As for the analysis of the sample sentences written down by the students in relation to the key concepts, the table developed by Ercan, Taşdere and Ercan (2010) was taken into account. The related sentences were categorized as “sentences including scientific information”, “sentences including non-scientific and superficial information” and “sentences including misconceptions” with respect to their meanings. In this respect, for the sentences including scientific information, the sentences written down by the students were examined with respect to their associations with the key concept as well as with respect to the scientific accurateness of the information given in the sentences. For the sentences including non-scientific and superficial information, these sentences were those which did not provide any scientific information, which included only emotions and/or thoughts, which conveyed daily-life meanings and which conveyed meanings influenced by past experiences and traditions. As for the sentences including misconceptions, they were sentences including the key concepts which were used in different and/or wrong meanings rather than in their scientific, non-scientific, real, connoted or metaphoric meanings; in addition, the sentences in this group were also those in which the key concepts were explained with the meanings of different concepts. Regarding these categories, in terms of the principle of “Statism”, the sentence of “The state recovers the economy for the public.” could be given as an example of a sentence including scientific information; “Our state is big.” could be given as an example of a sentence including non-scientific and superficial information; and “There is someone governing the state.” could be given as an example of a sentence including misconception (For a related example, see Işıklı, Taşdere and Göz, 2011). Table 4 below presents examples and frequencies of the sentences obtained in accordance with the categories related to the key words in the present study.

Table 4

Frequencies of the sentences produced in relation to the concepts

Key Concepts	Sentences including scientific information	Sentences including non-scientific and superficial information	Irrelevant sentences and/or including misconception	
			Blank	
Respect	-	85	3	2
Tolerance	2	80	6	2
Love	-	86	2	2
Responsibility	1	72	13	3
Solidarity	3	72	12	4
Benevolence	-	82	2	6
Patriotism	1	81	7	2

When the numbers of the related sentences in Table 4 are examined, it is seen that the students wrote down sentences with quite a high rate. Based on this result, it could be stated that the students had at least one view about the key concepts. However, when the sentences were analyzed, it was found that most of the sentences belonged either to the category of sentences including non-scientific/superficial information or to the category of irrelevant sentences/sentences including misconception. Table 5 demonstrates some examples of the sentences written down by the students.

Table 5
Sample sentences and frequencies with respect to the sentence categories

Key concepts	Sentences including scientific information	Sentences including non-scientific/superficial information	Irrelevant sentences/sentences including misconception
Respect		<ul style="list-style-type: none"> • I salute my friend with respect. • We should always respect the elderly • Everyone in my family is respectful to each other. • We should respect the Turkish Flag. • I respect my teacher. 	<ul style="list-style-type: none"> • Being respectful is honesty.
Tolerance	<ul style="list-style-type: none"> • Mevlana's words are about tolerance. • Mevlana is one of our great thinkers who define tolerance with good words. 	<ul style="list-style-type: none"> • My friend behaved me tolerantly. • I tolerantly behave my friend who doesn't speak to me. • I am tolerant towards my friend's views. • In our neighborhood, Uncle Seyfettin is very tolerant. 	<ul style="list-style-type: none"> • I kissed my father's hands. • I met a very good witch while walking. • We shouldn't vent our anger on other people. • Let's love and be loved, life is short.
Love	<ul style="list-style-type: none"> • Yunus Emre taught us love. 	<ul style="list-style-type: none"> • My elder sister's name is Love. • If you love Allah, then he will love you. • Love is prior to everything. • The heart of this child is full of love. • I have a girlfriend I love much • You should show yourself to your beloved. • Love is good for everyone. • I miss maternal love. • I have a love-attachment with my new friend. • It is very nice to hug everybody with love. • It is very beautiful to be loved by others with love. 	
Responsibility	<ul style="list-style-type: none"> • We have to obey traffic rules. 	<ul style="list-style-type: none"> • My mother made me responsible for looking after my little brother. • All people should do their own duties. • Our neighbor entrusted her daughter to us. • A responsible person will never be late. • I am responsible for misbehaviors of my little brother. • My little brother does not have any responsibilities. • All the responsibilities belong to me. • My mother gave me some responsibilities. • I take the responsibility of a crime I have committed. • Doing homework is one of our biggest responsibilities. 	<ul style="list-style-type: none"> • It is something related to the self. • I like helping others. • Taking a responsibility means a burden on you.
Solidarity	<ul style="list-style-type: none"> • Solidarity means collaboration • There should be solidarity for the 	<ul style="list-style-type: none"> • My friend in our neighborhood and I have decided to be in solidarity. • Our soldiers have always been in solidarity. • If family members are in solidarity, then 	<ul style="list-style-type: none"> • People consult me for anything. • Solidarity means making effort for something. • I will be in solidarity

	<p>existence of a community</p> <ul style="list-style-type: none"> • Atatürk fought together with the public in the war. 	<p>nothing will go wrong.</p> <ul style="list-style-type: none"> • Many hands make light work. • All groups should be solidarity. • My friend Ayşe is always in solidarity with others. • We can strengthen our friendship if we are in solidarity. • We carried out our project in solidarity. 	<p>with the others at the meeting.</p> <ul style="list-style-type: none"> • You can do everything if you cooperate with others. • Everybody here is strong. • Sometimes, there is solidarity in courts of justice.
Benevolence		<ul style="list-style-type: none"> • A benevolent person donated blood. • I donated my blood to Kızılay. • A benevolent person walking along the street helped an old man trying to cross the road. 	<ul style="list-style-type: none"> • Ulaş is an honest person. • I shared my food with my friend.
Patriotism	<ul style="list-style-type: none"> • As a patriot, all Turkish men aged 20 join the army to do their military service. 	<ul style="list-style-type: none"> • A patriot does everything for his homeland. • Whoever loves his homeland loves his nation too. • A patriot sacrifices his life for his homeland. • All soldiers fight for their homeland. • There are people who died to protect their homeland. • My elder brother told me that I should love and protect my homeland forever. 	<ul style="list-style-type: none"> • People doing their military service are patriots. • Our people are patriots. • I love peace. • One of Atatürk's principles is patriotism.

When the sentences made by the students in relation to the values in Table 5 are examined, it is seen that most of the sentences belonged to the categories of sentences including nonscientific and/or superficial information and sentences including misconceptions/ irrelevant sentences. Accordingly, it could be stated that there were quite a few sentences including scientific information as the key concepts semantically covered such aspects as social, moral and personal values rather than including scientific or technical information, principles and terms. In addition, the fact that the given values were abstract concepts and that the students were just at the stage of learning abstract concepts might have caused them to load intuitional meanings to these values.

In the study, it was seen that in relation to the value of respect, the students generally emphasized respect to such elements as Turkish Flag, friends, teachers and family elders and that there were misconceptions, though few in number, in the sentences related to the values of benevolence and honesty.

In addition, it could be stated that the students associated the value of tolerance with Mevlana, known for his tolerance in our history and culture and that they gave examples from their daily lives, which showed they knew the meaning of the concept of tolerance. However, it was seen that some of the students made sentences including misconceptions regarding the values of tolerance and respect.

In relation to the value of love, it was seen that the students generally made associations with Yunus Emre, who is known in our history and culture for his understanding of love. However, there were some students who made sentences including misconceptions regarding the values of love and respect.

Regarding the value of responsibility, the students made sentences associating the action of taking responsibility with taking care of something/someone, taking responsibility for others and nature, untrusting something/someone and doing homework. However, it was also found that some of the students made sentences including such misconceptions as associating responsibility with “a burden” and with the value of benevolence.

In terms of the value of solidarity, it was seen that the students made associations in their sentences with helping one another, sharing the responsibilities and supporting each other. In addition, they made sentences including misconceptions such as associating the value of solidarity with counselling, helping others, honesty, strength and trials in courts.

With respect to the value of solidarity, the students made associations with donating blood to Kızılay, helping each other, showing mercy and sharing. However, there were some students who made sentences including misconceptions such as association with the value of honesty.

Lastly, in relation to the value of “patriotism”, it could be stated that the students made associations with Atatürk, dying for the homeland and military service. On the other hand, some of the students reported patriotism to be one of Atatürk’s principles and made sentences including misconceptions such as misunderstanding the meanings of “patriotism” and “being a patriot”.

Conclusion and Discussion

The present study was carried out to reveal elementary school 4th grade students’ cognitive structures regarding the values found in the curriculum of the course of Social studies. In the study, the students were given seven values. The results obtained in the study demonstrated that the students produced words most for the value of tolerance and least for the value of solidarity. In addition, it was seen that the students produced such words for the value of respect as love, tolerance, family, elderly, friendship, sincerity and honesty and produced such values as respect and love and such words as family, goodness, friendship and happiness for the value of tolerance, while they produced the values of respect and tolerance and the words of family and happiness for the value of love. Also, they produced the words of homework and duty for the value of responsibility and produced the value of respect and the word of solidarity for the value of benevolence. Different from the others, the students produced the words of homeland, respect, soldier and Atatürk for the value of patriotism. In the study, it was concluded that under a given value, the students written down the other given values. In other words, they associated the values with one another. Six of the seven values given to the students to reveal their cognitive structures were universal values, while only one of them was a national value. When the values included in the curriculum of the course of social studies were examined, it was seen that most of the values were universal ones.

When the results obtained in the present study are examined, it is seen that the values produced by the students most at the cut-off point of 50 and higher were love, respect and tolerance and that the students associated the values of love and respect with the

word of family. In other studies, it was revealed that the values prioritized by families were love, respect and family unity (Yiğittir, 2010; Tay & Yıldırım, 2009). Studies conducted with teachers demonstrated that love, respect and tolerance were among the values which the teachers were most willing to teach to their students (Tay & Yıldırım, 2009; Balcı & Yanpar Yelken, 2010). In studies carried out with preservice teachers, it was found that they most frequently associated the concepts of respect, tolerance, honesty and solidarity in relation to moral and human values (Çetin & Ünsal, 2019). In one study carried out with students regarding values and value education, it was found that what the word value reminded the students first included love, respect, friendship, sincerity and tolerance (Tay, Durmaz & Şanal, 2013). Learning values is a life-long process with the influence of interactions between such socialization tools in daily life as mass communication, peers and family (Coombs-Richardson & Tolson, 2005). Therefore, it is seen that the results of the present study are consistent with those of other studies reported in related literature. The values adopted most by teachers and families, two most important sharers of value education, were revealed in the present study via the students' cognitive structures. When the sentences made by the students in relation to the values were examined, it was seen that the students mostly made sentences regarding the values of love, respect and tolerance. On the other hand, when the sentences made by the students were analyzed, it was revealed that the students made sentences including information only about the values of solidarity and patriotism and that the other sentences made by the students included misconceptions and superficial and irrelevant information about the other values. Based on this result, it could be stated that the students had general views about values. This result could be attributed to several factors: First, the values were abstract; secondly, the students were at just at the initial stage of learning abstract concepts or at the end of learning concrete concepts; next, certain problems were experienced in the process of teaching-learning these values; lastly, the students might not have internalized the values sufficiently.

Determining students' cognitive structures and misconceptions regarding values provides clues in relation to how to structure the teaching and learning processes. This is as important as value education (Aydemir & Ulu Kalın, 2018). Elementary school students' acquisition of especially abstract values requires a process and observation, and it is also difficult to measure it. Therefore, based on the findings obtained in the present study, it could be stated that WAT, an alternative measurement and assessment technique, can be used to reveal students' cognitive structures and misconceptions in the process of their value education. Also, WAT, which is generally used in mathematical fields, could be used in other non-mathematical and social fields as well.

In addition, the value education process could be designed in a way to overcome the misconceptions identified and to help students internalize values. Moreover, future studies could be carried out with students from different class levels to determine their cognitive structures and misconceptions regarding other different values. Also, experimental studies could be designed to determine the conceptual change by covering the phases before and after the value education. Practitioners could be provided with trainings in relation to the use of alternative measurement and assessment tools including especially WAT in the teaching and learning processes.

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