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Investigation of Pre-service Primary School Teachers' Decision Processes Related to Genetic-based Socioscientific Discussions in Terms of Human Rights

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Abstract. In this study, it was aimed to investigate the decision processes of pre-service primary school teachers (PPSTs) related to genetic-based socioscientific discussions in terms of human rights. In this context, in the study, it was focused on the birth of gifted people with genetic technology, the use of genetic tests in the process of getting health insurance, and gender selection by the PGD method. The study was carried out as a descriptive study in the screening model with 203 PPSTs studying at the fourth grade in three faculties of education in the Southeastern Anatolia region in Turkey. In the study, the data were collected with the Evaluation Form for Decision Processes related to Genetic-based Socioscientific Discussions. Research data were analyzed by content analysis. The results of the study indicated that PPSTs used different decision processes in genetic-based socioscientific discussions and based these decision processes on different justifications. Furthermore, they also revealed that PPSTs largely made decisions that were unrelated to human rights in genetic-based socioscientific discussions. However, they could usually make accurate inferences when they made human rights-based decisions. This study is important in terms of providing information on how PPSTs' decision processes related to genetic-based socioscientific discussions are shaped and on how human rights are employed in this process.

Keywords: Socioscientific issues, human rights, pre-service primary school teachers, decision-making process, social discussions.

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1. INTRODUCTION

The innovations brought by scientific and technological developments, which are an integral part of human life, are of great importance for the development and change of societies. Scientific and technological developments improve the quality of life by making human life easier and also serve to find solutions to various problems such as increased energy and food needs. Nevertheless, negative effects, risks, social, moral, or ethical problems that are caused or considered to be caused by these developments bring along a large number of social discussions. These social dilemmas and debates, which include ethical and moral values arising from developments in science and technology, are expressed as socioscientific issues (Sadler, & Zeidler, 2005). SSIs are situations that have a scientific structure and require decision making at individual and social levels, analyzing risks and probabilities, values and ethical reasoning, are usually brought to agenda with the media, and have political, national and global dimensions (Ratcliffe, & Grace, 2003). SSIs, which require performing global assessments as the citizens of a democratic society by considering that science has both benefits and dangers (Yu, 2010), are a way for the democratization of a society and an important tool in the development of democratic citizenship (Kolstø, 2001; Zeidler, Sadler, Simmons, & Howes, 2005). The issues of global warming, organ transplantation, human genome project, use of genetic tests, genetically modified organisms, alternative energy sources, nuclear power plants, genetic testing, and cloning can be given as examples of SSIs (Doğanay, & Öztürk, 2017; Ozturk, 2018; Topçu, 2015). The majority of SSIs are also controversial issues for human rights and freedoms (Chang-Rundgren & Rundgren, 2010; Doğanay, & Öztürk, 2017; Ozturk, 2018; Sweet, & Masciulli, 2011). Among them, the possible effects of genetic technology-based SSIs on fundamental rights and freedoms have made them the subject of international discussions and have caused them to be included in international conventions. Accordingly, it has been aimed to keep the possible negative effects of developments in genetic technology on human rights and freedoms under control in international documents such as the Convention on Human Rights and Biomedicine (2003), the Charter of Fundamental Rights of the European Union (2000), and the Universal Declaration of Human Genome and Human Rights (2000). On the other hand, scientific circles also indicate that developments in genetic technology have/may have effects on many rights such as human dignity, privacy of personal information, prohibition of discrimination, right to health, right to choose a profession and work (Caulfield, & Brownsword, 2006; Çankaya, 2009; Doğanay, & Öztürk, 2017; Gostin, 1991; Hornosty, 2011; Sweet & Masciulli, 2011). For example, the use of information obtained from genetic tests may lead to exposure to discrimination in working life (Miller, & Tucker, 2017). In the health sector, this may appear in different ways such as inability to benefit from health insurance, the loss of benefit provided (Çetin, 2017) or having to pay high premiums (Uyanık Çavuşoğlu, 2003, Demir, 2013). On the other hand, developments in genetic technology have also made the use of genetic information as a biological weapon, the risk of creating a superior human race (eugenics) and gender discrimination the current issues (Demir, 2013; Doğanay, &

Öztürk, 2017). In this context, it is of great importance to make right decisions in social discussions and decision processes for the prevention of possible negative effects on human rights that may occur due to genetic technologies and for the protection and strengthening of fundamental rights and freedoms.

In these discussions, it is particularly important to make decisions by considering the fundamental rights and freedoms of pre-service teachers who will be the architects of the society of the futurebecause teachers are able to develop democratic attitudes, understanding, and ideals with respect to their place and mission in society (Tuncel, & Balcı, 2015). In this context, they undertake the mission of providing children with the acquisition of democracy involving human rights values (Carr, 2006; Yavuz, Duman, & Karakaya, 2016; Tuncel, & Balcı, 2015). Teachers should first be participatory as a member of a democratic society and be citizens who respect human rights in order to perform this task. It is particularly important for pre-service primary school teachers (PPSTs) to be able to make decisions by considering human rights in this processbecause primary school education constitutes one of the most important stages of human rights education (Flowers et al., 2009; Sağlam, 2017). The task of providing children with these values in primary schools falls to primary school teachers. Accordingly, attention is drawn to the requirement of making arrangements in primary school teacher training programs (Jennings, 2006; Karakuş, 2018; Ozturk, 2018). In Turkey, primary school teachers provide the formal education of fundamental rights and freedoms, democratic values and citizen responsibilities both as a separate discipline and in an interdisciplinary context at the primary school level. Accordingly, the acquisition of knowledge and attitude on human rights is also foreseen in the primary school teaching undergraduate program updated by the Council of Higher Education (2018) in Turkey. It reveals the importance of providing PPSTs with the acquisition of understanding and attitudes related to human rights. In this context, teachers who take the leadership role in the development and protection of values in the society should be equipped with these values in the pre-service training process and should be able to reflect them in decision-making processes. On the other hand, the fact that teachers establish decision-making processes on accurate values is also of great importance in the shaping of values they will give to students (Ünal, 2011). This makes it important to examine how PPSTs use decision processes related to genetic-based socioscientific discussions and whether they can make decisions that are consistent with human rights. Nevertheless, no study on the investigation of PPSTs' decision processes related to genetic-based socioscientific discussions in terms of human rights was found, limited to resources that could be reached by the review of the relevant literature. It was observed that the studies based on PPSTs and genetic-based SSIs (Alaçam Akşit, 2011; Erdoğan, Cerrah Özsevgeç, & Özsevgeç, 2014; Ergin, 2013; Uzunkol, 2012) focused on the determination of opinion and risk perception, investigation of genetic literacy skills, and the development of ethical values. On the other hand, the studies in which genetic-based SSIs such as gender selection, eugenics, and the use of genetic tests were examined from the perspective of human rights (Uyanık Çavuşoğlu, 2003; Çetin, 2017; Erbaş, & Evsel,

2012; Green, 2003; Gostin, 1991; Hornosty, 2011; Koyun, & Örnek Büken, 2013; Otlowski, Taylor, & Bombard, 2012; Sweet, & Masciulli, 2011; Demir, 2013; Vasichek, 2009) were carried out in legal or sociological contexts. It is considered that such a study will contribute to filling the gap in the relevant literature, will provide information to understand PPSTs' decision processes related to genetic-based SSIs and how human rights are employed in this process, and will be an important data source for the program studies to be carried out for providing PPSTs with the acquisition of relevant understanding and attitudes in teacher training programs.

In line with the justifications specified, in this study, it was aimed to investigate PPSTs' decision processes related to genetic-based SSIs in terms of human rights.

2. METHOD

Research Design

This study, in which it was aimed to investigate PPSTs' decision processes related to genetic-based SSIs in terms of human rights, was designed as a descriptive study in the screening model (Karasar, 2011). In descriptive studies, an existing situation is attempted to be defined within its own conditions and as it exists.In this study, it was aimed to describe how PPSTs' decision processes related to genetic-based SSIs are formed, the justifications that provide a basis for decision processes, and what kinds of assessments are performed in terms of human rights. Thus, it was aimed to reveal the function of human rights in these decision processes, in other words, in which stages, how often and in which aspects they are a part of this process. Content analysis, one of the qualitative data analysis methods, was used in the analysis of the research data. In this context, this research can be described as a descriptive study in which qualitative methods were employed in the data analysis process.

Population and Sample of the Study

PPSTs studying at the fourth grade in the faculties of education in the Southeastern Anatolia region in Turkey constituted the population of the study, and 203 PPSTs studying at the fourth grade in three faculties of education who were selected from among them by disproportionate cluster sampling constituted the sample. In the disproportionate cluster sampling method, the sample of the study is formed by selecting a sufficient number of clusters in the population without a certain ratio according to the neutrality rule (Karasar, 2011). In this study, fourth-grade PPSTs in each faculty of education in the Southeastern Anatolia region were defined as a cluster, and the sample of the study was formed by selecting three of them. Furthermore, PPSTs' voluntariness to participate in the study was another point that was considered in the process of forming the sample. It is known that participants are willing to convey true information, skills, feelings, and thoughts when they volunteer to participate in the study. Therefore, the study was based on the principle of volunteering by considering that more accurate information about the real feelings and thoughts of PPSTs would be

obtained. PPSTs, who constituted the sample of the study, consisted of 136 (67%) females and 67 (33%) males, and their ages ranged from 22 to 27 years. While 76 (37%) of the PPSTs participated in any event such as seminars and conferences on human rights, 127 (62%) of them did not participate in any event. Furthermore, only 11 (5.41%) of the PPSTs stated that they participated in an event related to genetics.

Data Collection Tools

In the study, the data were collected using the Evaluation Form for Decision Processes related to Genetic-based Socioscientific Issues (EFDPGSI). The EFDPGSI consisted of two parts. The first part included the questions aimed at knowing PPSTs such as gender, age, and participation in an educational event on human rights and genetics previously. The second part included dilemma scenarios that would provide information on PPSTs' decision processes related to genetic-based SSIs. In the process of identifying dilemma scenarios, the relevant literature was first reviewed, and the dilemma scenarios that would enable PPSTs to perform assessments in the context of human rights were determined. The scenarios determined were submitted to expert opinion, and those that would serve the purpose ideally were determined. In this context, the opinions of four faculty members with knowledge on qualitative research, one of whom was studying on human rights education and socioscientific issues, two of whom were studying on human rights education and one of whom was studying on socioscientific issues, were received. Then, the pilot application of those dilemma scenarios was performed on 9 PPSTs, and whether it provided access to the requested information and its intelligibility were checked. The necessary corrections were made after the feedback received, and the EFDPGSI was finalized. Accordingly, dilemma scenarios named “A genetic discovery excellent people” (Doğanay & Öztürk, 2017), “Ordering a boy” (Sürmeli, 2008) and “A new step in the insurance process” (Doğanay & Öztürk, 2017) were included in the EFDPGSI. The scope and predicted human rights contexts of these dilemma scenarios can be summarized as follows:

- In the dilemma of “A genetic discovery excellent people," it is mentioned that both mentally and physically excellent people can be brought into the world through a genetic discovery made by a scientist named Gülşah. However, Gülşah is indecisive about whether or not to allow the use of this discovery for various reasons. This dilemma scenario contains various human rights values such as genetics-based discrimination, an unethical intervention for people, especially eugenics. Furthermore, along with the realization of this discovery by a Turkish scientist, it was aimed to reveal whether PPSTs would perform assessments within the national or universal context and how they would employ human rights values in this process.
- In the dilemma of “Ordering a boy,” gender selection with genetic technology of a family with three girls to have a boy and the optional destruction of other embryos as a result of this selection are mentioned. This dilemma involves the decision process related to whether couples have the right to select the gender of

their infants by genetic technology, and various human rights values, especially gender discrimination and the right to life.

- In the dilemma of "A new step in the insurance process," the indecisiveness of an insurance company owner named Mr. Ahmet on whether to implement an innovation including the use of different premium applications along with the use of genetic tests in the process of getting health insurance is mentioned. This dilemma contains many human rights, such as the right to health, right to get a job, right to privacy, especially genetic-based discrimination.

Data Collection

In the study, the data were collected in writing using the EFDPGSI. In the process of data collection, PPSTs were first informed about the aim of the study without raising awareness and guiding so that they would perform the assessment of human rights, and the importance of the information they would provide and voluntary participation were stated. The PPSTs who volunteered to participate in the study individually answered the questions in the EFDPGSI in writing. It took 30-40 minutes to fill out the EFDPGSI.

Analysis of Research Data

Content analysis was used in the process of analyzingthe research data. In content analysis, the main purpose is to reach the concepts and relationships which can explain the data collected. In this process, it is attempted to define the data and to reveal the facts that may be hidden in it. Similar data are combined within the frame of certain concepts and themes and organized and interpreted in a way that the reader can understand (Yıldırım & Şimşek, 2016, p. 242). In this study, it was aimed to reveal how PPSTs' decision processes related to genetic-based SSIs are formed, what kinds of assessments are performed in terms of human rights, and justifications that provide a basis for these decision processes. In this context, content analysis was performed, and it was aimed to present decision processes by conceptualizing them under certain themes. Accordingly, the written documents related to the research data were examined line-by-line in accordance with the aim of the study, and the codes were created. A sample data excerpt from the dilemma of "A genetic discovery excellent people" data set for the analysis performed during the creation of codes is presented in Table 1.

Table 1

Sample Excerpt for the Analysis Study Performed in the Coding Process

Student No	Codes	Sample Excerpts from the Dataset
S101	The disappearance	If I were a scientist, I wouldn't allow this applicationbecause it is not true that there are only excellent people. Genetic diversity disappears. When genetic diversity disappears,

	of genetic diversity	then there are uniform people, then every human being is the same, and there is no difference between them.I do not want the use of it so that genetic diversity would not disappear …
S13	Inappropriateness in terms of Religion	I do not want it to be used. Allah has bestowed a certain intelligence and physical strength upon everyone. To the extent everyone needs. It would be a great sin to attempt to change what God has created. This is not appropriate for our religion.For this reason, I am absolutely against it. We should all do what is appropriate to our religion, and we should stay away from what is inappropriate …
S201	Rejecting due to the danger of creating a superior race (Eugenics) Thinking that it would lead to discrimination	I would not support the use of this discoverybecause, even today, there is a conflict of superiority. With this discovery, …the creation of excellent people will escalate the conflict among people… efforts will be made to create a superior race, in other words, it will be worked for eugenics, and there is a danger of eugenics. I wish nobody would experience this situation; it has very bad consequences. In history, there are various examples of efforts to create a superior race for different reasons, though not genetics,that are known by everyone... Furthermore, economically poor countries and people will not be able to apply it, which will lead to the formation of social classes among people, in other words, there will be genetic-based discrimination among people. Anyone who will be stronger with this discovery, of course, everyone wants it to be used; so what about those who can't use. Who wants to be in their shoes…

When Table 1 was examined, it was observed that justification codes that provided a basis for decision processes were determined through both direct and semantic inferences from PPSTs' statements related to the sample dilemma case. In the study, the codes were reviewed again, those serving similar purposes were combined, and decision

categories were created. Decision categories were also examined again, and those with similar features were combined, and decision themes were created. After this procedure, three decision themes for the dilemma of "A genetic discovery excellent people," six decision categories within these themes, and 23 decision justification codes that provide a basis for these decisions were achieved. For the dilemma of "A new step in the insurance process," three decision categories and 21 decision justification codes that provide a basis for these decisions were achieved. For the dilemma of "Ordering a boy," three decision categories and 18 decision justification codes were achieved. The coder reliability was employed in order to ensure the reliability of the results obtained during the analysis process. In this context, consensus and dissensus were determined. The reliability formula proposed by Miles and Huberman (1994) was used in the reliability calculation process, and the coder reliability was calculated to be .91.A consensus was achieved by discussing the codes with dissensus. The results were presented by digitizing with frequency values.

3. FINDINGS

Since quantitative and qualitative data are analysed separately in sequential explanatory mixed methods design (Creswell, & Clark, 2014), this section includes first quantitative findings and then qualitative findings.

Results on the Dilemma of "A Genetic Discovery Excellent People"

PPSTs' decision processes related to whether allowing gifted people to be brought into the world with genetic technology were examined with the dilemma of "A genetic discovery excellent people." The results of how PPSTs' decision processes were shaped are presented in Figure 1.

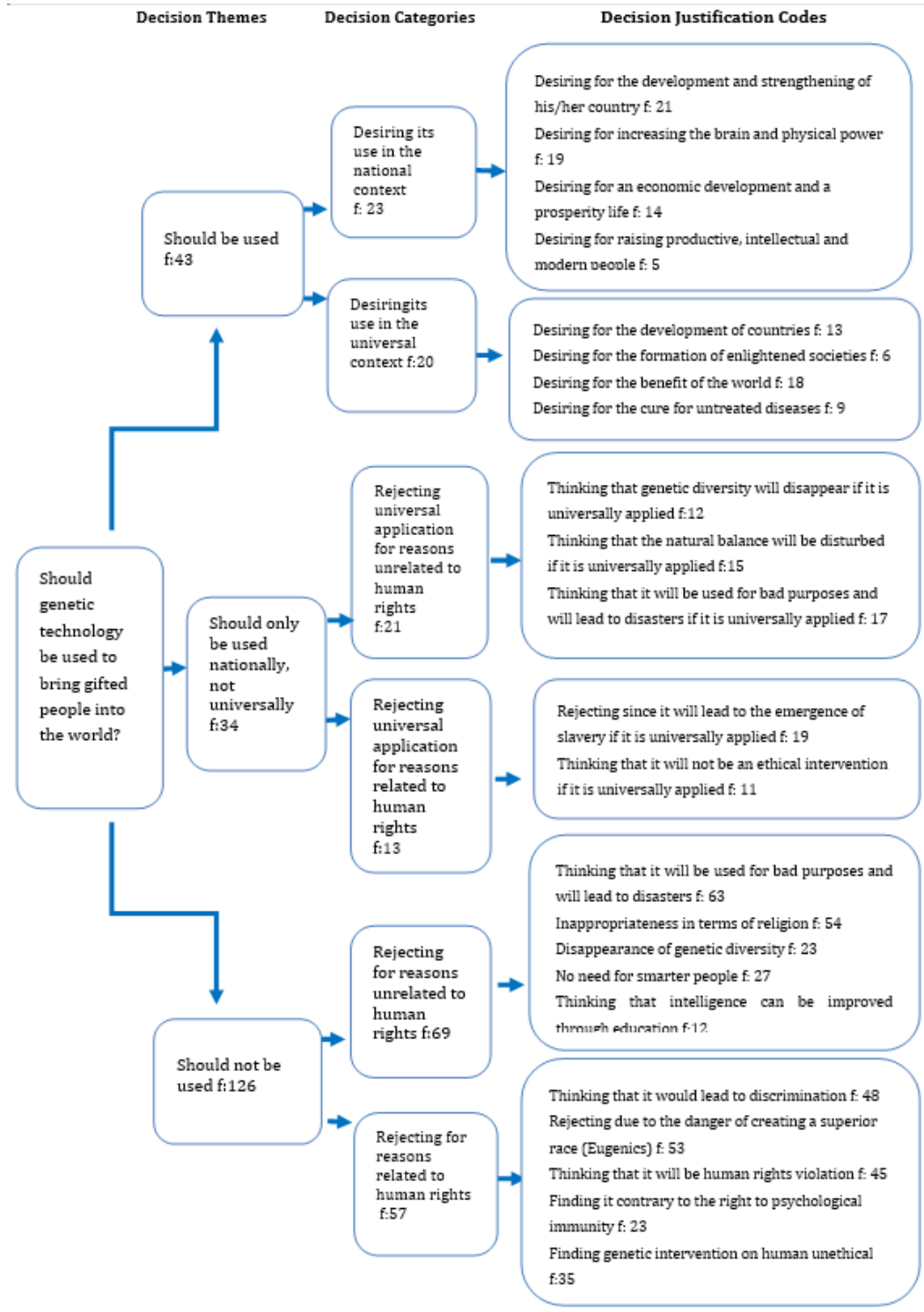

Figure 1. Decision process related to the creation of gifted people with genetic technology

When Figure 1 was examined, it was observed that PPSTs' decision processes related to the use of genetic technology to bring excellent people into the world were gathered around three views: should be used, should not be used, and should only be used nationally, not universally. Among them, the view "should not be used" was mostly present (f:126, 62%), and in this context, it was observed that PPSTs' decision processes were gathered into two categories. Among them, it was determined that 69 PPSTs had the view of rejecting for reasons unrelated to human rights. In this context, PPSTs mostly indicated that they rejected the application since it would be used for bad purposes and would lead to disasters (f:63) and it would not be appropriate to religion (f:54). They also suggested that such an application would eliminate genetic diversity (f:23), existing human intelligence was sufficient (f:27), and intelligence could be improved through education (f: 12). Among them, the view that the application might lead to disasters was stated by one of PPSTs as follows,"*I would not allow it because it is certain that it will give negative results if it gets into the hands of malicious people. For example, wars would increase, people would get into competition with this discovery, and it may cost a lot of people's lives... disasters would occur in the world, the world would become an unlivable place*… (S6)". Inappropriateness in terms of religion, which was another reason that was mostly put forward by PPSTs, was stated by one of the PPSTs as follows,"*I do not want it to be used. Allah has bestowed a certain intelligence and physical strength upon everyone. To the extent everyone needs. It would be a great sin to attempt to change what God has created*…" (S13). When these results are examined, it can be said that PPSTs generally focused on the potential negative consequences to be caused by the application or whether it was consistent with the current value judgments, without establishing a direct connection with human rights in decision processes. In the study, it was determined that 57 PPSTs had the view of rejecting for reasons related to human rights. In this context, PPSTs mostly indicated that they rejected this application since it would lead to discrimination (f:48), there would be the danger of creating a superior race (eugenics) (f:53), and it would be human rights violation (f:45). Furthermore, they also put forward the reasons of violation of the right to psychological immunity (f:23) and that genetic intervention on human is unethical (f:35). Among them, the reasons of the danger of eugenics and causing discrimination, which were mostly put forward, were stated by one of the PPSTs as follows:

"I would not support the use of this discovery because, even today, there is a conflict of superiority. With this discovery,… the creation of excellent people will escalate the conflict among people … efforts will be made to create a superior race, in other words, it will be worked for eugenics, and there is a danger of eugenics...Furthermore, economically poor countries and people will not be able to apply it, which will lead to the formation of social classes among people, in other words, there will be genetic-based discrimination among people…" (S201)

One of the PPSTs indicated that he did not find the application ethical and that it was contrary to human rights in this context by stating,"*I would not allow it. Ultimately, it is*

basically a genetic intervention, I do not approve these kinds of things for people, they are not subjects...it is not ethical, it is forbidden. If it was a good thing, it would already be allowed, it is also now forbidden....contrary to human rights…" (S158).When the results related to this decision category are examined, it can be said that PPSTs especially focused on the risks that may occur in decision processes especially in terms of human rights and found this application dangerous for all humanity.

In the study, it was determined that the view on the use of genetic discovery was supported by 43 PPSTs (21%). It was determined that 23 of the 43 PPSTs with this view desired that it would be used in the national context while 20 of them desired that it would be used in the universal context. PPSTs desired its use in the national context with the reasons of the development and strengthening of the country (f:21), increasing the brain and physical power (f:19), an economic development and a prosperity life (f:14), raising productive, intellectual and modern people (f:5). Among them, it was determined that the reason of the development and strengthening of the country was mostly put forward, which was stated by one of the PPSTs as follows,"*I would desire that it would be allowed to be used in our country… it should be absolutely used in order to become a more developed and powerful country in the world* …"(S23). Increasing brain and physical power, which was another most put forward reason, along with the reason of the development and strengthening of the country, was stated by another PPST as follows,"*I would allow the use of this discovery because this country needs intelligent, intellectual, and physically strong people...Thus, Turkey will develop and reach much higher levels* …" (S48). When these results are examined, it can be said that the development and strengthening of their countries came to the forefront in the decision processes of PPSTs who desired its use in the national context. The PPSTs who desired its use in the universal context (f:20) mostly indicated that they desired it for the development of countries (f:13) and for the benefit of the world (f:18). Furthermore, they supported the use of this technology for the formation of enlightened societies (f:6) and finding the cure for untreated diseases (f:9). Desiring it for the benefit of the world, which was mostly put forward reason among them, was stated by one of the PPST as follows, "*I would approve its use… its use can make the world a better place...intelligent people will be more useful, and the inventions required by the era can be realized. All of them will benefit the world*…"(S47). The fact that this discovery would be useful for the formation of enlightened societies was stated by one of the PPSTs as follows:

"I would like that this genetic discovery would be used... another important reason for desiring it is for the formation of enlightened societies because intelligent people can think more broadly, make right decisions with the pros and cons, enlighten the society, and lead to right thinking. The number of enlightened people in societies would increase, and the world would become a more peaceful place …" (S12).

When these results are examined, it can be said that not the development of their own country but the development and change around the world came to the forefront in the decision processes of the PPSTs who desired its use in the universal context.

It was observed that 34 PPSTs had the view that it should only be used nationally, not universally, and that decision processes were gathered into two categories: rejecting a universal application for reasons related to human rights and rejecting a universal application for reasons unrelated to human rights. It was determined that the PPSTs who put forward this decision for reasons unrelated to human rights (f:21) indicated that they desired that it would be applied nationally for the development of their own country, however, they did not desire it since genetic diversity would disappear when it was universal (f:12), natural balance would be disturbed (f:15), and it would be used for bad purposes and it would lead to disasters (f:17). Similarly, it was determined that the PPSTs who put forward this decision for reasons related to human rights (f:13) desired that it would be applied nationally for the development of their country, however, they did not desire it since slavery would emerge if it was universally applied (f:9) and it was unethical to modify people's genetics (f:11). In these two decision processes, it appears that PPSTs had a view that good results would be achieved and it would be beneficial for their countries if the genetic discovery wasrealized in the national context. However, there would be problems if it was applied in the universal context, in other words, around the world. It is argued that the main difference between these two categories is that the problems to be faced in the universal application in the second decision process would lead to human rights problems, which was indicated by one of the PPSTs as follows:

"…it should be absolutely applied in our country. This application will make us a more powerful country that can stand on its own feet...however, its application around the world...The concept of slavery will re-emerge. Slavery dependent on technological progress... people will lose the human rights they have gained...it is also unethical to perform such genetic studies on humans…" (S76)

When the citation is examined, it can be said that this PPST actually had the awareness that the use of this genetic discovery would pose a problem with human rights. However, he did not describe it as a problem when it is applied only in his own country.

When the results were evaluated in general, it could be said that PPSTs' decision processes differed, and in this context, it was mostly decided that this discovery should not be used (f:126), and 70 (34%) of the PPSTs paid attention to human rights-related situations, and only 57 (28%) of them were able to evaluate the potential risks in terms of human rights in the universal context and to make inferences consistent with the characteristics of human rights.

Results on the Dilemma of "Ordering a Boy"

How PPSTs' decision processes on gender selection by the PGD method were shaped, and whether human rights were included in this decision process were examined with the dilemma of "Ordering a boy." The results are presented in Figure 2.

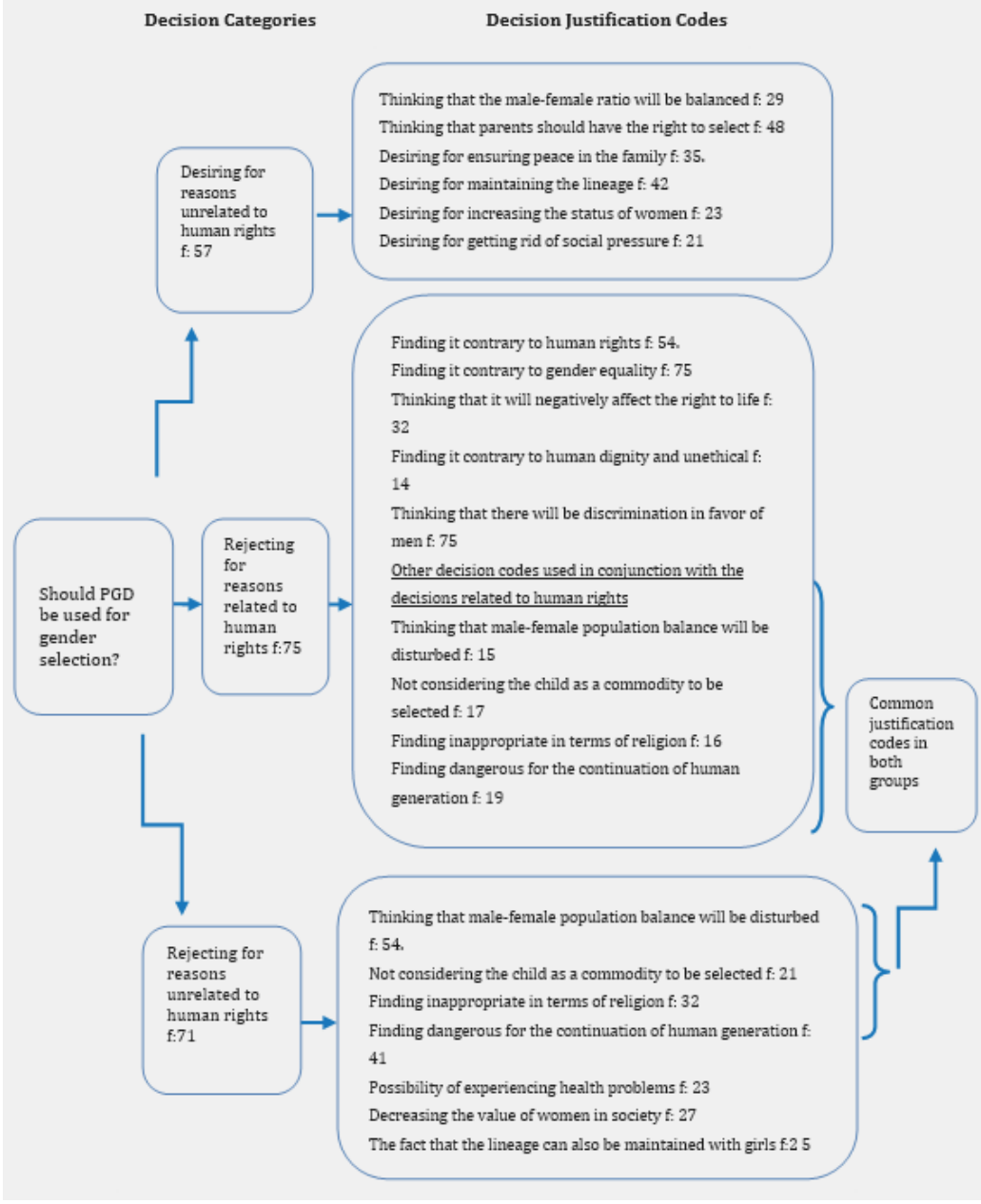

Figure 2. Results on the decision process related to gender selection by PGD

When Figure 2 was examined, it was observed that PPSTs' views on gender selection by the PGD method were gathered in three categories: desiring for reasons unrelated to human rights, rejecting for reasons related to human rights, and rejecting for reasons unrelated to human rights. Among them, it was observed that the PPSTs who did not desire the use of gender selection by PGD for reasons unrelated to human rights constituted 35% (f:71) of the total participants. It was determined that the PPSTs included in this decision category did not generally approve and favor an intervention for gender selection. However, they based this situation on reasons unrelated to human

rights. In this context, they mostly indicated that they rejected the application since the male-female population balance would be disturbed (f:54), human generation would be in danger (f:41), and it would be inappropriate in terms of religion (f:32). Among them, the probability of disturbance of the male-female population balance and finding it dangerous for the continuation of human generation were stated by one of the PPSTs as follows, "*There should be absolutely no such thing because there is a fondness for boys in our society. If this happens, everyone will give birth to a baby boy... There will be a disturbance in the male-female population balance in the world. This will also cause that human generation would be in danger ... "* (S20). Inappropriateness in terms of religion, which was another reason shared by a significant part of the PPSTs, was stated by one of the PPSTs as follows,"*I think it shouldn't be used. It is wrong according to Shura verse 49...gender determination is sinful not halal* (S9)". Furthermore, the PPSTs in this decision category indicated that they rejected this application for the reasons that the child is not a commodity to be selected (f:21), possibility of experiencing health problems (f:23), decreasing the value of women in society (f:27), and the lineage can also be maintained with girls (f:25). When the results are evaluated, it can be said that the decisions of the PPSTs in this category were shaped by the effects of the application on social structure and value systems.

It was determined that 57 (28%) of the PPSTs had the view of desiring its use for reasons unrelated to human rights. It was observed that PPSTs mostly put forward that this application was necessary for parents to have the right to select (f:48) and to maintain the lineage (f:42). Among them, the fact that gender selection could be made to ensure the continuation of the lineage was indicated by one of the PPSTs as follows,"*It should be available. He desires for the continuation of his lineage, which is important for a father*…" (S41). On the other hand, it was observed that PPSTs considered gender selection as a way to prevent social pressure, ensure peace in the family, and increase the status of women. It was indicated by one of the PPSTs as follows,"*In our country, the boy takes a very important place in most of the families. The fact that a woman does not have a son may sometimes cause her to be excluded, underestimated, considered worthless, and exposed to violence. Sometimes, social pressure forces the man to marry a second woman even though he does not want... Therefore, the peace of the family is disturbed... It will be a great chance for them to be able to make such a selection, there will be no such thing as social pressure, the peace of the family will be ensured,... will increase the status of women*…" (S86).

In the study, the PPSTs, who rejected the use of PDG for gender selection for reasons related to human rights, consisted of 75 people, constituting 37% of the participants. In this context, it was determined that all PPSTs in this category suggested that the application would be contrary to gender equality and would bring along discrimination in favor of men. It was indicated by one of the PPSTs as follows,"*It definitely should not be. With such an application, many families will desire this method, and gender discrimination will start again, no one will want to have a girl, they will mainly desire for a*

boy because their lineage will be maintained... gender inequality will be revealed ..."(S7). Furthermore, it was determined that an application for gender selection in these decision processes was not desired by PPSTs since it was found to be directly contrary to human rights (f:54), it would negatively affect the right to life (f:34), and it was found to be contrary to human dignity and unethical (f:14). The fact that this application would cause problems for the right to life was indicated by one of the PPSTs as follows:

"I think that families should not be allowed to select the gender of their children by PGD because every child has the right to life. If families select the child's gender and destroy the cells of other children, the right to life of another gender, especially girls, would be violated. Both girls and boys have the right to life. Selection should not be made" (S101)

On the other hand, it was found in the analyses that the reasons for decisions that were not related to human rights were used as supportive in this decision category. It was determined that these reasons determined had a common aspect with the category of "rejecting for reasons unrelated to human rights," and PPSTs mostly focused on the disturbance of male-female population balance.

When the results are evaluated in general, it can be said that 63% of the PPSTs made decisions related to gender selection by the PGD method for reasons unrelated to human rights, and 37% of them made human rights-based decisions. In this regard, it can be said that only 37% of the PPSTs perceived gender selection by PGD as a problem related to human rights and made inferences accordingly, and that the reasons that it would be contrary to gender equality and there would be discrimination in favor of boys were common views in the decisions made in this context.

Results on the Dilemma of "A New Step in the Process of Getting Health Insurance"

How PPSTs' decision processes related to whether to apply different premiums in the process of getting health insurance with the use of genetic tests were shaped, and whether human rights were included in this decision process were examined with the dilemma of "A new step in the process of getting health insurance." The results are presented in Figure 3.

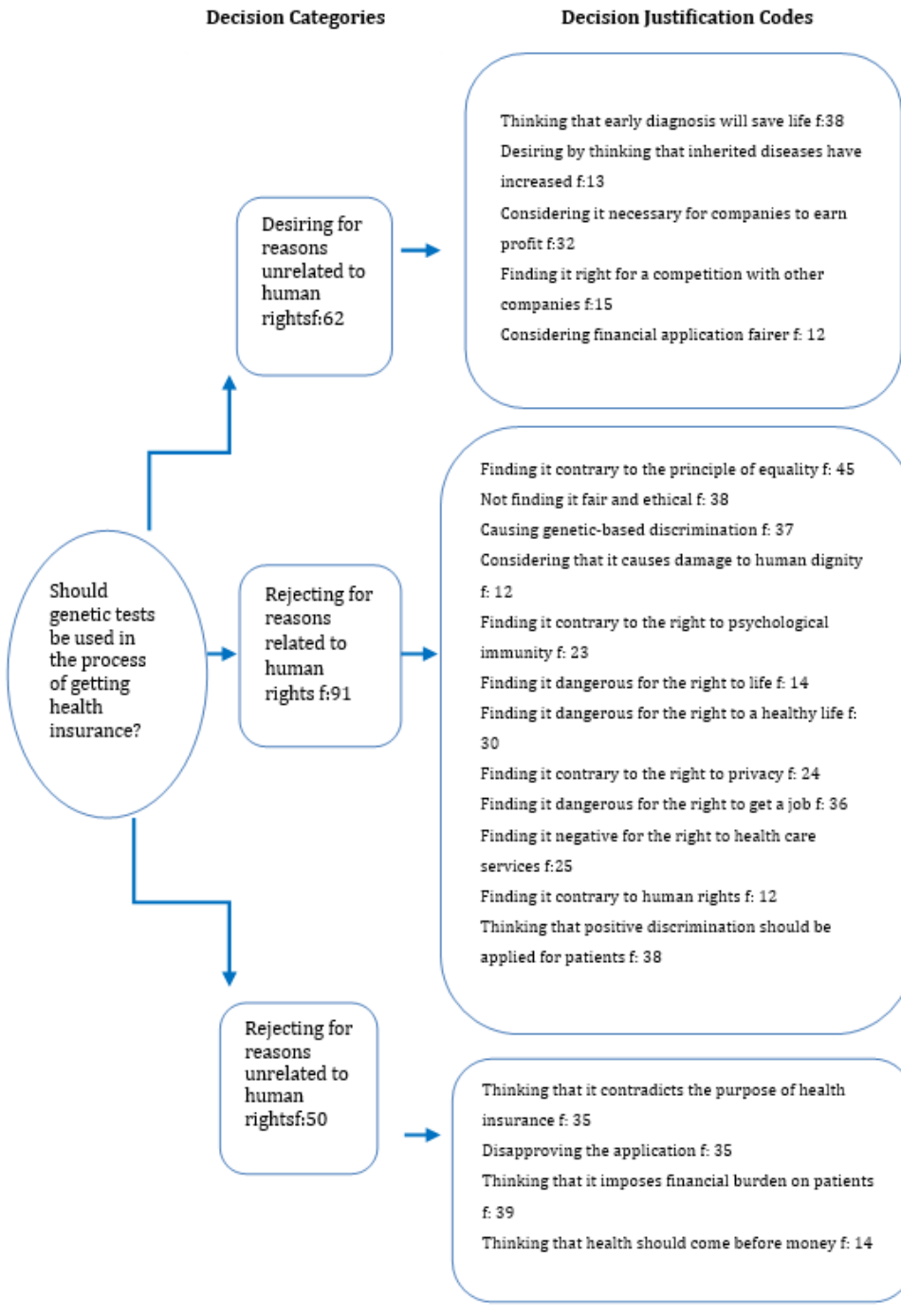

Figure 3. Decision process related to the use of genetic tests in the health insurance process

When Figure 3 was examined, it was observed that PPSTs' decision processes related to the use of genetic tests in the process of getting health insurance were gathered in three views: desiring for reasons unrelated to human rights, rejecting for reasons related to

human rights, and rejecting for reasons unrelated to human rights. Among them, it was determined that PPSTs mostly had the view of rejecting the use of this application for reasons related to human rights (45%, f:91), and 12 reasons related to human rights that provided a basis for this decision process were achieved. In this context, PPSTs mostly stated that they rejected this application since they found it contrary to the principle of equality (f:45), they did not find it fair and ethical (f:38), it would lead to genetic-based discrimination (f:37), it was contrary to the right to psychological immunity (f:23), they found it dangerous for the right to a healthy life (f:30) and for the right to get a job (f:36). Among them, it was determined that this application was mostly rejected since it was contrary to the principle of equality and was not fair and ethical. It was indicated by one of the PPSTs as follows:

"I wish this innovation would not be put into practicebecause human rights indicate that every human being is equal. Whether they have a physical or mental disability or a health problem. It is contrary to the principle of equality...Yes, the insurance company will incur a certain amount of charge... it is unfair and unethical that the health problems of people applying for the policy are reflected in the insurance, priced for five times and mentioned in the report…"(S21)

In this context, another PPST made the following assessments for genetic-based discrimination and the right to a healthy life:

"…there were many types of discrimination. This is a different kind of discrimination, such as gender, race, religion, and social status. I do not find it right to discriminate people on the basis of genetics due to their genetic problems... their healthy lives are endangered and even taken away. This is also a loss of rights, a right to a healthy life…"(S143).

The fact that this application would have negative effects on the right to psychological immunity and the right to get a job, which was another reason that was mainly focused in this process, was indicated by one of the PPSTs as follows:

"…people will be punished for a genetic disease that may arise in the future, even if they are not sick now. They will be forced to pay more premium and will, therefore, become unemployed, isn't a right to have a job? it means disregarding... Anyone who knows it will be mentally depressed. You are not sick, but later you learn that you will have a very serious illness. On the one hand, you would become unemployed and run out of money... where is the right to psychological immunity? This right is completely violated... just for congenital genetic diseases you have…" (S56)

In this context, PPSTs stated that they rejected the use of this application since it was dangerous for the right to life (f:14), they found it contrary to the right to privacy (f:24), they found it negative for the right to health care services (f:25) and it would be contrary to human rights (f:12). In this process, 38 of the PPSTs evaluated this situation from a different point of view and stated that positive discrimination should be made for people who are diagnosed with a disease as a result of genetic tests. The demand for positive

discrimination and the fact that the application will have negative consequences for the right to health care services were indicated by one of the PPSTs as follows:

"…Here, it is attempted to provide services to patients who are sick with higher charges, and many people will not be able to afford it. People will not receive health services and will suffer the loss of rights. On the contrary, I think those people who are sick should be supported more because they will need it more. Insurance companies should discriminate positively for these patients...should help them use their rights instead of losing them" (S168)

When these results are evaluated, it can be said that the PPSTs in this category focused on the negative consequences to be caused by this situation in terms of human rights, and they justified their decisions in consistency with the scope and content of human rights.

Other results of the study indicated that 25% of the PPSTs disapproved this application. However, they associated it with the reasons unrelated to human rights. Accordingly, PPSTs put forward the reasons that it contradicted the purpose of health insurance (f:35), they disapproved the application (f:35), it would impose a financial burden on patients (f:39), and health should come before money (f:14). Among them, it was determined that they mostly adopted an attitude against the application since it would impose a financial burden on patients. One of the PPSTs indicated it as follows, "*I definitely do not want such a thing. Does everyone have a good financial situation? I do not understand. You should feel sorry because you are sick or because there is no cure? It is obvious that such a thing will impose a very cruel financial burden on patients, shame on people, I don't want it at all*" (S72). The other reasons put forward by PPSTs in this context were thinking that it contradicted the purpose of health insurance and disapproving the application. In this process, the reason which was least stated by PPSTs was that health should come before money, which was indicated by one of the PPSTs as follows, "…*It is impossible for me to accept the logic here. Not money but health should come before money*…" (S97). When the results are evaluated in general, it can be said that the PPSTs who expressed opinions in this decision category created reasons by considering the negative situations that the application might bring along, and they did not make any association with human rights in these reasons, in other words, they did evaluate them from the perspective of human rights.

In the study, it was determined that 30% of the PPSTs approved this application for reasons unrelated to human rights. In this context, it was observed that the reasons of the companies' need to earn a profit (f:32) and that early diagnosis would save life (f:38) were mostly put forward. The reason that early diagnosis would save life was stated by one of the PPSTs as follows, "*It is a quite reasonable method...a very early diagnosis and very early detection of certain conditions even before feeling sick ensure that people take care of themselves more. Thus, they can live a healthier life. It can save life*… (S23)". The other reasons that provided a basis for this decision process were desiring by thinking that inherited diseases have increased (f:13), finding it right for a competition with other

companies (f:15), and considering financial application fairer (f:12). Among them, one of the PPSTs, who found financial application fairer, stated that "*I think innovation should be put into practice. Even in car insurance, accident risks of people are calculated, and the price is determined, it will be a fairer application in this way*…" (S126). When the results related to this category are evaluated, it can be said that PPSTs mainly desired this application based on financial reasons. However, a small part of them approved this application for taking health measures, and none of them made associations with human rights.

When the results are evaluated in general, it can be said that 30% of the PPSTs approved the use of this application while 70% of them did not approve it, and the view that it should not be applied was predominant. It was also determined that 45% of the PPSTs, who thought that genetic tests should not be used, could make assessments within the context of human rights.

4. CONCLUSION, DISCUSSION AND SUGGESSTIONS

The results of the study indicated that PPSTs used different decision processes in genetic-based socioscientific discussions and based these decision processes on different justifications. These results also revealed that the ratios of human rights-related decisions in case of different dilemmas in this process also varied, and this ratio increased to 45% at the most. The results of the study on the use of genetic technology to bring gifted people into the world indicated that PPSTs mostly decided that it should not be used (62%) in this context. Accordingly, 28% of the PPSTs stated that they rejected this application since it was not appropriate for human rights. With respect to it, they stated that there would be a violation of human rights, it would be contrary to the right to psychological immunity, it would lead to the emergence of discrimination, would cause eugenics, and genetic intervention on a human would not be ethical. Among them, it was determined that this genetic intervention was not desired mostly because it would cause eugenics. Nowadays, the danger of eugenics is considered as one of the most important reasons for the prohibition of studies on genetic improvement of people (Çankaya, 2009; Tauscher, 2015). In parallel to this situation, eugenics was also prohibited in the Convention on Human Rights and Biomedicine (2003). On the other hand, it is a fact that an effort to create gifted individuals will not be ethical and will bring along discrimination as well (Halidi, 2017). In this context, it can be said that PPSTs made realistic and accurate inferences related to human rights in their decision processes. Nevertheless, the low ratio of the PPSTs who could make this assessment in the context of human rights needs to be considered. It was observed that the PPSTs who rejected this application for reasons unrelated to human rights mostly focused on the reasons of the possibility of its use for bad purposes and inappropriateness in terms of religion in their decisions. When PPSTs' structure that includes cultural and moral values is taken into consideration, it can be said that it was an expected result that PPSTs made evaluations in the religious context. In this context, it appears that religious

justifications were similarly made in socioscientific decision processes in various studies (Evren Yapıcıoğlu, & Kaptan, 2018; Öztürk, & Doğanay, 2019; Öztürk, & Eş, 2017; Sadler, & Zeidler, 2004; Topçu, Muğaloğlu, & Güven, 2014). On the other hand, it is possible that technological developments that facilitate human life with the innovations they bring may lead to the emergence of undesired results when they are used for bad purposes. It is even possible that these results may turn into a factor that will threaten the whole world (İşman, 2001). In this context, the fact that PPSTs had worries for this application and rejected it since they did not fully know its results can be said to be an acceptable justification. In the study, it was determined that the decisions of the PPSTs who desired the use of this application were gathered in two categories. When these two decision processes are compared, it can be said that the PPSTs who made decisions in the national context focused on the development of their countries and the benefits that can be achieved in this context, while the PPSTs who made decisions in the universal context focused on gains to be achieved around the world. Accordingly, it can be said that the PPSTs who focused on gains to be achieved around the world adopted a view which was closer to global citizenship values (Kan, 2009). In the study, the PPSTs who desired that the application should be used only in the national context and disapproved its use in the universal context constituted 17% of the PPSTs in total. It was determined that 38% of them made these decisions for reasons related to human rights. These PPSTs desired its use in the national context for the development of their countries and did not describe it as a human rights problem, however, they indicated that there would be human rights problems and slavery would emerge if it was universally applied, and it was unethical to conduct such studies on people. In other words, it was observed that PPSTs could approve the situations that they think are contrary to human rights under normal conditions when a national gain comes into question. Similar problems with this situation were also found in the study by Doğanay and Öztürk (2017). In their study, the researchers determined the problems of interest-based human rights, understanding of human rights based on superiority and at the national level. In this context, they determined that the participants considered human rights violations normal in the case of interests, leaned toward the idea of discrimination in order to become a stronger country, and evaluated human rights at the national level. Weissberg (1974) also stated thatwhen there are situations that contradict their beliefs and ideas, individuals may deny the relevant rights even if they defend human rights. This can also be interpreted that the PPSTs in this category made decisions that contradict the universality of human rights.

According to the results of the study related to gender selection with genetic technology, 37% of the PPSTs indicated that they rejected gender selection with genetic technology for reasons based on human rights. In this context, it was observed that PPSTs disapproved the application since they found it contrary to human rights and gender equality, there would be discrimination in favor of boys, it would negatively affect the right to life, and it was contrary to human dignity and unethical. In the Convention on Human Rights and Biomedicine (2003), it also appears that genetic intervention for

gender selection was prohibited. On the other hand, it is observed that international human rights law also tends not to recognize the right to gender selection and to prohibit gender selection since it increases discrimination against women (Toebes, 2008). Accordingly, although gender selection application is legal in the United States, it has been prohibited in countries such as Canada, Germany, and England. In Turkey, gender selection is not legal except for gender-borne diseases (Center for Genetics and Society, cited by Koyun, Taşkın, & Terzioğlu, 2011). It is also a fact that this application will bring along gender inequality and will negatively affect the right to life (Çankaya, 2009; Koyun & Örnek Büken, 2013). The ethical problems that will arise with such an application constitute an important discussion topic in the relevant literature (Fasouliotis, & Schenker, 1998; Liao, 2005; Robertson, 2003). Accordingly, it can be said that PPSTs could realistically evaluate the potential risks that may arise with the use of this application, within the context of human rights. In the study, it was observed that the PPSTs who rejected the use of this application for reasons unrelated to human rights put forward reasons such as the fact that the male-female population balance would be disturbed, it would turn the child into a commodity to be selected, it would be inappropriate in terms of religion, it would decrease the value of women in society, and the continuation of the lineage could also be ensured with girls. In many countries, there is a tendency to make a selection in favor of boys, and it is a fact that this will disrupt the gender balance in the world and decrease the number of women (Davis, 1997). As it has been previously mentioned, religious and moral assessments are frequently observed in socioscientific decision processes. In the decision processes related to this dilemma case, it was observed that PPSTs also focused only on the statement that it would not be appropriate in terms of religion. However, according to Ekşi (2013), the main reason why gender selection is not appropriate in terms of religion except for therapeutic purposes is that it has the risk of gender discrimination and disruption of the gender distribution balance, and therefore, it poses a danger for humanity. Accordingly, it can be said that it is necessary for PPSTs to take into account the effects of the relevant situation on human rights and social structure even if they make evaluations in the religious context. Within the scope of the study, it was determined that the PPSTs who desired the use of genetic technology for gender selection for reasons unrelated to human rights put forward reasons such as balancing the male-female ratio, the requirement that parents have the right to select, ensuring peace in the family, and increasing the status of women. It was observed that these PPSTs had the idea that such an application would not disturb the male-female ratio in society, but it would ensure its balancing. Furthermore, it was observed that they considered the selection of a boy as a way to ensure peace in the family and to increase the status of women in society. However, a selection in favor of a boy except for health purposes decreases the status of women in society. It is also possible to say that PPSTs with the idea of increasing the social status of women by bringing a boy into the world indirectly confirmed the superiority of males (Koyun, & Örnek Büken, 2013).

In the study, the results on the use of genetic tests in the process of getting insurance indicated that PPSTs mostly (45%) had the view of rejecting the use of the application for reasons based on human rights. In this context, PPSTs stated that it was contrary to the principle of equality, it was not an ethical application, genetic discrimination was not right, it was contrary to the right to privacy, and it was also dangerous for the right to get a job and the right to a healthy life. The information obtained by genetic tests is used in some countries for different purposes such as employment and insurance, and it also seems likely to be used in the future (Godard et al., 2003). The use of this information has brought along psychological and social damages, various risks in the processes of recruitment, promotion and dismissal, less benefit from health care services or different premium wage applications, and therefore, genetic-based discrimination, and has also brought various problemsand discussions related to human rights to the agenda (Akpınar, 2010; Çetin, 2017). Those discussions have made it necessary to determine the areas in which genetic discrimination may exist, to evaluate the place of genetic discrimination in the context of human rights today and in the future, and to conduct legal studies on solutions (Küzeci, 2018). In parallel to it, it appears that different countries have taken various legal measures for this purpose. The Genetic Information Discrimination Act (GINA) can be shown as an example of these legal measures. This law prohibits employers from making negative employment decisions based on a person's genetic information, including family health history. It also prohibits insurance companies from discriminating against individuals by decreasing insurance coverage or increasing premiums. Furthermore, employers and health insurers are not allowed to request genetic testing according to the law. Because of this law, the Americans may be free to undergo genetic tests for diseases such as cancer, heart disease, diabetes and Alzheimer without worrying about work and health insurance (Petruniak, Krokosky, & Terry, 2011).Based on these results, it can be said that PPSTs realistically evaluated the potential risks for human rights in their decision processes and correctly structured their inferences. Nevertheless, it appears that a significant part of the PPSTs, 55%, structured their decision processes on the reasons unrelated to human rights. In this context, the PPSTs who desired the use of genetic tests in the insurance process indicated that they made this decision since thought that early diagnosis would save life and companies should earn profit and found different premium applications more accurate. It would not be an inaccurate inference to think that genetic test results can be used to prevent the onset of diseases and to provide early diagnosis and treatment (Godard et al., 2003). Indeed, this view constitutes the starting point of genetic tests. Nevertheless, it can be said that the fact that PPSTs who produced ideas in this context are able to interpret that genetic tests can be used outside of their main purpose and this will lead to various problems related to human rights is a necessity for achieving healthier results in social discussions and decision processes. On the other hand, it is also a fact that private insurance companies are profit-oriented institutions. However, the main purpose of insurance companies is to help people to live healthy by providing health services to them. It should also be considered that some of the people will be

deprived of health services they already have through such an application, and their right to a healthy life can be taken away.

When the results of the study are evaluated in general, it can be said that the great majority of the PPSTs made decisions without making assessments in the context of human rights in genetic-based socioscientific discussions, and when they made decisions related to human rights, they could usually make right inferences. The small number of the PPSTs who made the right inferences in the context of human rights can be interpreted that PPSTs had a low level of awareness that genetic-based socioscientific discussions are also the situations involving human rights. It draws attention to the importance of carrying out studies aimed at developing the relevant awareness, knowledge, and skills. Accordingly, it may be suggested to provide training to develop the required awareness, knowledge, and skills so that PPSTs are able to make assessments in terms of human rights in genetic-based socioscientific discussions. On the other hand, the fact that some of the PPSTs made decisions that were incompatible with human rights and looked after their own interests in some cases is another important result of the study, which can be interpreted that some of the PPSTs have low levels of awareness and attitudes on the importance and priority of human rights. Accordingly, it may be suggested to provide PPSTs with awareness education on the importance and priority of the protection and development of human rights. Furthermore, in this study, three genetic-based socioscientific discussions were addressed, and inferences were limited to three socioscientific contexts. PPSTs' decision processes related to different socioscientific discussions can also be examined within the context of human rights in order to evaluate the situation in different contexts.

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APPENDIXES

Dilemma Scenarios

Scenario 1: A Genetic Discovery Excellent People

Gülşah is a scientist who studied abroad in the field of genetics, participated in many international projects and has received many awards for her studies. Gülşah has made an important discovery for all the people of the world with a genetic study she conducted after returning to the country. By means of this discovery of Gülşah, excellent people with both physically and mentally superior characteristics can be brought into the world. Thus, a significant development can be achieved in terms of mental and physical power. However, Gülşah is worried about some problems that this discovery may bring along. There are many questions in her mind. For example, who can benefit from this invention and how? What will be the positive and negative consequences of this practice for humanity?... Therefore, she is indecisive about whether or not to allow the use of this discovery.

If you were in Gülşah's shoes, what would you decide about whether or not to allow the use of this discovery? Could you please explain your decision with the reasons?

Scenario 2: Ordering a Boy

A couple with three girls also wanted to have a boy for the continuation of their surname. They learned that their request could be possible with the developing technology. According to the PGD (Preimplantation Genetic Diagnosis) technique, the cell is taken from embryos obtained by the in vitro fertilization method, and molecular genetic screening is performed, the embryos obtained as a result of fertilization are examined in the period of 6-10 cells, and thus, possible diseases and also gender are determined. The family can make a selection from among the fertilized embryos in the tube. Suitable embryos are fertilized, and the couple decides on what will happen to other embryos. Other embryos are either destroyed or given to other couples depending on the reason for rejection.

In your opinion, should couples have the right to determine the gender of the infant? Could you explain with your reasons?

Scenario 3: A New Step in the Process of Getting Health Insurance

Mr. Ahmet is the owner of a health insurance company. Mr. Ahmet is undecided about whether to implement a new form of insurance, which has been implemented by a large number of insurance companies, in his own company. With this application, genetic analysis will be requested from customers before the health insurance is made, and the insurance fee will be determined according to the results of this analysis. If people who apply to the company for the policy have a genetic disease such as Huntington, or Alzheimer or predisposition to a certain type of cancer, the fee may be increased up to five times. This will make a significant financial contribution to Mr. Ahmet's company. However, according to the test results, it will also impose heavy obligations on some people. This situation confuses Mr. Ahmet a lot.

If you were in Mr. Ahmet's shoes, what would you decide about whether or not to implement this innovation in the health insurance process? Could you please explain your decision with the reasons?