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Turkey's Problem-Solving Child: A Historical Analysis of the Cultural Spaces of Mathematics Education *

Ayşe Yolcu [1]

Abstract

This paper, as a history of the present, explores the connection between pedagogical practices of teaching and learning mathematics and historical conditions in relation to the production of the problem-solving child as a desired human kind in Turkey's early republican years (1923–1940). Archival resources are school mathematics curricula, textbooks, and teacher guidelines published during those years. Analysis focuses on the epistemological principles that make, order, classify, normalize, and differentiate the self and the other in curricular and instructional materials. Findings reveal that knowledge and practices that organize mathematics education contain normative principles that mark some as faithful and disciplined bodies and others as needing intervention to be fully recognized as Turkish citizens. The paper further explores how mathematics education contains a set of precautionary pedagogies to help not-yet-fit bodies to secure the social order and how those pedagogical practices reinscribe differences between children. Implications are discussed in terms of mathematics education and contemporary schooling. The analysis contributes to the field by addressing the issues of equality and inequality in education from a historical perspective, highlighting that differences between children are the product of a complex, multifaceted set of historical–cultural–pedagogical processes.

Keywords

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Introduction

One of the issues addressed in mathematics education is the differentiation in children's problem-solving achievement levels in diverse settings, such as daily life and school (Ministry of National Education [MoNE], 2018a; National Council of Teachers of Mathematics [NCTM], 2014; Organization for Economic Co-operation and Development [OECD], 2013). Educational reforms or curricular changes offer suggestions for closing this gap toward the realization of the vision that all children are capable of doing mathematics, provided that the necessary pedagogical arrangements are in place (MoNE, 2009, 2018a; NCTM, 2000, 2014). However, there is a paradox in these discourses. During the course of inclusive efforts to close the gap, some children are prescribed with different pedagogical practices and are thus recognized as being different from the norm (Popkewitz, Diaz, &

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[1] Hacettepe University, Faculty of Education, Dept. of Mathematics and Science Education, Turkey, ayseyolcu@hacettepe.edu.tr

Kirchgasler, 2017). In addition, these pedagogical practices have less to do with teaching the subject matter than working on individuals' internal characteristics to effect the kinds of changes that will organize proper modes of life for the society in which they live (Popkewitz, 2008). In other words, mathematics teaching practices, which include all children, order them in a hierarchy through cultural rules and norms, thus producing proper and improper spaces of life (Diaz, 2017). For instance, possessing mathematical knowledge was identified as a human need in the United States during World War II; these needs were differentially categorized as personal, vocational, and scientific (Yolcu, 2017). Although ability grouping was considered inclusive in terms of making provisions for everyone to learn mathematics, it became a cultural practice that organizes students' actions and their participation in daily life, and by making and differentiating proper citizens, it also excludes others (Yolcu & Popkewitz, 2019).

Teaching and learning mathematics entail a complex, multi-layered process. On the one hand, there is a need for pedagogical practices to translate the subject matter for children's comprehension. On the other hand, the principles and standards of school mathematics embody subjectification processes that create the desired future self (Diaz, 2017; Popkewitz, 2008; Valero, 2017). These processes provide possible and plausible statements for children; however, they regulate cultural spaces through differentiating proper and improper modes of life. These regulations generally embody a style of thinking that makes, differentiates, and classifies kinds of people through the commonsensical concepts of modern schooling, such as competencies, inclusive education, context, citizenship, human growth, globalization, and problem solving (Popkewitz et al., 2017). Although mathematics might be seen as independent from these concepts, reducing uncertainty (Hacking, 1990) and organizing modern life by cultivating faith in numbers has become a cultural practice (Porter, 1995). Mathematics education has participated in this historical trajectory with practices such as problem solving since the 18th century (Popkewitz, 2004). Hence, there is a need for historical studies that examine subjectification processes and pedagogical practices in mathematics education.

Problem solving, for example, is considered to be an inevitable part of mathematics education, both as an instructional method (MoNE, 2009, 2018a; Schoenfeld, 2014; Stein, Boaler, & Silver, 2003; Van de Walle, Karp, & Bay-Williams, 2010) and as a real-life skill (MoNE, 2009, 2018a, 2018b; OECD, 2013). However, when closely examined, problem solving is not merely about mathematics; it is also related to the principles, produced by pedagogical and cultural schooling spaces, that shape children and their differences (Hacking, 2007; Popkewitz, 2004). A problem-solving child, for example, can be considered a particular kind of human to think about the modern self who plans and orders actions rationally and reasonably in order to bring progress, development, and civilization to a world that is characterized by uncertainty (Popkewitz, 2008). In this context, with a focus on Turkey's early republican years (1923–1940), this paper aims to historicize cultural spaces of mathematics education that are not merely about subject matter, but are also concerned with making children as "problem solvers."

The processes for producing problem-solving children that are explored in this paper contain continuous expressions of hope for the desired future (i.e., becoming a modern nation state) as well as fear of the kinds of humans that threaten that future. This style of thinking, which incorporates hopes and fears, produces the particular kind of human that embodies normalized qualities of action and participation while generating differences by creating divisions, social exclusions and pathologized qualities of being (Popkewitz, 2008). In other words, hopes and fears create inequalities during the process of trying to build an inclusive system (Diaz, 2017; Popkewitz et al., 2017). In this regard, the making of the modern self, specifically the problem-solving child, is neither natural nor neutral; rather, it is concerned with issues pertaining to the normalization of society and the prevention of deviancy in the early 18th-century moral pedagogies that emerged with secularization efforts and later, in the 19th century, educational reforms, as can be seen in various historical studies (Bilgi, 2014; Kirchgasler, 2018; Popkewitz, 2008; Tröhler, 2012).

In education literature, there are very few studies that have historically examined the modern subject of mathematics education processes (Diaz, 2017; Popkewitz, 2004; Yolcu & Popkewitz, 2019). Turkey in particular has not been considered in this line of research. Nonetheless, mathematics education literature in Turkey is not without historical studies in recent years. This research has examined curriculum shifts in terms of mathematical content, such as numbers (İncikabı & Korkmaz, 2018; Osmanoğlu, 2016), algebra (Toluk Uçar, 2018), geometry (Yavuz, Kerpic, & Kepceoğlu, 2016; Yavuzsoy Köse & Özen Ünal, 2018), and data analysis (Ader, 2016, 2018), and analyzed changes in the aims and objectives of school mathematics (Çırak & Bay, 2016; Doğanay & Yeşilpınar Uyar, 2018; Ergün, Özmantar, Bay, & Agaç, 2016). International literature follows a similar pattern in that mathematics education studies have examined the theoretical framework of research (Kilpatrick, 1992), the content of school mathematics reform (Stanic & Kilpatrick, 1992), and the challenges faced during program implementation, such as memorization, teachers' unpreparedness for the utilization of innovative approaches, and insufficient resources (Ellis & Berry, 2005). This paper, as an investigation of cultural spaces of school mathematics in Turkey's early republican years, can contribute to the existing historical studies in mathematics education research across the world by introducing a different dimension through highlighting the processes for producing the problem-solving child as an iteration of the modern self.

When historical research about problem solving is examined in detail, it is noted that Dinç Artut and Tarım (2016) conducted one of the first studies describing how problem solving was defined, how those definitions shifted, and what techniques and strategies were used in mathematics education programs over the years. Another historical study that was conducted in Turkey examined the problem-solving steps proposed in the curriculum, pedagogical suggestions for problem solving, and shifts in teacher and student roles during the republican years (Özmantar & Öztürk, 2017). The authors concluded that since abandoned practices such as the novelty of problems, planning the solution, and controlling the results were readapted, the new curricula that emerged during the republican period did not constitute a permanent development. However, considering the notion of change, it should be remembered that curricula are multifaceted, complex, historical and cultural process that need to be addressed with respect to social and political dimensions (Popkewitz, 2008). Historical studies in Turkey have not attended to the cultural aspects of mathematics education reforms and curricula nor have they addressed societal issues such as equality and inequality. Considering educational change and development, questions such as "Who do children become?" and "What kind of a world is being created?" require urgent answers (Selçuk, 2018). In order to rethink the generative aspect of knowledge and thought in the making of the self and society, this article explores how mathematics education practices such as problem solving made children, their differences, and by extension the society in cultural terms during Turkey's early republican years.[1]

Rethinking (In)equalities: The Cultural Politics of Mathematics Education

Mathematics education is a relatively young field, having sprouted its roots in mathematics and psychology (Kilpatrick, 1992). Nevertheless, within the last two decades, it has been emphasized that culture is an important part of teaching and learning mathematics and should therefore be addressed in the political realm through social (Lerman, 2000) and socio-political turns (Valero, 2004). Embracing socio-political perspectives in mathematics education research produces critical thought with regard to the differential effects of mathematics education practices through opening up new possibilities and

[1] This paper is not about scrutinizing the curriculum to uncover the exact, accurate, or "real" meaning of problem solving. The historical research in this article is concerned with statements and propositions related to problem solving and not about what exactly occurred in schools. The analysis focuses on how the problem-solving child operates as an mechanism that produces various types of people and their differences within the cultural realm of mathematics education. More details are given in the Theoretical and Methodological Framework section.

productive ways of examining subjectifications and the formation of the cultural field as a result of these processes; it also facilitates the posing of questions about how power operates in the field.

Several studies in the social and political context have suggested inclusive mathematics teaching practices that incorporate diverse cultural knowledge and experiences to ensure equity (Diversity in Mathematics Education, 2007); they have pointedly mentioned that mathematics education reforms do not represent the experiences of children from diverse backgrounds (Apple, 1992). Efforts to make mathematics education practices more just and equitable with the overarching goal of providing all children with access to mathematical knowledge have focused on cultivating informed, productive, and critical citizens who have a sense of belonging (Gutstein, 2006; Skovsmose, 2011). Nonetheless, as observed in the review papers, students are psychologically differentiated in terms of their motivation to acquire the knowledge taught in lessons (Yolcu, 2019), mathematics education's political dimension seeks solutions only in pedagogical spaces (Pais, 2012), and inequalities are reduced to an identity problem (Pais, 2013).

Given the existing studies' limitations, researchers who explore the political dimension of mathematics education locate their studies in a larger sphere and analyze mathematics education practices using contemporary social theories (Stinson & Walshaw, 2017). On the one hand, studies focus on the analysis of ideologies such as capitalism, neoliberalism, racism, and nationalism (Baldino & Cabral, 2018; Doğan & Haser, 2014; Martin, 2013; Pais, 2019). On the other hand, the research has examined how the modern self is historically constituted and made into an administrable citizen in/through mathematics education (Diaz, 2017; Popkewitz, 2004; Valero, 2017; Yolcu & Popkewitz, 2019). However, ideological examinations overlook how discourses and practices are shaped in various times and spaces where mathematics education is in itself assumed to disseminate ideologies as its basic agenda (Pais, 2019). Historical studies that examine the cultural spaces of mathematics education and the constitution of modern selves make important analyses regarding how power operates in its locality by emphasizing the temporality of mathematics education practices. This paper will focus on the relational, situated, and productive aspects of power and knowledge, and it will provide a historical examination of how the problem-solving child and his/her differences are constructed as a cultural form.

While there are already historical studies that examine the formation of the modern self, what does it mean to do this work in the context of Turkey? First of all, Turkey is not excepted from those educational reforms that have historically made the modern self. As Bilgi and Özsoy (2005) noted, there have been continuous efforts to identify better schooling and pedagogical practices to attain the modern way of being and living. Nevertheless, the modernization of individuals in Turkey does not entail copying the West, nor has the West been taken as a model to be applied in local contexts (Ahıska, 2005). Rather, it should be understood as a travelling library that includes the movement of ideas, practices, and tools that create spaces for new forms of subjectivities, rationalities, and multiple modernities (Popkewitz, 2005). This moving library is an analytical approach to examining the connections and disconnections that are produced as principles to order different modernities, which are assembled with local narratives, pedagogical tools, and research practices that break the modern/traditional binaries.

Furthermore, power and knowledge relations that are analyzed in this article do not drive the recirculation of particular ideologies or the hierarchical formation of the subject. As Said (1983) argued, when a particular theory or concept travels, it is re-appropriated and reconnected with the cultural context that it encounters. This confrontation is neither reductive nor assimilative; rather, it generates a field of power relations and enables the further production of discourses and practices, which are examined in this paper. A historical examination of the generated spaces is necessary to highlight the potential and limitations of mathematics education practices.

Lastly, as mentioned in the introduction, the making of the problem-solving child and his/her differences is a cultural issue, since differences not only divide people but also regulate proper and improper modes of life. In other words, new modes of life emerge and are differentiated in a particular time and space, and societies are made. For example, in Turkey's case, the hope is to elevate the nation to the level of "contemporary civilization," and the fear, with regard to the making of both the child and the society, concerns the Ottoman past (Kadıoğlu, 1996). Here, temporal differentiations (i.e., backward–progressive or old–new) do not mark the space in oppressive terms; rather, they highlight the continuous paradox of modernization, in which cultural spaces (of school mathematics, for instance) are treated as a differential and productive constituent of modernity (Ahıska, 2003).

Historizing the epistemological principles embedded in the pedagogical regulations of mathematics education enables an understanding of the kind of human that is desired, which, in turn, determines the desired society through the style of thinking that drives these creation processes. The 2023 vision document emphasizes the necessity of addressing "the issue of mentality" and understanding the "paradigm of human realization" in order to solve basic educational problems (MoNE, 2018b, p. 17). This study, therefore, provides a historical analysis of local educational problems and contributes to our understanding of differences and (in)equality issues that have emerged in mathematics education as a cultural-historical problem by examining the mathematics education practices that were prevalent in Turkey's early republican years. The following research questions are addressed in this paper:

- How did the pedagogical practices of teaching and learning mathematics come into being along with the historical conditions and how did they make the problem-solving child?
- How is mathematics transformed as a product of pedagogical practices and how does this transformation affect the subjectification of the problem-solving child as a kind of person?
- What are the principles of reason that make, order, classify, normalize, and differentiate problem-solving children as a kind of people?

Theoretical and Methodological Framework

Theoretical Framework

This study is informed by Foucault's works on governmentality (1991) and related scholarship (i.e., Hacking, 2007; Popkewitz & Brennan, 1997; Rose, 1999). Rather than being thought of as a concept to be applied, the notion of governmentality is taken as an alternative way of thinking about how human conduct is organized in present-day societies, particularly in/through contemporary schooling practices. According to Foucault (1991), the "governmentalization of a state" refers to a multiplicity of in-depth processes that maintain, manage, and order the economic, personal, and social lives of the masses and specific populations. These processes are different than those that exist in sovereign societies, where people submit to the monarch's authority. They consist of practices and tools that facilitate governing from a distance in modern societies, where power is exercised not through repressive practices or brute force, but with practices informed by knowledge, truth, and reasoning styles that order, classify, differentiate, and normalize the modes of conduct (Foucault, 1995). That is, governmentality requires the invention of new technologies to manage people's economic lives as well as their health and habits (Rose, 1999).

Governmental technologies, nevertheless, embrace a regime of truth that embodies a productive notion of power, circulating in individuals' political, social, and personal lives. This regime does not merely shape and fashion human conduct by constraining citizens; it also makes up citizens who are capable of behaving with regulated freedom (Rose & Miller, 1992). In place of a central control mechanism, governmental technologies embody the heterogeneous mechanisms of diverse forces, such as techniques of calculation, assessment and examination procedures, and the standardization of training systems, that simultaneously generate norms and anomalies.

In the light of the notion of governmentality, this paper focuses on diagnosing and problematizing the principles and standards of mathematics education that historically order and shape the problem-solving child as a possible way of understanding how the subjects are constituted in modern life. More specifically, this paper analyzes the power/knowledge relations that constitute who the child is and should be. The focus is on how the problem-solving child historically became the signifier of a particular regime of truth that orders, classifies, and differentiates children as future citizens (or not).

Methods

This study is a historical analysis and diagnosis of the cultural spaces of mathematics education and how they make kinds of people and fashion differences between them. The method is called *a history of the present*. It is not about the past, but rather how the past is an intricately woven constituent of the present (Foucault, 1990). In educational research, history of the present approach is a useful means of highlighting how the grid of pedagogical discourses and practices come together to shape and fashion human conduct both in and out of school. Furthermore, history of the present methodology takes the pedagogical ordering that can be found in educational texts and conducts a fine-grained analysis of power relations as the problematics of administration (Valero, 2004). This is not tantamount to scouring the origins to see where and why the problem-solving child emerged in Turkey; rather, it is more about exploring how governmental technologies come together in intelligible and reasonable ways to produce proper and improper modes of life. In this line of thought, the historical analysis denies the linear progression of time, and it is not evolutionary in this paradigm (Popkewitz, 2008). Historicizing is to examine social, societal, and scientific conditions to reveal the practices, calculations, and techniques that constitute commonsensical concepts in mathematics education. It is a strategy of questioning the mathematics learning and teaching practices that are developed in the name of progress, development, modernity, and civilization.

Data Sources

The historical material used in this study includes primary mathematics education sources published during Turkey's early republican years. The data include elementary and middle school curricular texts (Ministry of Education [ME], 1930; Ministry of Culture [MC], 1936), mathematics textbooks (Ministry of Education Training Center [METC], 1933a, 1933b), and teacher guidebooks (MC, 1935).

Data Analysis

How we come to know what we know, i.e., epistemologies or styles of thinking, are analyzed to gain an understanding of how particular kinds of people and their differences are formed. This requires a particular notion of history and documents, which do not constitute an accumulated record of people's actions or intentions. Conducting historizations requires an examination of the epistemological principles embedded in the statements that inform cultural norms about the self and society. In this regard, the analysis does not focus on what children did or on their individual experiences; rather, it is an inquiry into the constitutive role of knowledge in the construction of proper and improper social lives, as reflected in the cultural spaces of mathematics education (Popkewitz & Brennan, 1997).

The analysis of epistemological principles or reason refers to the hopes and fears related to mathematics education in the making of the problem-solving child, which occurs simultaneously with the division of this type of child's others. The analysis emphasized epistemological anxieties (Stoler, 2009) and posed the following questions: What kind of child is being hoped for and produced? How are children being ordered and shaped in terms of developing their own rationales and desires to live and act in particular ways? What kind of (un)livable spaces are being generated? What kind of a child threatens the desired future society? Who is excluded? That is, who has become the other that is prescribed with different pedagogical practices in these formations? These questions are concerned with a reconsideration of the constructs that are given as natural in mathematics education, such as problem solving; at the same time, they culturally rework what the normal and pathological are, as a means of rethinking inclusion and exclusion processes in mathematics education.

As a necessary component of rethinking, instead of directly applying Foucault's (1991) notion of governmentality and the history of the present method to make a simple analogy, the abovementioned theoretical and methodological framework is taken as a toolkit for exploring the relevant historical sources. During data analysis, the making of the modern self in Turkey is examined to explicate the creation of the Turkish problem-solving child and explore how this connects with and disconnects from other configurations in the world. It is also necessary to analyze the statements and expressions developed for children in the context of hopes and fears. In their own cultural–historical contexts, the politics of mathematics education and (in)equalities are explored through seeking answers to the above-listed questions. In the first phase of reading, the keywords that diagnose differences and precautions are identified as "problems that are relevant to homeland geography," "children's incompetencies," and "the inculcation of solution methods" in the original texts. These keywords are selected because they are repeatedly, albeit without explanation, used in educational texts to categorize children. For instance, "backward student" is frequently used, but there is no explanation for why these children are behind. Foucault's (1991) notion of governmentality indicates the need to bring the style of thinking that underlies these statements to light. As Dean (1994) mentioned, the history of the present methodology does not seek positivist validity and therefore a reality that is acknowledged by everybody; on the contrary, the method interrogates the order in the text(s) written for individuals and identifies the style of thinking in generated cultural spaces. As such, the historical analysis continued to embed these keywords into larger historical and pedagogical contexts in a process guided by the literature on the modernization of Turkey and the constitution of the modern self, the cultural history of numbers, and the historical, cultural, and political dimensions of schooling. Hence, as a historical narrative, the findings and discussion will be presented in the next section.

Results and Discussion

This study aims to historically examine the cultural spaces of mathematics education texts in the context of making problem-solving children through mathematics education. The historical investigation is concerned with the discourses and practices that were published in Turkey's early republican years. Findings and results will be presented in three main titles, each of which corresponds to one of the three research questions. The first to be addressed will be how school mathematics as a mechanism for producing particular types of humans relates to the historical conditions, how the making of modern secular citizens is associated with these processes, and consequently, how solving the problems of everyday life has become a cultural norm. In this section, the formation of faithful bodies alongside the construction of citizens as strong republicans and the processes of creating the other will be discussed. Second, the pedagogical transformation of the subject in order to make mathematics accessible and how this transformation relates to subjectification processes will be discussed in the context of the network of practices. Finally, principles and practices of pedagogical reasoning that differentiate and classify the problem-solving child and its other as well as their differential treatment will be analyzed and discussed.

Making Strong Republicans: Solving the Problems of Daily Life

Almost a century earlier, educational practices in Turkey mostly focused on fashioning effective, informed citizens for the modern republic, as opposed to the Ottoman people, over whom the sultan reigned (Akyüz, 2015; Üstel, 2004). These secularization efforts sought to place sovereignty in the hands of the people. The republican regime was considered to be the "best fit" for the Turkish nation, as evidenced in the following excerpt:

> All courses in primary school must serve the aim of raising children as *strong republicans*. The republican regime, which is based on the sovereignty of the people,

> should live as an essential opinion among students as the best regime that is compatible with the Turkish nation and ideal. (MC, 1936, p. 7, emphasis added)[2]

This sentiment permeated mathematics education. The nation-building project touched on teaching and learning about numbers and mathematical concepts, and as a result, school mathematics emerged as "a living tool" for inscribing republican discourses among students; in this task, the teacher's role was configured as follows:

> In a mathematics course, teachers would not have done their homework by having children understand the concept of numbers, by having children calculate correctly, and by having children solving mathematical problems accurately. A mathematics course is *a living tool* to calculate the dates of some national events, to have children calculate the effectiveness of the republican government and various national institutions in the republican era, to have children think about those calculations, and to get children interested in the numbers and numerical issues within the national problems. (MC, 1936, p. 21, emphasis added)

This perspective positioned school mathematics as one of the national concerns. As stated, school mathematics was "a living tool" for cultivating children's interest in national issues, institutions, and events by having students calculate the effectiveness of republican government, its institutions, and various national cases and events. In mathematics classrooms, the hope was not merely to successfully teach and learn mathematics, but also to construct a strong national self with a solid, self-motivated belief in the republican regime and both the skills and the drive to solve problems relevant to the nation and the homeland's geography (MC, 1935, pp. 5-7). This was the process by which a national self was made for the newly-established modern nation state.

The goal was not only to solve the nation's problems, but also to deal with the daily life problems affecting the Turkish people in order to elevate them to the level of a "contemporary civilization" (MC, 1936, p. 18). These problems ranged from family budgeting (e.g., how to shop, calculate foods' nutritional values, and save for the future) to paying taxes and getting insurance (METC, 1933b). However, the efforts that sought to ameliorate people's problem-solving experiences with these everyday tasks emphasized the problems' ubiquity rather than practical solutions:

> It is not absolutely necessary for all students to answer those questions correctly; the important thing is this: all students in the classroom must *feel* that problems involving percentages are frequently encountered in real life, hence everybody needs to know how to do those calculations. (METC, 1933a, p. 23, emphasis added)

The hope was to produce informed, effective modern republic citizens to secure the social and moral order in addition to teaching and learning mathematics as a subject matter. What we needed was "national education" to realize those hopes that simultaneously embodied the fear of darkness and decay. Positioned in a binary relationship, Ottoman educational practices (such as *mahalle mektepleri* [neighborhood schools]) and the "old" regime were not suitable for the Turkish nation's character and soul (see also Bilgi, 2014). More specifically, in school mathematics, pedagogical practices such as problem solving using examples from daily life were seen as the modern, preferable way of doing mathematics that was suitable for the newly-established modern nation state. On the other hand, drills and the memorization of facts were seen as unpleasant methods of teaching and learning mathematics, which "originated" in Ottoman educational practices. According to the guidebooks, teachers should "prevent students from relying on memorization, and this issue needs to be vigilantly controlled. It should be kept in mind that the principles and rules taught through memorization cannot remain in memory for a long time" (MC, 1935, p. 4; see also for comparison Aslan & Olkun, 2011).

[2] The quotations are the author's translations of the originals that appeared in historical sources.

The comparative style of thinking concerning republican and Ottoman educational practices was not merely about changing the pedagogical practices for teaching and learning mathematics; it was related to the larger socio-political project of making citizens. The construction of a national self for the new state did not occur independently of its past. Nevertheless, the past was not seen as a historical continuum of making the self; rather, it was viewed as the categorical other (Bora, 1996). In the case of school mathematics, the pedagogical practices of drilling and memorization conjured an image of the Ottoman Empire, which was an old civilization that needed to be eradicated. The problem-solving child, therefore, became school mathematics' desired identity in the republican regime, which, given its complex relationship with the old regime, simultaneously produced inclusion and exclusion.

From Strong Republicans to Faithful Bodies

The school became the symbol of the new republican era. As evidenced in the excerpt below, teachers were not only teaching school subjects; they were also cultivating their students' "faith" in the republican regime with respect to progress, happiness, and Turkish national pride, grounded in a comparison of the "old" versus the "new" regime as the feared and the hoped for, respectively:

> Each teacher needs to cultivate *faith* in the republican regime's indispensability and make its valuable results and great works visible as well as Atatürk's revolution for the prosperity, happiness, and dignity of the Turkish nation. This shall be done by making comparisons between the old and new regimes in classes and in every other phase of children's school life. (MC, 1936, p. 7, emphasis added)

Despite the emphasis on the secularization of both education and society at large, faith in another entity was cultivated among school children. The separation from the Empire in favor of the modern nation state created "secular" but still faithful bodies, which materialized in the form of the problem-solving child. Since children were to effectively solve the problems of daily life, they were prepared for the moral and social order led by the republican regime.

In the Republic of Turkey's formative years, everyday life was a field of politics and power (Çınar, 2005). Solving the problems of daily life was a modern invention in Turkey, i.e., to "calculate" everyday life. It was a specific technique for regulating people's conduct and generating technologies for them to govern themselves as faithful bodies. Nevertheless, the making of informed, efficient citizens of the modern nation state entailed a re-installation of power relations, where the practices have been continually modified. The comparison between the "old" regime and the "new" one categorizes humans according to their belief in the necessity of the new regime as well as their sensitivities to solving the problems of modern life. It follows that a comparative style of reasoning was maintained to include and exclude particular kinds of people as faithful bodies to the newly-established state, despite the promise of equality (or equal citizenship).

Making Scientific Minds: Numberless "Mathematics" Problems

At the turn of the 20th century, educational reforms in Turkey served two main purposes. One was to develop a "national consciousness" among students, so that the Turkish people could regain their pride, which had been damaged during the Ottoman reign, and the second was to "eliminate the nation's un-scientific nature" (MC, 1936, p. 6). This latter objective was adopted as the "main principle" of an education system designed to fashion a culture for the republican regime. Evidently, the issue was not merely about changing the regime; it was also about changing the people themselves by cultivating reason and rationality. Problem solving, then, was one of the skills that could potentially realize these hopes through schooling:

> Schools should take every opportunity to teach students to reason and think. Teachers will guide students to identify problems; seek solutions; collect successful strategies, useful information, and materials; compare and contrast evidence; draw conclusions; and eventually control outcomes; therefore, teachers will cultivate *scientific minds*. (MC, 1936, p. 25, emphasis added)

Problem solving was one of the techniques for making children into reasonable beings capable of "identifying problems," "devising solutions," "comparing strategies' effectiveness," "drawing conclusions," and "controlling outcomes" in their daily lives. These practices translate mathematics into a particular cultural form that orders, classifies, normalizes, and differentiates its subjects, such as the problem-solving child, under a pedagogical gaze. The pedagogical gaze was also a disciplinary tactic that governed children's souls as future citizens. As Popkewitz (2004) stated, "the psychological inscriptions focus on the interior dispositions or the soul of the child, creating the problem-solving child as a particular kind of human for pedagogical intervention" (p. 4). School mathematics in particular constituted one of the spaces where the desired future citizens, with their "scientific minds," were constructed in the Republic of Turkey's formative years:

> The aims of mathematics courses are to teach children to make calculations safely and quickly, both mentally and in writing, and impart solutions for and applications of simple problems that are necessary for life. (ME, 1930, p. 48)

The purpose of school mathematics, here, was not only to teach (and have students learn) mathematics, it was also about managing and controlling human conduct by teaching simple problems that would be needed in everyday life. The relationship between mathematics and life is grounded in the social history of numbers. Briefly, the making of self-governed citizens in modern societies required inventing new administrative technologies, such as rules and standards of reason (Poovey, 1998). In this particular effort to construct future citizens, numerical practices became one of the methods, as well as a civilizing medium, for arranging and standardizing social relationships in the absence of religious images in secular societies (Miller, 2004). In this way, people could govern themselves in light of their own ability to reason, which was validated with numbers. Following the European enlightenment, the quantification of everyday life has historically emerged as a crucial agency for governing the self and society (Porter, 1995). Nevertheless, the technology was not about the inculcation of numbers. On the contrary, it was about the production of objectivity in social relationships and the guarantee of trust among people as citizens. Life, which had been uncertain, was planned and organized through the objective qualities of numbers that appeared outside of politics and culture (Rose, 1999). These were the processes for developing standards of communication, participation, and social relationships in everyday life; historically, these were embodied in modern pedagogy and related educational reforms.

The governing technologies of numbers, such as accuracy and precision, have gained an important place in past and present-day school mathematics practices in Western countries (Yolcu & Popkewitz, 2019). In Turkey, however, the tasks of teaching solutions for real life problems and developing the related sensibilities in the problem-solving child were not always accomplished through numbers. At the end of each unit in the mathematics textbooks, there was a set of numberless problems, called *adetsiz meseleler*:

> How do you organize your income and expenses? How do you organize your weekly home budget? How do you find out what percentage of your weekly income your weekly expenses represent? How do you calculate the amount of money that is reserved for food, if you know your home expenses and the percentage that is reserved for the food? (METC, 1933a, p. 54)

Although the problem was about percentages and proportions in budget calculations, the issue was not represented in numbers nor were students required to produce a precise numerical answer. The focus was instead on how to do calculations, which procedures to follow, and methods for arriving at solution methods, rather than on the solutions themselves. In these spaces of school mathematics, the construction of self-governed citizens was, with the overarching goal of self-validation, based more on duties and procedures than on numbers. Turkey's problem-solving child, then, was not only a person who could tell the truth in numbers, but also a subjugated body who follows particular procedures and solution-oriented methods without the guidance of numbers. This is not to say that one form was superior to the other, nor was this an indicator that "numberless problems" were lacking something. It was, however, an important disconnection from the Western construction of numbers, which arranged and standardized daily life and social relationships. Here, a different type of objectivity was constituted to ensure the prevalence of reason and rationality in human conduct during everyday life. Without mirroring the Western experience with numerical practices, this approach connects with life's modern construction and rationality. The desire to plan social life with problem-solving procedures manifested a reconceptualization of "civilized" conduct and participation that simultaneously differentiated modes of life.

From Scientific Minds to Disciplined Bodies

The issue was not limited to changing people's behaviors; it extended to working on their souls and disciplining their bodies, using their own reason and rationale. This was meant to eliminate anomalies in classrooms and in society:

> Teachers should have students adjust disciplinary principles and rules by guiding them to conceptualize those principles as a necessary part of the work instead of exercising them through brute force. The student who starts to think that discipline is indispensable to efficiency should genuinely find it necessary; therefore, discipline should enter children's souls and live in the school climate. The student who is accustomed to working in a disciplined environment begins to be concerned about any undisciplined action and thus avoids anomalous actions as often as possible. (MC, 1936, p. 13)

Here, the making of the desired modern citizens was registered as a discipline problem. The modern space of Turkey was arranged with those desired bodies who developed disciplined work habits based on a sense of duty drawn from their "scientific minds." In this way, the social order and national interests would not be disrupted. Nevertheless, that space simultaneously embodied fears of others who had not developed such work habits and beliefs. That fear necessitated pedagogical tools and tactics meant to cultivate "the soul of discipline and order" in each individual, in the interest of national progress and development:

> Although the teacher will try to agreeably instill the soul of discipline and order in the student, he or she will consistently discipline the student by speaking, persuasion, signaling, and warning if necessary, all by strictly not tolerating any [untoward] actions from the student who has not adjusted him or herself to discipline and order […] Our teachers should always remember that the soul of discipline and order, which is to be instilled in the members of the nation and met with great interest and care from each, is an important factor for elevating the nation. (MC, 1936, p. 14)

The social and historical rationale for public education was to create self-governed, productive citizens for the modern nation state, in contrast to the Ottoman people, who were loyal to their sultan (Akyüz, 2015). However, the processes for producing the desired scientific minds authorized a sense of duty with regard to discipline and order in the social and cultural spaces. In the case of school mathematics, children were to "regularly solve problems," and this order needed to proceed by having students "regularly keep a notebook" to "make the mind work systematically" (MC, 1935, p. 5). Solving

the problems of daily life without numbers was a means of working on children's inner characteristics, changing their souls, and cultivating another faith: in following procedures in the interest of national progress and development. In addition to the fashioning of the desired problem-solving children and their differences, this situation embodied the construction of not-yet-fit bodies, i.e., bodies that had not been disciplined or had no faith in the existing order.

Making Not-Yet-Fit Bodies: The Precautionary Pedagogies of School Mathematics

In mathematics classrooms, one of the issues concerned paying attention to "backward students" in addition to "mathematically superior students" by taking "various precautions" (*muhtelif tedbirler*). Teachers were asked to investigate the in- and out-of-classroom causes of this backwardness (MC, 1936, p. 11), so that "backward students" could be identified, appropriate interventions could be made, and the students could be reformed in alignment with the desired body of the nation. Although the curricular texts at the time did not specify any methods and practices for identifying "backward students," the inquiry was concerned with the child him/herself as well as his/her environment outside of school; that is, the reason for the child's backwardness was also perceived as a social problem, thus placing some responsibility on the family and the community. This was unsurprising considering 20th-century school reforms where the pedagogical strategies incorporated universal standards and norms for modes of life. The trilogy of child, family, and community historically became a way of "seeing" the notions of deviance and disorder (Popkewitz, 2008). In mathematics education reforms in particular, the fact that mathematics had fallen into disuse in daily life was taken as a threat that could generate masses of unintelligent, inefficient citizens who were "backward", "undeveloped," and "uncivilized" (Yolcu & Popkewitz, 2019).

As has been argued in previous sections, the knowledge and practices of mathematics education were particular technologies for making citizens for modern Turkey. Nevertheless, becoming a citizen of the newly-established modern nation state was a performance that was measured based on one's degree of loyalty to the secular state and its prescribed way of living (Bora, 1996). In the context of mathematics education, this performance was about solving the problems of daily life; however, it also consisted of a specific set of practices to make persons faithful and disciplined. Modernization processes revealed a fissure between the Ottoman Empire and the modern republic with respect to social, cultural, and educational practices, as has been explored in the above sections; the former is represented as anti-modern or traditional, associated with the darkness and decay and constructed pathologies as objects of intervention. The amalgam of knowledge and practices of school mathematics did not polarize the problem-solving child and its other. However, the pathologized qualities of being and acting were materialized as not-yet-fit bodies that were to be corrected to become part of the new desired society.

School mathematics, here, was not only exercised as an administrative practice of governing humankind as faithful and disciplined bodies, but also as an intervention device for identifying and restraining those "unruly" bodies located outside the bounds of normalcy. In addition to the inquiry into why students were "backward," pedagogical spaces were rearranged according to particular solutions, such as making the problems "relevant" to children's everyday lives as well as the local environment, while also focusing on "routine problems" that would attract children's interest (MC, 1936, pp. 158-159). These educational solutions had little to do with mathematics as a subject matter. They were practices that individualized the social and cultural questions and societal problems. That is, Turkey's continual crisis (i.e., leaving the traditional past behind in order to attain the enlightened future) was reduced to a psychological problem: asking whether the child is interested in solving the problems of daily life.[3]

[3] Historically, pointing out psychological constructs such as "interest," "dislike," or "motivation" has been a way to talk about differences while also becoming tools for situating larger social and political problems in individual states of mind and personality traits. Changing the individual and his/her family and community aimed to secure the social and moral order and maintain power relations (see Rose, 1985).

The comparison of "old" and "new" produced spaces that mathematics education practices sought to transform in an attempt to "rescue" children from their "backwardness." While that space acknowledged backward students' existence, it generated a cultural field that was ordered with daily life issues, such as budget planning and insurance and tax payments. Linking precautionary practices with children's everyday lives and local environment was a strategy for inculcating "modern" ways of being and acting, which needed to be adopted by all in the interest of national progress, well-being, happiness, and pride. The "all," here, assumed two kinds of children: those categorized as "clever students" and those students who "lacked understanding" (MC, 1936, p. 29). The latter were not differentiated only because of their mathematics ability; the desired children for the newly-established state were expected to solve the "problems that were relevant to the nation" and do "homeland geography exercises" (MC, 1935, pp. 5-7). As previously mentioned, school mathematics, at this time, was "a living tool placed in teachers' hands to develop children's interest in the numerical processes inherent in national issues" (MC, 1936, p. 21). Those children who "lacked understanding" were, in the early republican years, seen as not having accomplished the aims of school mathematics, and so they were classified as "backward" and in need of pedagogical interventions that could stimulate their interest. When teachers "saw" children's "incompetence," they were expected to work hard to "eliminate" those "deficiencies" by having such children do "exercises with uncomplicated numbers" (MC, 1936, p. 160).

"Memorization" and "high repetition" were not recommended as effective mathematics teaching and learning methods, since problem solving involves both "reasoning" and "habit" (MC, 1936, p. 161). That reasoning, nevertheless, had little to do with mathematics. Reasoning as a superior alternative to memorization sought to cultivate specific habits, such as "enterprise," "investigation," and "creation:"

> Memorization of prepared, stereotypical proofs and solutions to problems does not provide [students with] the opportunity to reason and think; on the contrary, this situation constructs people who are in need of other's mercy and help, thus damping down their qualities of enterprise, investigation, and creation. (METC, 1933a, p. v)

The desired habits also reflected those characteristics that were feared. For instance, waiting for others' help was not proper for a "steady character" and the nation's "strong bodies" (MC, 1936, p. 11). The child's redemption from his/her "backwardness," then, consisted of institutionalized discipline and control mechanisms that order the pedagogical space and the society. Put differently, educational solutions, which aimed to rescue "backward children," were rather a set of government technologies working in and through their bodies to cultivate particular modes of life, including the habits of "enterprise," "investigation" and "creation." Although these habits allowed for action and participation in the social and cultural spaces, it was not about broadening those possibilities. In other words, they constituted a controlled, administered disciplinary space for being and acting as proper citizens of the newly-established modern nation state.

Problem-solving processes were divided into stages and standardized procedures, including "understanding the problematic situation," "identifying the desired outcome," "making applications," "performing related calculations," and "exercising control" (METC, 1933a, p. 2). Problem solving, here, was not merely about psychological inscriptions that would pique children's interest in mathematics. Together with the proposed structure and its processes, it was also about social inscriptions in which a disciplinary space was constructed for self-governed citizens to prevent social and moral disorder. That is, following the problem-solving sequence had little to do with arriving at the solution; it was more about inculcating norms and standards of communication in those regulatory spaces. For example, teachers should guide their students to "clearly express" what they have done and would do at every stage of problem solving. In addition, teachers should have their students independently "control" their results (MC, 1936, pp. 158-159). Expressing the actions they performed in clear ways was about learning how to act and participate in those social spaces in a controlled manner, without brute force. Here, the political anxiety was about the reformation of the child as a problem solver and the domestication of

the not-yet-fit bodies through "inculcation of controlling the results" (MC, 1935, p. 5). In that way, both social and moral order were "constructed, shaped, organized, and re-educated through disciplining the body, imposing habits and regulating via tactics of calculation" (Rose, 1985, p. 26). Hence, the twin tasks of identifying individual differences and acting upon them with pedagogical interventions were rather about the reformulation of moral treatment.

Conclusion and Implications

The purpose of this study has been to examine the cultural spaces of school mathematics that produce the "problem-solving child" as an object of teaching and intervention through mathematics education practices during Turkey's early republican years. The analysis highlights how pedagogical practices that differentiate proper and improper modes of life desired for the future assemble with the cultural-historical conditions and political context, such as the foundation of a republic, the desire to build a modern nation state, and the processes of fashioning the modern self and an intelligent citizenry. To secure the social order, the normalized modes of life are materialized in faithful, disciplined bodies. This process simultaneously constructs, during Turkey's formative years, not-yet-fit bodies that are referred to as "backward" children and are viewed as needing to be "rescued" from their "unlivable" zones. The process generates the differences between the modern self and its other through mathematics education discourses and practices. These differences produced inequalities by labeling children as "backward" or "lacking understanding" and prescribing differentiated pedagogical practices for them. In other words, modernization efforts and the making of the modern self have been connected with the desire to produce problem-solving children in the cultural spaces of mathematics education, giving rise to various kinds of people and their differences, and creating inequalities by ordering differences hierarchically.

Turkey's modernization processes have a nuanced set of assemblages that gave meaning to schooling-related hopes and fears. In this paper, historical explorations denaturalize the belief that modernity in Turkey is a copy of the West or a fabrication of the Western way of thinking along the cultural spaces in Turkey. More specifically, as the problem-solving child travels through Turkey's cultural and pedagogical spaces, he/she entangles with different sets of assemblages, flows, and networks. Therefore, it is necessary to rethink the statements in the mathematics education programs or textbooks in their own context. For example, numberless problems diverge from the social history of numbers in Western societies, but they connect with the desire to constitute norms of action and administer faithful, disciplined bodies' participation in social life. These practices reveal that non-European modernizations have their own unique trajectories, creatively combining Western influences and local practices that ultimately generate much more complex modernization processes and cultural identities (Çınar, 2005). Therefore, historical studies that analyze the formation of the modern subject in different times and spaces are needed to examine the cultural policies of mathematics education. In other words, both in mathematics education and in other subject areas, research on educational history ought to examine cultural spaces by placing subjectification processes on its radar; further, historical studies ought to go beyond descriptive content analysis. For example, what historical, political, and cultural conditions assemble with the organization of statistics and probability as one of the content areas for holistically approaching statistical thinking at the turn of 21st century (Ader, 2018)? Within these processes, what kind of a child is prepared for the uncertainty of life and how are his/her distinctions made in relation to previous years?

Taking modernity as an attitude toward the present rather than a chronological period between pre- and postmodern, as Foucault (1984) would argue, provides an analytic tool to shed light on contemporary practices and explore its limits, simultaneously avoiding totalizations and grand narratives. Pedagogical inscriptions pertaining to closing the achievement gap in contemporary educational reforms and renewed curricula ignore the historical processes that produce differences between children and their relationships with culture (Gutiérrez, 2008). The suggested pedagogical solutions seek to change children by locating the differences as internal qualities and pointing to the child as problematic. Nevertheless, the theoretical and methodological framework used in this study

highlights how inequalities become possible, together with cultural and historical conditions. The findings have drawn attention to the cultural and historical spaces rather than "innovative" approaches, placing an emphasis on the analysis of discourses and practices that produce differences between children, i.e., inequalities, and how the problem-solving child becomes an object of teaching and reform, instead of positioning children and their families as problematic.

The historical analysis of school mathematics proposes that greater attention be paid to cultural and pedagogical spaces that shape children and their differences within a local context. This article reconsiders the principles of school mathematics as constituting a cultural practice for constructing the national identity and selecting the nation of Turkey's citizens, while creating others who are yet to be part of it. In mathematics education research, Doğan and Haser (2014) also reported that mathematics curricula and textbooks embody nationalist discourses in the Turkish context. They examined nationalism through an analysis of the lives and cultural practices that are represented in these texts. According to their analysis, mathematics curricular materials represent a single language and a single religion, in which context the existence of various ethnic groups or non-Muslim citizens has remained unnoticed. This paper makes a different argument. The notions of what is distinctively and "truly" characteristic of a citizen of the newly-established modern nation state were not independent from those non-citizens or not yet reasonable and desirable persons who were called not-yet-fit bodies; such children were labeled as "backward," "lacking understanding," or "uninterested." Here, the comparative mode of reasoning authorized normalized and pathologized ways of being and acting. Specifically, mathematics education practices inscribed the "problem-solving child" as a model of the national identity, where its subjectifications relied on others who were to be seen, diagnosed, and correctively reformed. The precautionary pedagogies for including others in the "all" simultaneously legitimize divisions and exclusions without creating a single category for the excluded. That is, school mathematics curricula, teaching methods, and psychologies of learning embodied epistemological principles of inequality and the making of differences. These practices and the pedagogical gaze collectively constituted paradoxical unities with respect to the problem-solving child and its others instead of representing a particular ethnic or religious identity (Diaz, 2017; Yolcu & Popkewitz, 2019). Pedagogical principles such as controlling the answers or inculcating solutions and standards fashion scientific minds and identify some as the desired student and some as the others. Put differently, while hoping for a modern self in the form of a problem-solving child, the fear of the existence of the other and intervention efforts are fed by a style of thinking that facilitates the presence of inequalities and maintains the power relations.

In conclusion, the style of thinking that compares children as either backward or enlightened, or that orders school mathematics as either modern or conventional is not merely about social actors' intentions. Such thinking (re)produces differences between children through "precautionary" pedagogies that seek to solve "incompetence" in children. Hence, pedagogical precautions that classify students as either mathematically capable or "backward" are political practices that generate inequalities. Here, it is important to mention how psychological practices enter the school mathematics curriculum not only as a way of distinguishing two kinds of people (such as the problem-solving child and its other), but also as a set of precautionary measures for not-yet-fit bodies who are taken as educational objects and sites of pedagogical intervention. Those precautionary pedagogies have little to do with mathematics as a subject matter. As findings reveal, the precautionary pedagogies suggested in the curricular documents are normalization strategies of training or, so to speak, disciplinary measures for unruly bodies through the domestication of their actions and participation. Furthermore, these pedagogical practices were specific technologies for governing the soul, as they inscribed desired modes of thinking and sensibilities. The psychological gaze, here, is an inculcation of norms and standards to secure the social order, generate livable and unlivable cultural spaces, and maintain power relations. Therefore, this study introduces a different perspective to the field by arguing that inequalities are the product of a complex, multifaceted cultural–historical–scientific process and not the reason that requires psychological solutions or "new" educational reforms.

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