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Teachers' Noise Sensitivity and Efforts to Prevent Noise Pollution in School*

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Abstract: The noise phenomenon at school is one of the factors that may negatively affect school climate. **Purpose** In this study, the noise sensitivity and coping efforts of classroom teachers who intensely experienced noise phenomenon in their school were determined using basic qualitative research. **Method** Semi-structured interviews were conducted with the teachers selected for the study group. The collected data were analyzed using thematic analysis. **Findings** showed that loud noise at school might lead to hypersensitivity in teachers, migraine and prolonged severe headache, difficulty in communicating, tinnitus, difficulty in focusing on lessons, adverse effects on communication and interaction within the family, excessive tiredness and getting distracted, and a reduced tolerance limit, as well as feeling tired and angry. The findings suggest that teachers are in search of a quiet environmentto get away from the noise in the school. They reluctantly try to get used to the noise, and they think of retiring early from the profession. It was understood that teachers acted in various ways to cope with the noise, such as verbally warning noisy students, plugging their ears, closing the door/windows, and going out to the schoolyard to get away from the noise inside the building. **Implications** the teachers suggested improving the acoustics of the school, using visual stimuli with lights instead of bell sounds, raising the awareness of parents about noise and arranging the schoolyard in such a way that students can release their energies without causing noise.

Keywords: Noise in school, teachers, sensitivity to noise, physiological and psychological effects of noise

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Introduction

Sound is a type of energy composed of mechanical vibration waves. Air in an environment is necessary for the sound to reach and be perceived by the listener or speaker. All subjects related to sound, such as the measurement, separation and calculation of unwanted sounds, are within the scope of acoustics (Kurra, 2009). The human history of sound goes back to antiquity. In Greek, acoustic means hearing. Noise is defined in various ways in the literature. For example, while Özulu (1991) defines noise as "polluted sound", Kurra (2009) defines noise as a randomly structured, incompatible, high-level and disturbing complex sound ensemble. Noise is insidious pollution that is invisible to the eye, does not pollute the air, water and soil, but eventually, its effects start showing. Because of this feature, it can easily lead to learned helplessness in humans (Cohen, Evans, Krantz, & Stokols, 1980; Hiroto, 1974). Thus, developed societies that have realized the destructive effect of noise now define noise as "unsustainable pollution" (Henny, 2014). It has been known for a long time that noise, which is a special type out of many sounds that exist in human life, negatively affects human health. At the beginning of the 19th century, Nobel Prize-winning scientist Robert Koch said that people will fight against noise like cholera or plague in the future. Koch likened the noise to epidemic diseases with no cure, defined it as an environmental pollutant and emphasized that noise should be controlled concerning human and public health (Kurra, 2009). Making great progress on measures against noise in Turkey is the goal. For example, with the Ministry of Environment and Urbanization [MoEU] making acoustic insulation mandatory in all buildings in 2017, the acceptable background noise was determined as 39dB for a school with the lowest class C acoustic performance. However, almost all of the schools consist of old buildings lacking acoustic design and equipment. There is a need to solve the problems arising from the acoustics of such buildings and to spread the new noise regulation to society through education (Kurra, 2009). For this, the awareness of the society should be raised by considering noise as a social and environmental problem. Undoubtedly, it is up to the schools and teachers to raise the awareness of society.

In the last 10 years, studies have been conducted with teachers on the level of noise at school, noise sources and the degree of disturbance from noise (Akar, Tantekin-Erden, Tor, & Sahin, 2010; Aydin, 2004; Guremen, 2012; Sezer-Senkal, 2015; Tezcan & Demir, 2006). The results show that teachers are very disturbed by the noise in the school building, noisy behavior is a major disciplinary problem, the current noise level is not suitable for efficient teaching, and teachers are dissatisfied with the interior sound of the building. For example, in a study that examined the noise caused by the behavior of primary school students at schools in Turkey, it was been identified that "yelling" and "unauthorized conversations" are frequently encountered types of behaviour (Turnuklu & Galton, 2001). In another study on the sources of noise at school, teachers ranked first (67%) students talking to each other, second (22%) certain sounds like pulling a table/chair, third (5.83%) visual and hearing aids and equipment sounds and in the fourth and fifth place, equally the sounds of the ventilation and lighting fixtures (1.94%) as the main sources of noise in the classroom (Guremen,

2012). In addition, in the same study, teachers stated that the classrooms were not suitable for the auditory comfort conditions required for educational activities and that they were uncomfortable with the noisy environment they were exposed to. Can and Ermeydan (2017) researched how teachers spend their time at school. Their findings showed that teachers spend a large part of their time silencing students' unnecessary speech, reducing classroom noise and preventing discipline problems. This is a bigger obstacle for quality teaching than educational programs, educational policies and inadequate equipment. Unless a suitable learning environment is provided, even the world's best education curriculum and the most suitable equipment will not be effective.

Noise is such a major problem at school that it arises even in research in which the main purpose is not even to study noise. For example, in a study aimed to determine the needs of teachers working in primary schools regarding classroom management, students' making noise is one of the leading and undesirable behaviors that disrupt the flow of the course. Teachers emphasized that the problem is seen at all levels of education from kindergarten to high school. In another study in which high school chemistry teachers' views on classroom discipline were investigated, it was found that teachers attributed the noise in the classroom to reasons, such as "difficulty in attracting the student's attention to the lesson," "tolerance towards students" and "revealing repressed feelings at the student's home" (Tezcan & Demir, 2006). In studies in which collaborative and constructivist learning approaches were applied, the findings showed that the biggest difficulty was the noise made by students during the activities (Bilgin, Aktas, & Cetin, 2014; Yildirim & Donmez, 2008).

Starting from the learning environments, improving the school climate will contribute to the creation of positive school culture. As a result, there is a consensus that it will contribute positively to students' development and increase their academic success. In this context, it is crucial that physical spaces where communication and interaction between students, teachers, administrators and employees take place and where the curriculum is implemented have a suitable climate. There are many studies that reveal, with quantitative data, that the noise phenomenon is one of the main factors affecting the school climate. These studies show that the noise level in the school is quite high (Grebennikov, 2007; Jaramillo, 2014; Jaramillo, Ermann, & Miller, 2013; Lindstrom, Waye, Södersten, McAllister & Ternström, 2011). While some of these studies relate noise to types of mechanical systems in schools, other studies have examined teachers' perspectives on noise and noise sources in the classroom. In Jaramillo's 2014 study, teachers expressed the view that they would be more likely to concentrate on disturbing noise generated by other children in adjacent corridors rather than mechanical system noises. In another study conducted by Jaramillo et al. (2013), teachers blamed other students in corridors and adjacent classrooms for noise, rather than fixed sources, such as mechanical equipment, as a source of the disturbing noise, and emphasized that this situation decreases the achievement of students. Grebennikov (2007), aiming to reveal preschool teachers' exposure to noise in the classroom, found that the level of noise a teacher is exposed to was well above the health and safety legislation limit. In the same study, it was pointed out that there was a high level of noise in the building

when there are many students in closed areas when students started to play physical games or get bored, and during music lessons. It is believed that further research into noise in school environments is critical to understand both the scope of the problem and possible solutions.

In learning environments, noise may affect teachers in many ways. There are many studies in the literature to investigate how teachers are physically and psychologically affected by school noise (Grebennikov & Wiggins, 2006; Kristiansen, Lund, Nielsen, Persson, & Shibuya, 2011; Poulou & Norwich, 2010; Sargent, Gidman, Humphreys, & Utley, 1980). In a study examining its' psychological effects on preschool teachers, it was found that 40% of the participants were exposed to noise way above the maximum level on a daily basis, 50 dB (A) required by the Australian Occupational Health and Safety (OH&S) standard (Grebennikov & Wiggins, 2006). It was stated that this level of noise causes occupational stress and difficulties in interpersonal relationships. Kristiansen et al. (2011) found that there was a relationship between reverberation time in the classroom and feeling disturbed by noise. In addition, in the same study, noise disturbance was associated with the teacher's professional experience and the low age of the children. In another study conducted with Greek teachers, Poulou and Norwich (2010) examined teachers' perceptions of students' emotional and behavioral difficulties within the framework of "violence and prevalence." As a result of this, it was emphasized that one of the student behaviors that teachers had difficulty within the classroom was unauthorized speech and noise.

In addition to the studies abroad, there are national studies that reveal the noise originating from the physical environment, as well as studies that address the effects of noise in schools concerning its effects on stakeholders and the disruptions it creates in the teaching process. Regarding this, there are many studies showing numerical explanations of noise based on measurements. These studies were conducted on the basis of the physical conditions and usage conditions of the schools as the public places collectively shared by the people there. For example, in a study evaluating indoor and outdoor noise conditions in primary schools in Amasya, the average outdoor noise level of schools was found between 54-77 dB (A) and the average indoor noise level was between 67-74 dB (A) (Guremen, 2012). In another study, it was determined that the indoor noise level reached the range of 80.25-84.50 dB (A) during break time (Özbıçakçı, Çapık, Gördes, Ersin, & Kıssal, 2012). In another study (Tamer-Bayazit, Kucukciftci, & San, 2011) in which noise disturbance in primary schools was examined based on field studies, the average indoor noise level during lessons and breaks was 72.48 dB (A) and 87.04 dB (A), respectively. In another study in which indoor noise levels were determined according to the occupancy of the schools in a city center, the noise levels were between 47-72 dB (A) in the garden when the spaces were empty and 42-67 dB (A) when the corridor was empty. Noise levels were between 63-87 dBA in the garden when the spaces were full and 69-93 dBA when the corridor was full (Sahin, Senol, & Ogel, 2016). Similarly, Find (2014) found that the indoor noise level varied between 90.4 dB (A) and 60 dB (A) during recess, whether in private or public schools. Köse (2010), examining the indoor noise of

schools concerning the effects of the surrounding buildings, determined the level of noise exposed to schools around the airport as 63.27 dB (A) with the windows open and 54.3 dB (A) with the windows closed. In the same research, the outdoor noise level in the school garden was determined as 71.11 dB (A). Different studies conducted in this area show that although schools are defined as places sensitive to noise in the first degree in the noise regulations, the findings have revealed that the noise level of schools exceeds the upper limits of the regulations (31-35 dB (A)) (MEU, 2017).

Studies on noise and noise pollution in schools are grouped into five areas. These studies are: (1) studies in which teachers evaluate the effects of noise on teaching processes, (2) studies emphasizing the negative conditions created by noise pollution in learning environments, (3) studies addressing the negative effects of noise in the application of alternative teaching approaches, such as cooperative teaching techniques or constructivism, (4) quantitative studies that examine noise pollution at school in the context of classroom management strategies applied at different educational levels, such as pre-school, primary and high school. In addition to these, there are also studies examining noise sources in school buildings concerning quality and quantity, presenting the presence of noise in the numerical form with measurements and aiming to reveal the negative school climate. It is observed that people, such as teachers, who are constantly exposed to loud voices gain considerable sensitivity due to being exposed to loud noises from multiple sources, a sensitivity that turns into attitudes in their personal lives. In addition to the numerical expressions of the sound level that a person can withstand, this sensitivity situation turns into a phenomenon that needs to be examined in various dimensions when it becomes a phenomenon that is constantly exposed. However, to our knowledge, there has not been a qualitative study that addresses the definition and interpretation of the phenomenon of noise in the school climate by teachers, how teachers practice in noisy situations, how they behave, how they protect themselves and their students from the negative effects of noise, and what kind of suggestions they make for how they develop solutions to control the noise.

The problem of noise pollution, which is the subject of this study, is an issue that needs to be addressed with qualitative explanations in addition to numerical analysis. This research fills a gap created in this context by adding qualitative research conducted on the basis of the opinions and experiences of teachers, who are some of the stakeholders, to the issue of noise pollution in the school. It is thought that the research will add an in-depth dimension to the problem of noise pollution in school due to the variety of qualitative data it presents, and it will affect many areas, such as educational management, educational leadership, teacher training, classroom management, program development and design of teaching materials. The purpose of this study is to understand how the phenomenon of noise, which creates a negative climate in schools, affects teachers, is interpreted by teachers, and what efforts and suggestions teachers have for controlling noise. For this purpose, data were organized within the framework of the following five research questions:

1. How are teachers affected by noise pollution in schools?

2. How are teachers protected from noise pollution in schools?
3. How do teachers protect their students from noise pollution in schools?
4. What are the teachers' efforts to reduce noise pollution in schools?
5. What are the teachers' suggestions for reducing noise pollution in schools?

Method

Research Design

In this study, a qualitative research approach was adoptedto give meaning and depth to the quantitative research and numerical analyzes conducted on noise pollution as a common problem in schools (Creswell, 2013). Basic qualitative research methods were employed. According to Merriam, in basic qualitative research, researchers focus on how people interpret their lives, how they construct their own worlds, and what meaning they add to their experiences (2013). This study focused on teachers who experienced the problem of noise pollution in schools. It started off with questions, such as: how teachers are affected by this problem, how they cope with this problem, what solutions they suggest to reduce the effects of this problem, and how they protect themselves and their students. This study attempted to understand how teachers structured their worlds in the noise environment.

Working Group

This study was conducted in a public primary school in downtown Bursa.To reveal how the phenomenon of noise at school was interpreted by teachers, a study group was formed using purposeful sampling (Patton, 2002). In the criterion sampling type, the researcher can adhere to predetermined criteria as required by the phenomenon he wants to investigate, as well as determine the "basic criteria that can reveal the relevant situation due to the nature of the research" (Yildirim & Simsek, 2018, p. 122). The criteria in this study are that teachers have received awareness training about noise pollution and implemented various practices through prepared activities. Accordingly, teachers from all grade levels in the same institution were selected from among the teachers who met these criteria. This research was structured to understand how these teachers make sense of the noise phenomenon in the institution and how they designed solutions for it.

Data Collection

The data collection process was performed in the 2016-2017 academic year. While planning the data collection process, the aim was to make sense of the experiences, opinions, and suggestions of eight classroom teachers regarding the noise

phenomenon in their in-school education environments as an educational phenomenon. For this purpose, meetings were held two consecutive times. In the first interviews, researchers used a structured form to enable teachers to express how they understood the terms sound and noise. In this form, participant teachers answered the questions: "What is sound?", "What is noise?", "How do you define the phenomenon of noise pollution?" and "What are the sources of noise in your school?"

In the next stage of the data collection process, second interviews were conducted with these teachers to provide a deeper understanding of how they experience the noise phenomenon. A semi-structured interview form was prepared to bring together teachers' views in a common formal structure. On the basis of this form, eight semi-structured interviews with an average of 30 minutes each were conducted. These interview recordings were later transcribed. While semi-structured interviews focus on the basic topics to be understood about the phenomenon to be investigated, they are also prepared in a way that allows the interviewer to convey his/her thoughts about the situations he/she experiences in the same phenomenon (Yıldırım & Şimşek, 2011). Semi-structured interviews were conducted in a way that allowed teachers to give examples and explanations from their experiences in the school environment and the attitudes they developed. The questions asked in these interviews were:

1. What do you feel when you hear the noise?
2. How does your exposure to too much noise at school affect you?
3. What do you do when you hear sounds that make you uncomfortable?
4. How do you protect yourself from noise at school?
5. How do you protect your students from noise at school?
6. What are you doing to reduce the noise level at school?
7. How do you usually react to students' noisy behavior during recess?
8. How do your colleagues generally react to students' noisy behavior during recess?
9. In your opinion, what can be done to reduce the noise at school?

Data Analysis

In the data analysis process of this research, two consecutive paths were followed. The process based on the analysis of the first interviews with the teachers was conducted through the responses of the structured interview forms to four questions, and the findings are presented in Table 1. Semi-structured interviews that provided second and in-depth data were analyzed by applying the process steps of the thematic analysis method explained by Creswell (2017). In this process, which started with the coding of data with an inductive approach, the processes of bringing together the codes related to each other and then separating them into higher dimensions (themes) were applied.

Accordingly, in the first stage of the analysis process, the data of the semi-structured interviews with the teachers were compiled into a single document and prepared for analysis, and the information outside the scope of the research was extracted by repeated reading. The data set, then ready for analysis, was coded over semantic units (the smallest significant units), and the first step was completed. The codes were then grouped into common categories. Finally, the categorical clusters were brought together as themes and presented in the findings as headings, illustrated by specifying the page with direct quotations.

Research Quality and Ethical Issues

Many methods are applied to increase the validity of qualitative research. The social context of the research was explained to ensure the sustainability and usefulness of the research: detailed descriptions and direct quotations were included in the findings, and thematic analysis steps were explained without coding. These procedures were applied to the suggestions of Miles and Huberman (2015). For the replicability of the research, the structuring of the data collection tool, data collection process and data analysis steps are explained. In accordance with ethical rules in qualitative research, necessary permissions and research findings of the study group were shared with the working group, and they were informed that code names would be used in the publications, thus supporting confidentiality.

Findings

In this study, an in-depth data collection process was followed with teachers, who were among those who experienced noise phenomena in schools. The analysis was completed on the basis of interview data, which was the primary data source in the basic qualitative research. The first of these interviews asked the questions "What is sound?", "What is noise?", "How do you define the phenomenon of noise pollution?" and "What are the sources of noise in your school?" Table 1 includes the the teachers' opinions in the study group about the questions on class levels, sound, and noise.

Table 1.

Opinions of Teachers in the Study Group on Sound and Noise

Teacher	What's a sound?	What's noise?	What's noise pollution?	What are the noise sources in your school?
Aylin 2/H	Same thing as noise	Mixed sounds	Intense sounds together	Traffic sounds, bell sounds but mostly sounds of other people

Asli 1/F	It travels as waves	Erratic sounds	The same thing as noise	We tend to make more noise than the students as teachers.
Figen 2/G	It travels as waves	High frequency sounds that negatively affects our health	Noise coming from lots of sources	Sounds of children and the loud talking habit of teachers
Mehmet 3/A	Sound allows communication to happen	It makes people uncomfortable	It drives people crazy	Lack of teachers on duty in the hallways
Feride 1/İ	Sound is a type of vibration.	All sounds that are discomforting	Loud noises	Everything that's alive
Ozgen 2/F	We give examples from nature	It's bad for our health and hinders our workflow	Sounds that travel everywhere	Trash trucks and peddlers coming to the school
Simge 4/F	What are we hearing?	Distracting	It distracts us from the work we're doing	Students screaming along with the bell ringing
Dilek 4/F	The vibrations in our ears	Discomforting sounds	Nearly the same thing as noise	The screaming and shouting of children

The themes, categories, and codes obtained from the semi-structured interviews conducted in the second stage of the data collection process are explained in the figures below. Teachers' responses seen in the literature are presented in Figure 1 over three main themes conceptualized as (1) "problems" experienced by teachers regarding noise, (2) "practices and behaviors of teachers in noisy environments" and (3) "suggestions" for solutions to noise pollution by teachers.

Figure 1.

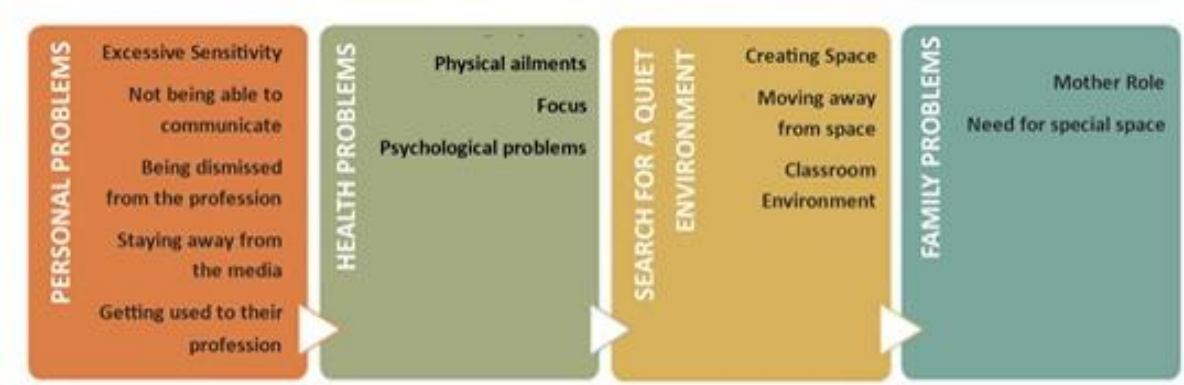
Themes

Problems Experienced by Teachers regarding Noise

Figure 2 summarizes the teachers' responses to: "What do you feel when you hear noise?" and "How does it affect you if you are exposed to too much noise at school?" The "problems" theme, which was formed by the analysis of the answers given to the questions, covered the problems teachers experience due to the noise pollution they are exposed to inside and outside the school building. Problems experienced by teachers were grouped as "personal problems," "health problems," "search for a quiet environment," and "family problems."

Figure 2.

Categories and Codes of Issues Theme



Personal issues. When the answers given to the interview questions were examined, teachers stated that they experienced personal problems, such as "excessive sensitivity," "not being able to communicate," "being dismissed from the profession," "staying away from the media," and "getting used to their profession" due to the intense noise they were exposed to in their schools. First, teachers stated that being exposed to high levels of noise in their school all day long made them more sensitive to sudden sounds or other types of sounds. In this regard, Aylin commented "Sudden sounds, especially door slams, make me feel as if that door is hitting my head" and draws my attention (Aylin, p. 2). Figen, who experienced the same sensitivity, said, "At that point, even the sound of music coming from a car next door disturbs you!" (Figen, p. 2). Ozgen claimed sensitivity to noise, "So I'm very disturbed by sudden noises. Either this is a personal tic or it's related to my job; a sudden horn sound, for example, has jump scared me for years (Ozgen, p. 4). Commenting on this issue, Simge said, "Rebellion! Rebellion because you don't want to hear it. I want to get away from this place immediately!" Simge (p. 2) explained how impossible it would be for teachers to get rid of the noise, as follows:

> We do not have such a chance here. The day we are on duty, for example, I am on duty today, I have no chance to escape. I have to stand in the hallway; I have to tolerate that sound. Especially when the weather is nice like today, we do not let the children out into the schoolyard when it's raining. Then, believe me, you'll be running away for help at the end of it. All the children inside

> are running at full speed, shouting, I can't tell you. You have to experience it, I can't even describe it to you right now (Icon, p. 3).

In their opinions, teachers stated that they had difficulty in communicating with their colleagues at school, with their family members in their daily lives, and even at home because of the noise they were exposed to at school, and that they could not "communicate." Regarding this subject, Aylin remarked, "If the house is open, even the voices coming from the television or the people in the house can disturb me, even people talking can disturb me." His comment in the same vein as Aylin (p. 2) is striking.

The problem of "dismissal from the profession" points to the disturbances experienced by the teachers in a noisy environment created as a result of the teaching profession and the existing school culture. The opinion given about this problem shows negative judgment of the teacher, who experienced this culture, this profession. One of the examples that can be given about this situation is the following words of Feride When Feride's explanation below is carefully examined, it is seen that the high level of noise in educational environments is a phenomenon that leads to teachers leaving the profession: "I feel very tired psychologically. I mean, I've been a teacher for 23 years and I am thinking of retiring, even though I have time to work. I mean, I feel really tired. I've had enough; I don't want to continue anymore." (Feride, p. 2)

Teachers who spent many years in the profession answered that they had habituation to noise. Mehmet was one of the teachers who have the problem of "getting used to his profession." Mehmet explained below that teachers were aware that noise disturbed them and their students, but they had become accustomed to noise. Mehmet's opinion on the subject is below:

> Obviously, as normal individuals, we feel uncomfortable, but our profession requires us to get used to it. Of course, we prefer not to hear any noise. This disturbs us, of course, but people also get used to the student's voices due to it being a part of the profession, so personally I am not disturbed by the children's noise. However, I think the children are affected by this (Mehmet, p. 1).

Health problems. It was understood from the opinions expressed by the teachers that they basically experienced three types of health problems: (1) "Physical ailments", (2) "focus" and (3) " psychological " problems. Under the title of "physical ailments", the physical ailments of teachers that occured due to prolonged noise are discussed. Both the structures of the school buildings and the noise caused by the students and the effects of environmental factors, teachers experienced discomfort that only got worse and causes serious damage despite treatment. Regarding this subject, Feride; "For example, there was a ringing in my ears constantly, I cannot get rid of this ringing because it's something I've struggled with for years, this is a hereditary discomfort, and I think it is caused by the noise." Similarly, Dilek stated, "I can feel my muscles contract. I have a cervical hernia. My shoulders stretch like this. I am more disturbed than ever" (Dilek, p. 2). Ozgen; "Again, prolonged noise causes headaches, I have headaches, I can feel it especially when I get home" (Ozgen, p. 4); he conveyed the bodily discomfort that occurred in himself. As another similar example, Asli claims, "I have a migraine, and it happens out of nowhere ..." (Asli, p. 3) and "I don't know how

someone would be comfortable with such an ear" (Asli, p. 3) and in the words of the teacher Aylin "What can I say, I have headaches, I have severe headaches" (Asli, p. 2). Those comments show that physical ailments caused by noise are commonly experienced.

With the problem of "focus," emphasis was placed on the shortened attention spans of teachers due to noise and the decrease in their efficiency in teaching lessons, as a side effect of noise. Most of the teachers interviewed stated that external factors and environmental factors triggered this situation. Asli teacher expressed her ideas on this subject; "I cannot be productive. I cannot teach my lesson efficiently." (Asli, p. 3).

The last item described in the health category was "psychological" problems, and it included the opinions of the teachers about how much they were affected psychologically. Aylin, on this subject, stated "There is a feeling of tiredness. So there is a distraction, I go home very tired. My tolerance is at an all time low" (Aylin, p. 2). Similarly, Figen said, "I feel bad, I feel pressured, I feel tired" (Figen, p. 2) and Dilek stated; "I get angry. I get nervous, I mean…" (Dilek, p. 2); He referred to mental and nervous health problems caused by the noise.

Seeking a quiet environment. It was understood from the opinions expressed by the teachers that they sought a quieter and more peaceful environment for themselves during school hours. Teachers looked ford for a quiet environment, which was grouped as "creating space," "moving away from space," and "classroom environment." The effort was to "create space" encompasses teachers' solutions to move away from the noisy classroom environment, corridors, and even the teachers' room. Regarding spaces they tried to create within the school, Ozgen states: "We have an empty classroom that is currently being organized as a library, we spend time there, or if the weather is good, it was good until now, I am always in the garden, I sit on the bench so that I can get fresh air" (Ozgen, p. 10). Mehmet's statement, "I prefer to spend my breaks in a quiet environment all by myself of course," (Mehmet, p. 2) can be given as an example.

The problem of "getting away from space" was a problem that revealed the situations of not being able to create a quiet space in the school or not being able to find a suitable place for this situation. On this subject, Ozgen revealed a solution they found, "There was also a long break, now it was removed. Now, there was a cafe across the street to have tea in the break time, so there's been a little change of place"(Ozgen, p. 10).

"Classroom environment" showed the problems teachers faced due to the compulsory and inadequate measures they could take in the classroom against noise. As a result of the interviews, Simge said,"We close the windows, it is very hot and a nightmare. Think close to April. It is hot inside, you cannot learn from the sound, you are overwhelmed, so there is no escape!" (Simge, p. 4). His words embodied the seriousness of the situation. It was stated that ignoring the insulation features of classroom environments

and buildings while constructing them created many problems for teachers and students, especially during the warmer months.

Family problems. Situations that negatively affected teachers' home life and parental roles were discussed in "family problems". In this section, family problems were explained as "mother role" and "need for special space". The "mother role" problem was created in line with examples of how exposure to noise affected motherhood requirements and approaches of female teachers. Figen claimed: "Only after a little rest, am I able to communicate with my children" (Figen, p. 2), while explaining the difficulty she experienced, Ozgen said, "Sometimes we can react to our own children, even our families" (Ozgen, p. 4). She drew attention to the determining effects of noise in her communication with her own children as a mother. Simge said, "When I go home, even the voices of my children are very loud to me. I couldn't listen to my own children" (Simge, p. 2), touching upon the importance of the situation and its sensitivity.

The "need for private space," another family problem, pointed out that teachers needed quiet and private time in their daily lives. According to Figen, "When I go home, I don't want to talk to anyone, I don't want to hear any sounds" (Figen, p. 2). She stated that she could not even tolerate the voices of the individuals in the house. Ozgen commented, "I try so hard to block it out, I have to occupy myself with something enjoyable so that I can ignore it by doing something I like" (Ozgen, p. 4). She explained that she turns to other fields of work to get rid of the noise she is exposed to. As a similar example to these, Feride claims, "I am disturbed by everyone talking at home because we are packed like a can of sardines here, and my head is filled up with noise already" (Feride, p. 2). His words attracted attention by their high level of emotion.

Teachers' Practices and Behaviors in Noise Situations

In the interviews, teachers also responded to the following: "What do you do when you hear voices that disturb you?" "How do you protect yourself from noise at school?" "How can you protect your students from noise at school?" "How do you generally react to students' noisy behaviors during breaks?" and "How do your colleagues generally react to students' noisy behavior during recess?" Answers to the questions were presented under the theme of "Practices and behaviors." With this theme, teachers discussed reactions to students (the biggest source of noise in the school) their way of warning students, and their efforts to protect themselves and their students from environmental factors like noise. This theme was explained by the "warning", "self-protection" and "protecting the student" categories and their codes in Figure 3 below.

Figure 3.

Categories and Codes of the Theme Practice and Behaviors

Warning. The "Warning" category was a heading in which the attitudes and behaviours of teachers towards students who exhibited noisy behaviors, especially during breaks, were analyzed with examples. In their answers, teachers stated that they warned the students exhibiting noisy behavior in the school either "verbally" or using "body language". As an example of "using verbal stimuli" behavior, Feride's following words are quoted:

> I have to give warnings like please don't speak, be more careful when speaking. Well, I feel the need to say don't do it all the time when I'm on duty. Can't you keep quiet, please don't shout, I have to say this all the time. Every time, I have to warn them by saying, do not shout, speak quietly, go play with each other quietly and stop the screaming. (Feride, p. 2, 3, 4)

Another example of verbal stimulus is, Ozgen's; "During the lesson, sometimes there may be a classroom without a teacher or the teacher's late, or there are children going to the toilet, if they are running, and if this is a prolonged commotion, I go out to the hallway and warn them (Ozgen, p. 4). The statements by Ozgen showed that teachers had to warn students not only during the breaks but also in exceptional situations that occured during the lesson (especially if these situations disrupt the course flow of other classes). Some teachers interviewed stated that they used the verbal stimulation method to explain the noise and harms it caused to students. A good example was Mehmet's remarks, "We tell them that they should communicate calmly, not shouting, especially outside, in the hallways" (Mehmet, p. 3). He stated that they not only warned children but also educated them not only for school but also for every field in life. Figen gave a similar example, "So when I'm in the classroom, I warn the kids to be silent. I wait for a while, trying to make them notice" (Figen, p. 3). On the other hand, Simge stated that while warning, teachers inevitably had to raise their voices, "Don't, don't yell, without realizing why you are yelling, maybe I go over to him and shout why are you yelling. We do so, too" (Icon, p. 4). In addition to all these examples, there were also teachers who stated that children did not always pay attention to warnings and that warning alone was not always sufficient. The best example for this is Mehmet's teacher; "We

warn him not to speak too loudly, that he should not shout; but after you warn the same student, when you turn around, he screams again" (Mehmet, p. 4).

In addition to verbal stimulus use behavior, teachers also resorted to "using body language." The teachers stated that it was difficult to reach the child physically during the schoolyard shift, so they preferred to use body language more while on duty in the hallway. Figen asserts: "Sometimes we point to children who are far away, sometimes by talking and telling, with signs, such as be quiet and calm." (Figen, p. 4). Ozgen states: "I mean, I always touch the children because I am such a tactile person by touching like this, so I caress his head or touch his cheek like this and explain it" (Ozgen, p. 9). This comment showed that, in some cases, using body language replaced verbal expression. Using warnings, Dilek says, "I'm making a hush sign from afar and I'm telling them that their throats will be sore when they scream. (Dilek, p. 5). Ozgen explains, "Often when they bump into each other, we just have to physically stop them, sometimes I do: What are you doing? Why are you screaming Why did you scream? " (Ozgen, p. 9), showing that teachers had to use body language along with verbal stimuli in noisy situations caused by students.

Self-protection. Teachers who were aware of the noise they were exposed to at school and who were physically or psychologically uncomfortable in this situation stated that they "protected" themselves from the noise inside the building. Teachers' "self-protection" behavior towards noise could be explained as "taking precautions" and "classroom measures." "Prevention" exemplified the efforts of teachers to minimize the physiological and psychological disturbances caused by the noise pollution they were exposed to during the day. Ozgen, on this subject, says, "One of our friends put cotton in his ears to block all the sound out." (Ozgen, p. 5) showed how disturbing the situation was in and of itself and the extent it reached in terms of being bad for our health. Aylin gave examples of teachers' efforts to protect themselves from noise: "We cannot take action. At one point, I thought about listening to music, wearing headphones and listening to music, but by doing that, I can't control students. " (Aylin, p. 2).

It was understood that teachers developed similar solutions regarding the theme of "in-class measures." Ozgen comments on this subject; "If the windows are open, I close them both to prevent children from reaching me. If it's coming through the door from the hallway, I close the door. " (Ozgen, p. 4). The solution proposal produced by Figen is as follows:

> So when I'm in the classroom, I warn the children to be quiet; I wait for a while trying to make them notice. Or that's what I'm talking about, and the noise that can hurt them and me. It is also the same in the schoolyard. We experience this constantly while being on duty, etc. (Figen, p. 3)

Protecting the student. Measures taken by teachers to protect students from noise, such as "protecting the student" behaviors, "protecting from echo" and "organizing the learning environment" are discussed. "Echo protection" behaviors mostly draw attention to the sound insulation deficiencies in school buildings. This meant that the voices or screams made by children who were going out for breaks while running

around the corridors were reflected rather than absorbed by the coating materials used frequently in interiors. According to Asli, "I send those who make noise to the schoolyard, I say that they are running and running loudly, go to the backyard, at least there will be little noise because the sound does not go through the walls." (Asli, p. 5), he explained how he tried to protect students. As a similar example, Mehmet's teacher; "We are trying to solve this problem by taking our students outside when good weather's nice to eliminate more problems." (Mehmet, p. 2) and Dilek's words, "I take the children to the garden. If they go out to the garden, there is less noise in the hallways. " (Dilek, p. 3).

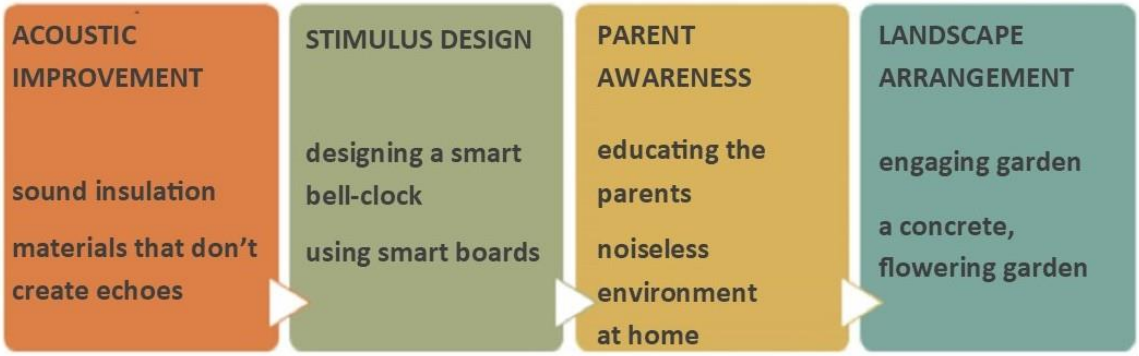
"Organizing the learning environment" behaviors were the precautions taken by teachers to protect students from noise, which affected the lesson hours in the classroom environment and reduced the efficiency of the lesson. The purpose of teachers taking these measures; it could be listed as preventing the decrease in the in-class performances of the students, the distraction of the lesson and the decrease in the efficiency of the lesson. Ozgen states, "If it's coming through the door from the hallway, I close the door." (Ozgen, p. 4) while emphasizing indoor noise sources; Asli teacher; "I close the windows, especially if it's coming from the outside, sometimes the voices of high schoolers are heard. (Asli, p. 4) emphasized the noise outside the school. Figen; "In other words, when we are very uncomfortable, we have to close the windows to block out the sounds coming from the outside. Sometimes there are voices screaming in the hallway. As the children pass, we close our doors and close our windows. " (Figen, p. 3) showed that it aimed to protect students from both inside and outside school noise sources.

Teachers' Suggestions for Noise Pollution

In the interviews, the teachers were asked: "What can you do to reduce the noise level at school? and "What should be done to reduce the noise at school?" The "suggestions" theme, which was formed as a result of the answers given to these questions, includes the ideas of teachers to minimize the noise sources in the school and to ensure that they and their students were affected by the noise in the school as little as possible. Teachers' opinions, within the theme of "suggestions," "Acoustic improvement," "stimulus design," "parent awareness" and "landscape arrangement" are presented in Figure 4.

Figure 4.

Categories and Codes of the Solution Proposals Theme



Acoustic improvement. This theme pointed to sound insulation, which is a major physical deficiency in school buildings in our country. Asli speaks on this subject; "Sound insulation can be applied to schools." (Asli, p. 5), mentions this basic point. Dilek; "If the rows were thick, thin, maybe covered with a material, then it wouldn't make a sound." (Dilek, p. 5). He draws attention to the fact that apart from insulation, materials used in schools are also made in a way that did not create echoes or ringings. Mehmet made an educational suggestion regarding this:

> Of course, it can be prevented by hanging various materials on the walls in the corridors or by using many isolation materials that will absorb the noise; but as a priority, teachers need to pay attention to this issue by spreading them throughout the year in classrooms to destroy the main source, students need to be warned frequently. (Mehmet, p. 3)

Stimulus design. The "Stimulus design" proposal emphasized the need for teachers to constantly stimulate students about noise with visual or auditory materials. In this regard, Figen makes a striking proposal, "If we put stimulants, such as this traffic sign on our smart boards in my mind, if we load it on that board, they can be kept on constantly. For example, if we warn them to 'look at the board' when the noise gets too high in the classroom, maybe they can control themselves better" (Figen, p.4). Another remarkable suggestion was that by Ozgen: "One of our friends even suggested that a clock can be applied, and the parents can agree with the municipality or elsewhere to give the children a smartwatch to look at" (Ozgen, p. 13). One proposal was to design a smart bell-clock. The opinion of Dilek, which Ozgen also mentioned in her opinion, is as follows:

> But since there is no clock, the entrance and exit of the children are not clear. There should be a clock in the teachers room, from the digital clock in the schoolyard and in the classrooms. I was encouraging children to wear a watch. If I had my own watch, yes, we would be able to look at my watch and go out for a ten-minute recess. Therefore, it could be turned into a project, and we could ask someone to buy a clock, but the parents of the kids buy it, so there's no need when they're paying attention. If you care about the idea, they will care about the watches. They will also learn about the concept of time. (Dilek, p.6)

Parent awareness. The teachers 'suggestion of "raising parents' awareness" included the necessity of supporting and maintaining noise sensitivity, which the school would try to develop in the education of parents and in their daily life and home life. Feride expressed his views on this subject: "Parents should be involved, of course, parents should definitely be taught first" (Feride, p. 4). Ozgen agreed, "I think that it's important to educate the families about their children, with whom they spend a lot of time" (Ozgen, p. 7), he expressed the importance of family education on noise awareness.

Landscape arrangement. The last of the teachers' suggestions was about "landscaping". This proposal aimed at the interesting arrangement of the schoolyard areas outside the school building, where the children threw their energy, in a way that the children will release their energy. The remarkable views and suggestions of Dilek on this subject are given below:

> Recesses at school are the noisiest. Instead of concrete, soil should be grass in the garden. For example, children have tree stumps; if they had nature, they wouldn't be bothersome any more, I think they become monstrous because there is concrete everywhere. They are calm when they're one with nature. There should be trees, grasses and flowers in the schoolyard. It should be a playground or something, not made of plastic, of course, wood (Dilek, p.4).

Conclusion and Discussion

Sources of Noise at School

"What are the sources of noise in your school?" In addition to the answers, such as the sounds coming from the traffic, the sound of the bell, the sounds made by the teachers in the school building, the garbage truck coming to the school and the sound made by the peddlers, five out of eight teachers stated that the noise source in the school was "children's voices, the students' bell inside the school building combined with the screaming and yelling all together caused an increase in the noise level at school. These findings are consistent with the findings obtained from research conducted with teachers in this field (Grebennikov, 2007; Jaramillo et al., 2013; Türnüklü & Galton, 2001). Teachers who took part in the study of Jaramillo et al. (2013) suggested that the noise at school was caused by students' yelling in addition to mechanical ambient noise. Similarly, teachers who participated in the studies of Grebennikov (2007) and Türnüklü and Galton (2001) stated that the source of noise at school was students making noise, yelling and speaking without permission.

In addition, in this study, unlike in the literature, teachers proposed sources of noise in their schools as: traffic, the bell, garbage truck coming to school, peddlers, and everything alive. One teacher even stated that the reason for the noise in the school was the lack of teachers on duty in the hallways. Two teachers pointed to the school's own teachers as the source of the noise in the school. One participant emphasized that the teachers often speak loudly in the school building, and another participant emphasized that the teachers made more noise than children.

The above-mentioned results suggest that although the source is mostly students and teachers, the schools where the teachers participating in this study work are generally noisy. This result is similar to other studies conducted in this field in our country (Akar et al., 2010; Aydin, 2004; Bulunuz, 2014; Can & Ermeydan, 2017; Guremen, 2012; Sezer-Senkal, 2015; Tezcan & Demir, 2006). A frequently encountered problem is also noise by students. "Making noise/shouting" and "unauthorized speech" as part of their behavior is emphasized the most.

Turkey is known to have loud schools, but research has found schools in other countries to be noisy as well (Grebennikov, 2007; Jaramillo, 2014, Jaramillo et al., 2013; Lindstrom et al., 2011). In these studies, where teachers' perspectives on noise and noise sources in the classroom are examined, it is stated that noise is an important problem in and of itself that reduces the quality of education and that this level is above the required limits. The results obtained from this study are consistent with the results of many studies, both in our country and in the whole world.

Problems Experienced by Teachers due to Noise

Examining the answers given by the teachers to the question:"How are you affected by the noise in your school?" the problems they put forward could be grouped as personal problems, health problems, seeking a quiet environment, and family problems. When the findings obtained from this study were examined, it was determined that the teachers who participated in this study felt psychologically tired due to the high level of noise in their schools. Therefore, they did not intend to continue their teaching profession and thought to retire early. The noise seemed excessive. In addition, some teachers stated that they could not communicate well with their family members, friends and colleagues around them due to the high noise they were exposed to at school and that they became very sensitive to sound. Teachers stated that they were looking for quiet areas within the school building whenever possible, but when the facilities did not allow, or rather the environment created could not prevent the noise, they went out of the school and looked for solutions elsewhere. In the answers they gave during the interviews, the teachers stated that they had to cope with too many sources of noise during the day, they became very sensitive even to a normal voice, their tolerance level decreased and this was reflected in their private lives with their families. These results are consistent with the findings obtained in the study of Grebennikov and Wiggins (2006) investigating the psychological effects of noise on preschool teachers in Australia. In that study, 40% of the teachers stated that they were exposed to high levels of noise during the day, much more than what should have been in the school building, and this situation causeddifficulties in interpersonal relations.

In addition to the health problems expressed psychologically, the teachers participating in this study stated that they did not feel physically well due to the high level of noise they were exposed to and that they experienced physical disorders, which is consistent with the findings in different countries all around the world (Kristiansen et al., 2011;

Poulou & Norwich, 2010; Sargent et al., 1980) and research in Turkey shows similarities (Akar et al., 2010; Aydin, 2004; Guremen, 2012; Sezer-Senkal, 2015; Tezcan & Demir, 2006) with the health problems teachers experienced due to noise in their schools. In these studies, it was emphasized that the teachers were uncomfortable with the high-level noise environment because the classes were not suitable for the auditory comfort conditions determined for an educational institution.

Teachers' Attitudes and Behaviors against Noise at School

During the course of hours, due to the lack of sound insulation and acoustic improvements in most of the school buildings in Turkey, it is becoming a major problem in the school building. Teachers also stated in the interviews, for example, that students shouted and screamed and ran for no reason during breaks and that this situation caused a higher level of noise in the building, especially in the winter. The teachers emphasized that it was healthier for students to be in the schoolyard during recess rather than in the hallways so that the noise level in the building could be reduced as much as possible.

Teachers stated that when they saw that students behave noisily in the school building, they used their voices to control students. The findings show that teachers generally used verbal responses to draw attention with another voice in response to the student's noise when children were too far away for body or eye contact with the student to be made. In some cases, teachers stated that verbal expression was replaced with body language. Instead of yelling at the students running, shouting and screaming, especially during hallway duty, they told them to shut up with their fingers! They stated that they made the sign and warned the students with body language.

In this research, the teachers asked, "How do you protect yourself and your students from noise when the noise level is high?" When asked, they stated that they close the door of the classroom if the noise is coming from the hallway during the lesson and the window of the classroom if the noise is coming from outside. A teacher mentioned that another one of his friends had cotton in his ears at school to reduce the harmful effects of noise. Three teachers who took part in this study emphasized that if the weather is good, they take the children out to the schoolyard during the break. If the students go out to the schoolyard, the noise in the hallways decreases and the sound causes less damage in an open environment. These results show that teachers use the solutions they create against noise inside the building during the lessons or breaks and thus try to protect themselves or their students from noise in the short term. However, it is understood that under the leadership of the administrators, teachers do not make a common effort to reduce the noise in the school. I Individual efforts are insufficient in reducing the noise level in the school.

Teachers' Suggestions for Noise Pollution

When the suggestions for the solution of noise pollution mentioned by the teachers in the interviews are examined, it is seen that some of them are related to acoustic improvement. A teacher stated that by hanging various materials on the walls of the school corridors or using different materials to absorb the noise, noise could be prevented and the noise in the classroom could be reduced. Another teacher stated that using soft materials that did not make noise in the schoolyard instead of concrete would reduce the noise that occurs in physical education lessons and breaks. In theaters and opera buildings, acoustic improvement is made so that the sound the rear row in a quality way, fills the hall, and reaches our ears without ringing. In these buildings, sound-absorbing materials are used in floors, walls and ceilings. Similarly, it is possible to reduce the noise by making acoustic arrangements in environments, such as schools, hospitals and libraries where it is necessary to be silent and at a low noise level, and the sound that comes out can come to our ears in the most orderly and quality way. Considering this information, it is possible to reduce the noise generated by using sound-absorbing materials in the ceilings, floors and walls in school buildings. This result is similar to the results of other studies (Bulunuz, Bulunuz, & Tuncal, 2017; Saher & Karaböce, 2019). For example, according to Saher and Karaböce (2019, p. 386), "good classroom acoustics that can meet the auditory needs of all students can make learning more effective and students' academic performance higher. This can be considered as providing a democratic right to education for all children. "

In schools, it has been emphasized in different studies that the bell itself is a source of noise (Ay, Yapici, Kahraman, & Erusta, 2019; Bulunuz & Akyun, 2019; Tas, 2010). In these studies, cymbals that play at a very high volume, encouraging students to dance, run, leave the classroom and then scream and shout for no reason in the hallways, are considered to be a factor that increases noise in schools. Similarly, the teachers who took part in this study suggested that students should be constantly warned about noise with visual or auditory material, and they could use smart bells or specially designed clocks instead of normal bells in schools. Teachers are of the opinion that it is tiring and difficult and not always functional to warn students one by one all the time. Therefore, they agreed that different materials were needed to attract the attention of children. One of the teachers stated that colored stimuli, which are like traffic signs, should be placed on the smart boards in the classrooms and that these stimuli could alert the students when the noise level in the classroom increased so that the students could control themselves better. Another teacher emphasized that instead of using bells in the school, the municipality could distribute wrist watches to the students, thus reducing the noise in the school building and thus improving the habits of students wearing watches.

Studies emphasize that noise education should not be limited to teachers in schools, but should continue to be given by family members in homes where children spend the most time (Bulunuz & Akyun, 2019; Bulunuz et al., 2017). In order for this education to continue at home, first of all, it is necessary to raise the awareness of the households

on how to prevent noise and protect themselves from it. When we look at the socio-cultural background of the society we live in, somebody's definitely in the room watching television loudly, while the child is trying to study in the other room, or when the child is resting, falling asleep and reading a book, talking loudly or even hosting guests. Habits like these are pretty common place. These habits negatively affect both the family order and the psychological development and school success of the child. Thus, providing noise education to families is of considerable importance. It will be easier for children who grow up in a calm environment at home to exhibit similar behaviors at school.

The teaching profession requires a healthy and vigorous body in addition to a strong field of knowledge. Today, due to the increasing population, the large classes in schools disrupt classroom order and tranquility day by day and cause an increase in indoor noise. In addition, the construction of schools between the neighborhoods, the construction of the buildings near places, such as mosques and hospitals, and the daily traffic of vehicles and people produces increases in noise level, causing teachers to become exhausted, both mentally and physically.

Suggestions

Suggestions for Administrators and Teachers

Not using cymbals in school buildings and switching to a system without bells as a common practice will help to create a positive school climate without noise. Teachers' suggestions on the use of smart bells and noise warning clocks should be considered. In addition, school principals can be provided with managerial leadership roles to plan and implement competitions in their schools for this situation, and students can be asked to develop projects as stakeholders of the noiseless school climate. Thus, besides directing students to not be a source of noise, they will also make them a part of the solution. Principals can cooperate with the relevant units to add a new climate to the physical environment of their schools with the addition of relevant equipment, engineering studies and sound insulation. In addition, a school should be considered as a space where information is constantly flowing and experienced, like a library. For this purpose, a silent school perception can be created as a new perception in different units of the society and state institutions. Meetings should be organized in which teachers and students can discuss this problem and establish solutions by talking about the family, personal and health problems that emerged in this study. Here, it can be ensured that common solutions to problems are developed. One suggestion that can be considered in organizing the weekly course schedule of the school is that the courses with different structures should not be held at the same time in terms of the use of the physical environment or students talk. However, attention can be paid to that courses in which students are more physically active are included in the weekly course schedule in the first hours. In these lessons, the students will have met socialization and expression needs and will come to the next lessons calmer. By defining noise as a

physical and psychological need, times and areas where noise can be made can be created. Students knowing that they are limited by the time periods and areas set for noise can help them pay attention to these limits. Parents also should be made aware of issues that require being sensitive about noise in the home environment through meetings to be held. Teachers should set an example in terms of creating a quiet school environment with their behavior. Teachers can be asked to design signs that will prevent unauthorized speech in the classroom during the lessons, and the student who wants to speak can express his desire to speak when he lifts his sign. It must be ensured that the noise matches a visual expression.

Recommendations to Program Developers and Policy Makers

It is necessary to plan mobilization activities and develop symbolic expression tools for the new school environment that can be applied simultaneously at schools. In addition to encouraging the establishment of schools in city centers as physical spaces that are isolated and thus free from noise in our country, it is also important to structure the centers where schools are located as isolated centers. Although this isolated space approach seems imaginary, it can be easily resolved with a few measures and initiatives in practice. According to this approach, it is important not to allow the construction of bazaars, shopping centers, markets or commercial areas opened for other purposes around the schools where loud shopping will take place. In addition, it should be ensured that heavy commercial vehicles, such as buses or buses carrying passengers, are not allowed to pass through the streets or streets where the schools are located.

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