

**A TEST DEVELOPMENT STUDY FOR EVALUATION OF PRESCHOOL CHILDREN'S
SCIENTIFIC PROCESS SKILLS**

Fatma Şahin
Marmara University

Mehtap Yıldırım
Marmara University

Hikmet Sürmeli
Mersin University

İlknur Guven
Marmara University

Scientific process skills have been increasingly emphasized in science education. Researchers agreed on these skills promote conceptual understanding of science and scientific inquiry, and also scientific literacy. Considered these studies, many countries stressed scientific process skills as an integral part of their science curriculum. In Turkey, National Ministry of Education has included scientific process skills in the last three science curriculum 2004, 2013 and 2017. Preschool teaching program standards in Turkey emphasized that care should be taken to using scientific process skills in the activities. The program encourages the child to recognize his/her surroundings, to ask questions about his/her curiosity, to explore, to discover and to learn by doing. Besides many science activities, such as; observing living and non-living beings in the nature, make a discovery and use simple tools, preschool science activities in the program also include experimentation, concept learning and analogy. These activities aim to children to pay attention, to ask questions, to observe, to examine, to search and to explore (MEB, 2013). The purpose of this study is to develop and validate a Scientific Process Skills Test (SPST) in order to assess preschool children's skills appropriate for the scientific process skills in preschool education. This test will be an alternative assessment for researchers for their studies. For this purpose, the answers of the following questions have been searched: 1-To what extent the SPST is valid in order to measure the preschool children's scientific process skills? 2- To what extent the SPST is reliable in order to measure the preschool children's scientific process skills? The sample of this study is composed of 212 preschool children (aged 5,6 years). The study was conducted in four different preschools which two of them were state preschools, others were state preschool classes of primary schools in Istanbul. Older age groups of children (5-6 ages) in these schools were participated to this study during 2014-2015 and 2015-2016 academic years. The first pilot study of the test was applied to 32 children in a state preschool class of primary school. The second pilot study was applied to 180 children in two state preschool and one state preschool class of primary school and also children participated in the first pilot study. Both of the pilot studies were applied to the older age groups of primary school children. During the development process of the SPST, in the first step, in the scientific process skills appropriate for preschool children were determined from

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the literature and 20 items related to these skills were prepared. This test was applied to the sample. In this study, during developmental process, a multi-form test was prepared appropriate for measurement and evaluation techniques. In the first step of test development process, early childhood scientific process skills were examined in literature and determined as observation, measurement, classification, prediction, interpretation and communication. In the second step, type of the questions that is used to determine the children's scientific process skills have been decided. Care has been taken to ensure that the questions in the test were consistent with the skills. For this reason, besides the multiple-choice questions, three open-ended questions were also prepared for the test for which the children were expected to make inference. Children's ages and skills were considered during preparing the test items. Related with six different scientific process skills, 20 questions were prepared including 16 multiple choice questions, 3 open ended questions and a performance-based question. Each multiple-choice question consisted of four options. After preparing test items, the test was applied to the 32 preschool children in one school in order to understand the readability of the test items, intelligibility of the figures and drawings, to remove the terms that were difficult to understand from the test, and to determine total time required for answering the questions. With this first pilot, various corrections and adjustments have been made on some expressions and figures that students had difficulty in understanding. The prepared test was presented four questions that children had difficulty in understanding. The prepared test was presented to three experts who have studies about preschool science education in order to determine whether there were scientific errors both in the questions and in the options and also to test the content validity of the test. After reviewing process, final form of the test was prepared as consisting of 12 multiple test questions, 3 open ended questions and a performance-based question. The second pilot test was applied to the 180 children in four different schools in order to find construct validity and reliability and also to perform item analysis of the test. As a result of the application, the correct answers for the multiple-choice test items were scored as 1, and the wrong and blank answers were scored as 0. The correct answer and the performance questions were scored in the same way. In this study, a Scientific Process Skills Test was developed to measure preschool children's scientific process skills. For this purpose, 20 test items were prepared. At first step, the preliminary test was applied to a group of 32 children in order to test the understandability and readability of the test items. Four items were eliminated from the test since the children had difficulty to understand. The test was presented to the experts' opinions to determine the content validity. After reviewing process, 16 item test including twelve multiple choice, three open ended and one performance questions were prepared. To test the construct validity, hypotheses test technique was used and the results showed that hypotheses were supported and test items measure the test structure correctly. To test the reliability of the SPS test, internal consistency analysis was applied. Kuder Richardson-20 and Cronbach alpha coefficient were calculated and found to be .68, .68 respectively for multiple choice items. Consistency analysis for open ended and performance questions were also done by two academicians. Kappa statistics between to academicians was calculated. Remarkable characteristics of the SPS test were average