THE FAGAN TEST OF INFANT INTELLIGENCE

MANUAL

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Introduction

Achieving the prediction of later intellectual ability from infancy has challenged investigators for over 50 years. On standard intelligence tests, children are asked to encode and retain new information, to categorize stimuli, and to retrieve useful information. Methodological advances in the field of infant visual perception and recognition memory have made it possible to show that the infant is capable of encoding, retaining, categorizing, and retrieving visual information. Intelligent activity in the infant as indexed by visual information processing can be measured and is, in fact, predictive of later intellectual performance.

The Fagan Test of Infant Intelligence (FTII) is the culmination of 20 years of basic research on infant visual perception and recognition memory abilities and 10 years spent developing a clinically useful test for diagnosing infants at high-risk for later intellectual deficit. The Fagan Test of Infant Intelligence is the first commercially available test that predicts later intellectual performance for high-risk infants at an acceptable level of accuracy.

The advantages of the Fagan test of Infant Intelligence go beyond simply assessing cognitive normality or deficit for high-risk infants. As a research instrument, the Fagan Test of Infant Intelligence offers the possibility of eventually understanding the causes of mental retardation in high-risk infants, causes that are evident during infancy. More importantly for those who care for infants, use of the Fagan Test of Infant Intelligence means that the parents of the majority of high-risk infants can be spared several years of anxiety and encouraged to treat their infants as intellectually normal. Those parents of high-risk infants identified by the Fagan Test of Infant Intelligence as suspect for mental retardation can be encouraged to seek intervention programs to alleviate the effects of the deficit.

Although the Fagan Test of Infant Intelligence has behind it several years of systematic study, research does and will continue. You, as an administrator of the Fagan Test, may participate in that research by sharing your observations with us. With the data obtained, we will be able to further refine the test and increase our knowledge about the causes of and, we hope, the remedies for mental retardation.

The Manual details the data in support of the Fagan Test of Infant Intelligence, and presents the information you will need to correctly administer the test to high-risk infants. You are encouraged to contact us with your questions about the test itself, or about test administration. We also welcome your suggestions on how to improve any aspect of the test. We appreciate your using the Fagan Test of Infant Intelligence as a clinical tool in your evaluation of infants and we are here to facilitate your use of the test and in any way that we can.

The Fagan Test of Infant Intelligence: A Technical Summary

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The article, by Joseph F. Fagan III and Douglas K. Detterman, summarizes data on the psychometric properties of the Fagan Test of Infant Intelligence. The Fagan & Detterman article is presented here, in edited form, to serve as an introduction to the Fagan Test. Following a brief discussion of the empirical basis of the Fagan test, a note on the theoretical rationale underlying the test, and a summary of the development of the test, the Fagan test is presented including a description of the Fagan test, data and discussions on reliability, validity, and clinical utility, and notes on issues such as cross-cultural utility. The discussion concludes with a section on practical implications raised by the transfer of the Fagan test to professionals who are interested in high-risk infants.

The *empirical basis* for the Fagan Test of Infant Intelligence rests on the fact that individual differences in the processing of information during infancy are linked to individual differences in performance on standard tests of intelligence later in life. A basic measure of the processing of information is the tendency of the infant to look longer at a new target than at one previously seen (Fagan, 1970). Studies of the infant's preference for novelty have shown that the abstraction of information is a robust phenomenon during infancy.

Tests of visual novelty preference tell us that the infant has the ability to know the world. If such processes of knowledge acquisition underlie performance on intelligence tests later in life, it is justifiable to assume that their exercise early in life represents intelligent activity on the part of the infant. Hence, it comes as no surprise to find that measures of visual novelty preference derived during infancy are related to later intellectual functioning. Various meta-analyses (Bornstein & Sigman, 1986; Fagan & Singer, 1983) have found median correlations of about .45 between infant performance and later IQ. Studies employing more tests of visual novelty preferences and/or sampling from populations with a wider range of IQ have yielded somewhat higher correlations between early novelty preferences and later IQ. Fagan and Montie (1988) report a correlation of .49 between a test of 12 visual novelty problems administered to 128 children between 3-7 months and scores on standard intelligence tests at 3 years (IQ range = 25-135). Similarly, Rose, Feldman, & Wallace (1988) report coefficients

between .40 and .60 for aggregates of 6-11 visual novelty tests administered at 6, 7, or 8 months and IQ scores at 3 years (IQ range = 59-120). In short, there is a significant and well-established link between early preferences for visual novelty and later intelligence.

The *theoretical basis* for the Fagan Test of Infant Intelligence (see Fagan, 1984b) is predicated on the assumption that intelligence consists of a small set of basic processes for the acquisition of knowledge: processes which are innate, relatively automatic, dependent on neural integrity, and continuous with age. The assumption is that the processes by which infants distribute their attention to novel and previously exposed stimuli are, fundamentally, the same processes employed by older children and adults in solving intelligence tests. If infants vary in the speed with which they execute the basic processes of knowledge acquisition, then what we later measure on an intelligence test, when we ask for knowledge-based answers, is the long-term result of the interaction of speed of processing with the environment the child has been allowed to process (see Fagan, 1984b). Thus, proceeding from theory, if we wish to measure "intelligence" in the infant, the best approach is to use a paradigm such as selective attention to novelty that tests the infant's ability to process information, to limit time for problem solution so that initial speed of processing is tapped, and to pick discriminanda from a set of items having familiar distinctive features (such as faces), so that the interaction of innate speed of processing with the infant's exposure to real-world stimuli comes into play. All of these principles were followed in the development of the Fagan Test of Infant Intelligence.

The basic component of the Fagan test is a "novelty problem" composed of two pictures on a pivoting stimulus presentation stage as shown in Figure 1.

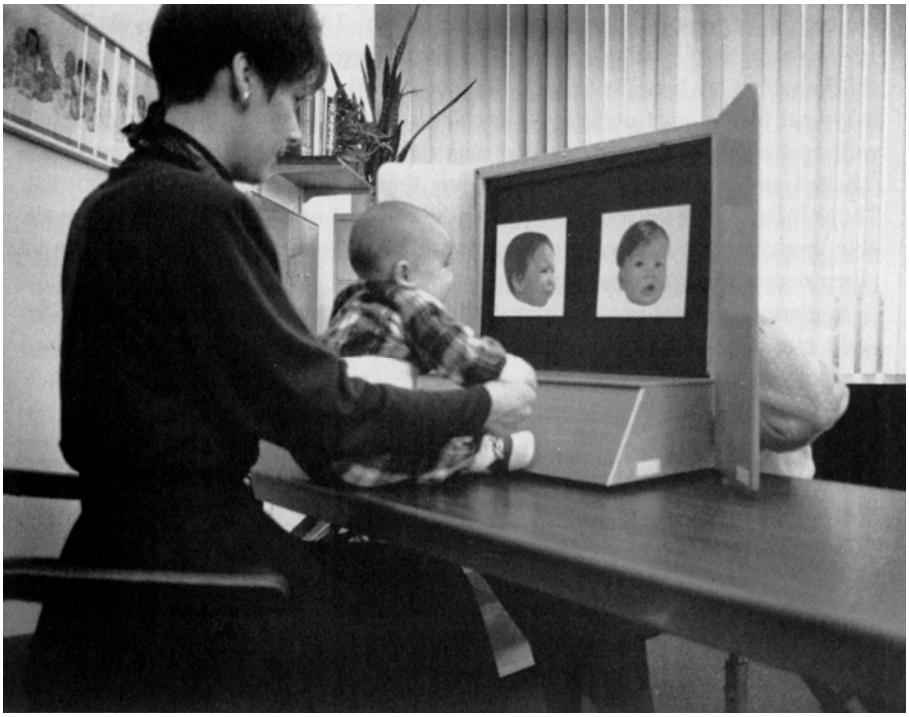

Figure 1

For each novelty problem, the infant is first exposed to a stimulus, such as a picture of a woman's face, until he or she has looked at it for a standard period of time. The study time may vary from 6 to 60 s depending on the infant's age and the nature of the stimulus. A tester, sitting behind the apparatus out of the infant's view, observes the infant's visual fixations through a peephole and records the length of the fixations by pressing a timing key on a computer. When the standard study time has been reached (infants vary in the amount of real time taken to reach the standard), the tester withdraws the picture from the infant's view by pivoting the stage. The previously seen picture is then paired with a novel picture, such as a new woman's face, and the two are presented to the infant simultaneously for a standard test time (usually 3 to 5 s). Right-left positions of the pictures are switched midway through the test phase in order to control for side preferences. The tester records the amount of viewing time devoted to each picture on the computer. The computer is programmed to compute a "novelty score" which, simply, consist of the amount of fixation during the test phase devoted to the novel picture divided by the total fixation time to both the novel and familiar picture, multiplied by 100.

The particular novelty problems used in any version of the Fagan test were based on findings from previous studies which suggested that normal infants at a specific age were able to make a certain discrimination. Novelty problems were constructed to tap emerging cognitive abilities at several different ages within the first year (e.g., the infant's changing ability to recognize faces; Fagan & Shepherd, 1982).

The goal of the Fagan test of Infant Intelligence is to differentiate potentially normal from potentially cognitively deficient infants within groups of infants suspected to be at risk for later intellectual deficit due to various prenatal or postnatal conditions.

Early studies by Fagan, Singer, & Montie, (1985), Fagan & Montie (1986 a, b.), Fagan, Singer, Montie, & Shepherd (1986), Fagan & Montie (1988) showed that the Fagan Test of Infant Intelligence, as then developed, represented a valid means of assessing infant cognitive function and was predictive of later intellectual function within groups of infants at high risk for later mental retardation. In addition, the use of the Fagan test for the detection of cognitive deficit in high-risk populations was as valid for infants who would later be mildly retarded as for those who would be severely retarded. Based on these results, a new version of the Fagan test was developed consisting of tests given at 6, 7, 9, and 12 months postnatal age (corrected for prematurity). Each test is composed of 10 pairings of a previously exposed and a new face. It is this 40 item test that has been made available to health-care professionals through Infantest Corporation.

The *current status* of the Fagan Test of Infant Intelligence, as distributed through Infantest, will now be considered. The 16 pictures (see **Appendix A**) and 10 pairings of targets making up the original version of the Fagan Test of Infant Intelligence, the version currently in use at 27, 29, 39, and 52 weeks postnatal age (corrected for prematurity), are shown as the novelty trials in **Appendix B**.

The sample tested to establish norms for the test and to provide initial reliability and validity estimates included 241 children tested as infants and followed until 2 or 3 years old (222 whites, 19 blacks) from middle-class homes (parental education: M = 15 years), the majority of whom (205 children) were full-term infants at low risk for later intellectual deficit. The remaining 36 children were at higher risk for later retardation for a variety of reason (e.g., prematurity associated with complications). At 3 years 149 of these children were revisited and tested with the Standford-Binet (Fourth Edition;

Thorndike, Hagen, & Sattler, 1986) and the Peabody Picture Vocabulary Test (Dunn & Dunn, 1981). These other 92 infants were seen again at 2 years tested with the Bayley Scales of Mental Development (Bayley, 1969).

The mean novelty preferences scores across ages for infants tested with the Fagan test items are given in **Table 1**. An extensive discussion of the *reliability* of the Fagan test is given in Fagan & Detterman (1992). The reliability estimates for the Fagan test permit a quite high validity, assuming that the outcome criterion test (e.g., the Stanford-Binet) is itself highly reliable. For example, for a three-session administration of the Fagan test, the possible predictive validity of the Fagan test can be as high as .63.

To test the *predictive validity* of the Fagan test, each child was given a mean novelty preference score for all pairings of novel and previously exposed items over test sessions. The minimum number of items composing a mean score was 20, the maximum, 40. In each sample, mean novelty preference scores were correlated significantly with later intellectual functioning, that is, the test proved to be valid. For 149 children the relationship between the Fagan test and the Stanford-Binet was .31 (df = 148, p <.001) and for the PPVT-IQ was .34 (df = 148, p <.0001). Each child in that sample was also assigned a mean IQ score at 3 years combining the Stanford-Binet and PPVT scores. The mean of those mean IQ scores was 108.0 (SD = 12.1, range = 65.5-136). Mean novelty scores and mean IQ scores correlated .36 (df = 148, p <.001). The correlation between the mean novelty scores for the 92 infants in the sample tested with the Fagan test and their Bayley MDI scores at 2 years was .29 (df = 91, p <.001). Of the 92 infants in the second sample, 31 were considered at risk for later cognitive deficit due to prematurity or various perinatal complications. The mean novelty preference score for those 31 infants was 60.3 (SD = 4.6) and their mean MDI at 2 years was 111.8 (SD = 19.9, range = 55-148). The relation between mean novelty scores on the Fagan test and MDI scores at 2 years was high and significant at .45 (df = 30, p <.006).

To obtain another estimate of predictive validity, we performed multiple-regression analyses (using list wise deletion of missing cases) in which all 40 novelty tests were used to predict outcome IQ (the mean of the Stanford Binet and PPVT for 149 infants or on the MDI at 2 years for the sample of 92 infants. For the 149 infants a multiple R of .43 was obtained. For the 92 infants, the multiple R was .57. In sum, the

predictive validity estimates of the current version of the Fagan test obtained in the present study, as well as in other published studies, may be characterized as significant and as moderate in value for samples of essentially low-risk children.

But predictive validity coefficients mean little to a clinician who wishes to characterize a particular infant. The real worth of the Fagan test is its clinical relevance for the diagnosis of mental retardation. Clinical relevance for the Fagan test was tested by dividing the children in the two samples of 149 and 92 infants into those with IQs or MDIs of < 70 and those with IQs or MDIs >70, and by further dividing them into those with mean Fagan test scores $\leq$53.0% and those with Fagan test scores >53.0%. The Fagan test, regardless of group tested, was 100% sensitive to the presence of later retardation and was highly specific (specificity ranged from 91.8% to 98.9%) in detecting normal cognitive functioning. In summary, the present study demonstrates that the Fagan test, if administered repeatedly during infancy, may lead to very high prediction of later intellectual deficit or normality.

One issue that has been brought to our attention regarding the use of the Fagan Test, is the issue of *cross-cultural utility*. Because the targets used in the original form of the Fagan test are photographs of white faces, there may be some question whether infants from cultures or subcultures where white faces are unusual would react to the test as would white infants. To answer the question of cross-cultural utility, a study by Fagan et al. (1991) compared the performance of four culturally and racially diverse groups of infants on the Fagan Test of Infant Intelligence. The sample consisted of 188 infants: 53 white Americans, 54 black Americans, 27 black Ugandans, and 54 Arab infants from Bahrain. Fagan tests were administered at 27, 29, 39, or 52 weeks corrected postnatal age. The various cultural groups did not differ in preferences for novelty in general, nor did their scores interact significantly across the four ages or 10 test items within an age. The mean differential fixation to novelty scores and standard deviations of these scores were virtually identical across groups at 59.1% (*SD* = 6.2), 58.8% (*SD* = 7.9), 59.0% (*SD* = 4.7), and 59.6% (*SD* = 6.5) for the American black, American whites, black Ugandans, and Bahrainian Arabs, respectively. In short, items on the Fagan test appear to be free from cultural bias.

TABLE 1
Mean Novelty Preference Score at 27, 29, 39, and 52 Weeks

Test Age (weeks)	*M*	SE_m	*SD*	Range	*N*
27	59.0	.7	7.2	41.7–75.5	100
29	60.1	.6	6.6	44.2–74.4	122
39	58.3	.7	7.6	31.3–75.8	136
52	59.9	.5	6.5	42.3–77.7	145

A number of *practical implications* arise from the fact that it is now possible to predict which infants at high risk for later intellectual deficit will actually be intellectually delayed later in life. Because these implications have been addressed in various publications (Fagan, 1984b, 1990, 1991; Fagan & Singer, 1983; Fagan et al., 1986), we will mention them briefly here. For individual children there are benefits to early diagnosis. In the studies conducted thus far, it is typical for the vast majority of high-risk infants (about 85%) to do perfectly well on the Fagan test. Hence, the majority of parents can have their anxieties relieved and can be encouraged to view their infant as intellectually normal. Those infants who do score poorly can be referred as early as possible to available programs for follow-up testing and for intervention. Their parents can be given necessary emotional support.

Society in general profits from the fact that researchers can now look for the early causes of mental retardation. Until recently, 4 to 6 years typically passed before retardation in the 50 to 70 IQ range could be diagnosed, an IQ range encompassing almost 90% of retarded children. The development of the Fagan test means that the lead time on prospective studies of the causes of mental retardation can be cut to 1 year or less. The Fagan test is now in use in over 300 centers in the United States and in various other countries. Investigators are using the Fagan test to study the possible effect exposure to various substances such as PCBs, alcohol, lead, cocaine, and mercury has on intellectual development. Others are exploring the effects of nutrition, iron supplements, and specialized feeding formulas on early intellectual functioning. The cognitive sequelae of maternal HIV infection, intrventricular hemorrhage, bronchopulmonary dysplasia, failure to thrive, intrauterine growth retardation, genetic anomalies, and various neurological abnormalities are also being assessed. The Fagan test is being

employed to study the genetics of intelligence using samples of adopted children and twins. The contribution of specific rearing factors to early cognitive functioning is being explored. Finally, variants of the Fagan test have been developed for use with monkeys and with rats so that animal models of early cognitive functioning can be established.

In brief, recent advances in the study of higher cognitive functioning in the infant, via the observation of preferences for novelty, have led to the development of a valid test of early intelligence. It should be kept in mind that the Fagan test has been developed for the early detection of later mental retardation and should not be used for routine screening with normal populations. In clinical use, the Fagan test should only be given to infants suspected to be at risk for later cognitive deficit. Used properly, it is possible that the early measurement of intelligence via the Fagan test (and tests like it) will result in the identification of some of the causes of mental retardation. The practical benefits of the new technology aimed at the early diagnosis of cognitive deficit are currently in the process of being realized by the transfer of the technology to health-care professionals engaged in basic research, clinical research, and in clinical application.

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Equipment List

The Fagan Test of Infant Intelligence is meant to be used as a complete, self-contained diagnostic system. The following components are included in the system:

Portable Viewing Stage

The portable stage is made of wood, weighing about 2 lbs.

Test Pictures

A complete set of test pictures includes: two each of pictures A, B, D, and HIJ; one each of C, E, F, G, K, L, M, N, O, and P. See **Appendix A**. When, eventually, the pictures show signs of wear, contact Dr. Fagan to place an order. Please note that all test pictures are copyrighted and should not be copied.

Testing and Scoring System Software

Supplied on CD.

Seating System

You will provide the seating system. Select a chair for the parent which will be comfortable. The chair could swivel and rock for the comfort of parent and baby. You could then provide a stool or other seating for the test administrator.

Training for the Fagan Test of Infant Intelligence

Infantest provides a Training Program which includes a VHS training film. The film begins by reviewing the various components that make up the Fagan Test. You will see how the system should be arranged for a test. The Fagan Test of Infant Intelligence software will be demonstrated and how to record the data. The tape will then describe how to accurately locate the picture image on the baby's eyes. You will have an opportunity to practice testing and finally you will go through the 92 week and 69 week reliability tests.

Note: The VHS Training film demonstrates a previous version of the software. The new version is much easier to use and uses different control keys (a mouse instead of a keyboard). The training film is still an excellent guide to arranging a test and to practice testing.

Care of Equipment

Stage

When moving the stage, carry in a manner that will not batter the stage.

Pictures

The pictures should be stored loosely in their bag away from excessive heat and light. Care should be taken to prevent damage to the corners of the pictures, as they may bend. Avoid scraping the pictures against one another. Keep the pictures away from pencils, pens, etc., as these may permanently mark the pictures, making them unsuitable for accurate testing.

Training Video

The Training Certification Film should be stored in its jacket and kept in a closed drawer or cabinet. The video should be stood on end when not in use; never leave it on its side. Keep the video out of sunlight, heat and high humidity. Let the tape warm to room temperature before playing it. Do not place the video near electrical equipment as it may be accidentally erased.

Space Requirements

The area should include sufficient room for the test administrator and the parent with the infant to move comfortably around the equipment. We recommend that a small office or part of a larger one be devoted to Fagan Test of Infant Intelligence testing and that the space be made as pleasant and home-like as possible. The Fagan Test of Infant Intelligence can also be taken into homes or other settings for use.

Testing Time Required

The time required for testing a baby varies with the age of the baby and the baby's state. Generally, not more than 25 minutes will be required for any test. Most tests take approximately 15 minutes. Additional time will be spent by the administrator preparing for the test administration.

Arranging Equipment for a Test

When the components of the Fagan Test of Infant Intelligence are placed for a test the main consideration is the ease of testing for all concerned. Modify the location of specific pieces of computer equipment as required. Placing the stage on a narrow table is preferable. When this setting is unavailable, we suggest placing the stage on a table angled on your left at a comfortable distance for viewing. Be sure to allow ample room for the baby to sit in front of the stage, as close to the pictures as possible. Other testing equipment will be on the table to your right. An older baby may sit on the table in front of the stage while the parent securely holds him in place. Another seating option could include using a highchair. However you test, be sure the baby is eye level with the pictures and sitting about 12 inches away from them. Always be sure to test with ample over-head light to ensure your ability to see the pictures reflected in the baby's eyes.

Stage Operation

The portable stage is very easy to use. After the stage is properly placed on the table, seat yourself on a chair or stool which is a comfortable height for testing. With the back of the stage before you, use your left hand to pull back on the top of the stage door. The door will open until the floor of the door reaches the back of the opening.

With the stage door completely open, the pictures can be placed for viewing by the baby. To put a picture on the stage, hold it with its letter facing you. Place it on the stage so that the Velcro on the picture is situated directly over the Velcro square. It is important to have the picture uniformly placed. Use the peephole as a guide for centering. Gently press the picture to the stage so that the two Velcro squares adhere to one another. When in place, the picture should be facing the baby. The identifying letter/number of the picture will be unseen against the back wall of the stage door.

Computer Operation

The Fagan Test software must run from a hard disk, the program itself (and a subfolder named **DATA**) are the only files needed to run the Fagan Test. The data files are automatically saved in the **DATA** folder by the Fagan Test software.

Installation

To install the Fagan Test software, make a folder on your hard disk such as **FTII** and place the program file FTII.EXE in the directory. Also create a **DATA** folder inside the folder where you placed FTII.EXE

Running the Program

Navigate to the Fagan Test folder and double click on FTII.EXE. You should not be running any other programs while running the Fagan Test – especially programs like instant messengers that might 'pop-up' and disturb the testing.

Conducting the Clinical Test

This section details how to use the computer to administer the Fagan Test of Infant Intelligence to high-risk babies. The computer will guide you through the entire testing sequence, but these instructions should add information that will make it even easier to understand the computer's guidance.

Testing Controls

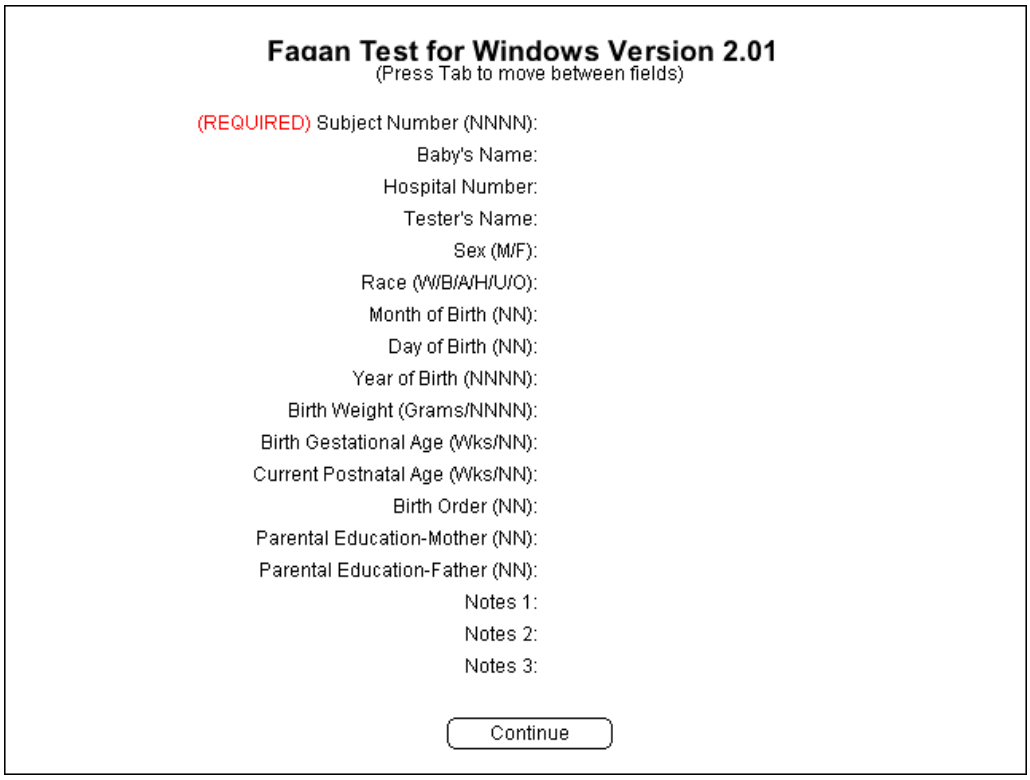
The Fagan Test for Windows uses a Mouse to record timer data instead of keyboard keys. Mouse testing is more flexible and easier to use for the tester. People new to mouse testing should take note of the following guidelines:

1) Get a 2-button mouse without any other buttons or scrollbars, the classic Microsoft Mouse is perfect for testing.
2) Hold the mouse in your hand with your thumb on the left side and right 3 fingers on the right side leaving only your index finger to press the buttons. Do not try and test using 2 fingers (one on each button), that leads to pressing both at once and bad data being collected.
3) Be sure to keep holding the mouse down when testing. If the subject looks at the left side of the screen for 2 seconds, you should be holding that mouse button down the entire time.
4) Practice. It takes a few minutes to get used to it and you don't want to try mouse testing on a subject without having tried it first on a video or a friend.

At the beginning and end of each trial, you will be prompted to click on a button on the screen to continue. The button moves slightly so that you don't accidentally click it and it requires you to look back at the screen and click twice between trials (once at the end of the trial, and once at the start of the next one). This 'slow-down' was done purposely to prevent you from accidentally proceeding too quickly to the next test when you are not ready. Once you click the **Continue** button to start collecting data – it doesn't start collecting until the first time you click a mouse button after you show the baby the pictures.

Background Information

When you start the Fagan Test, the software will prompt you for the background and demographic information of the subject. The Fagan Test only allows a combination of letters and numbers in the various fields (and sometimes only letters or only numbers).



The subject number (which can be up to 4 characters but – letters and numbers only) will also become the filename which is given an **F67.txt, F69.txt, F79.txt,** or **F92.txt** extension based on the test. The Gestational Period (typically 40 weeks for a full-term infant) and Postnatal Period (e.g. 27, 29, 39, or 52 weeks of age from birth) information are required if you want the program to suggest which test to give.

The Gestational and Postnatal ages are given in whole weeks only. If more precise readings are being used it would be advisable to make your own calculations concerning test suggestions. The program rounds down to the nearest test and a baby that is 68 weeks old (i.e. 40 weeks gestations + 28 weeks from birth) is recommended to take the 67 week test.

Press the <**TAB**> key to move to the next field.

The only required piece of information is the **Subject Number**, though the program can not suggest a test without the **Birth Gestational** and **Current Postnatal Ages.** It is advisable to complete the Background Information section as fully as possible before each test.

Baby's Name:

The next item to be typed into the computer is the **Baby's Name**. You can type the name in whatever order you wish, however, do not use any commas in the entry.

Press the **<TAB>** key to move to the next field.

Hospital Number :

Next the type in the baby's **Hospital Number**. Any 8-digit number can be entered. If you don't use a **Hospital Number** simply leave in blanks.

Press the **<TAB>** key to move to the next field.

Tester's Name:

Next the type in the name of the Fagan Test administrator who will be giving the test to the baby.

Press the **<TAB>** key to move to the next field.

Sex (M/F):

Next type in the **Sex** of the baby. You can type in **M**, **F**, or leave it blank.

Press the **<TAB>** key to move to the next field.

Race (W/B/A/H/U/O):

Next type in the **Race** of the baby. You can type in **W** for white, **B** for black, **A** for asian, **H** for Hispanic, **U** for unknown race or **O** for other, if the baby's race is not included on the list. You may want to use **O** for mixed-race children, as well

Press the **<TAB>** key to move to the next field.

Birth Date:

The **Birth Date** of the child is entered next. First type the two-digit number for the **Month of Birth (NN)** and press **<TAB>** then the two digit number for the **Day of Birth (NN)** and press **<TAB>** and then the four digit number for the **Year of Birth (NNNN)** and press **<TAB>**.

Birth Weight (Grams/NNNN):

Next type in the **Birth Weight (NNNN)** of the baby in Grams – this is a four digit number.

Press the **<TAB>** key to move to the next field.

Birth Gestational Age (NN):

Next type in the **Birth Gestational Age (NN)** of the baby in weeks – this is a two digit number.

Press the **<TAB>** key to move to the next field.

Current Postnatal Age (NN):

Next type in the **Current Postnatal Age (NN)** of the baby in weeks – this is a two digit number and refers to the age of the baby since birth.

Press the **<TAB>** key to move to the next field.

Birth Order (NN):

Next type in the **Birth Order (NN)** of the baby – this is a two digit number. For example, a first-born baby would be indicated by typing 01, a second-born by 02, and so on.

Press the **<TAB>** key to move to the next field.

Parental Education-Mother (NN):

Next type in the **Parental Education Level of the Mother** – this is a two digit number - 01 through 12 refers to grade school through high school; 13 through 16 refers to college; 17 and greater indicate advanced study beyond college.

Press the **<TAB>** key to move to the next field.

Parental Education-Father (NN):

Next type in the **Parental Education Level of the Father** – this is a two digit number - 01 through 12 refers to grade school through high school; 13 through 16 refers to college; 17 and greater indicate advanced study beyond college.

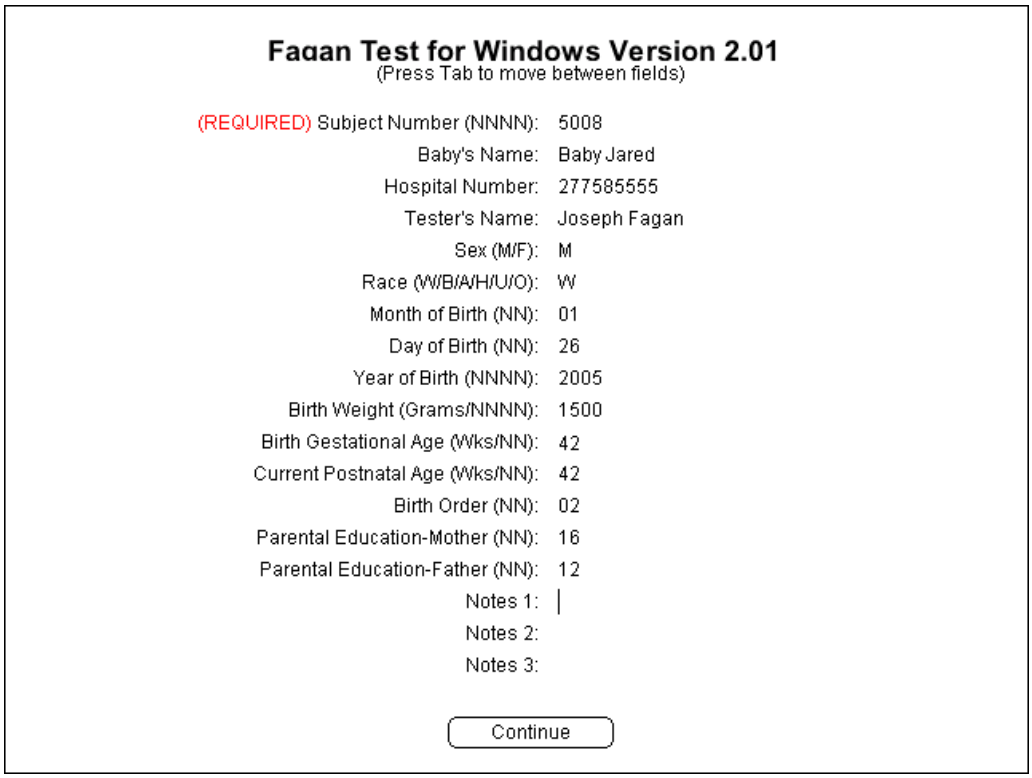
Press the **<TAB>** key to move to the next field.

Notes:

You may now enter up to three lines of **Notes**.

Press the **<TAB>** key to move to the next field.

When you have completed entering the background information, your monitor will display the following:

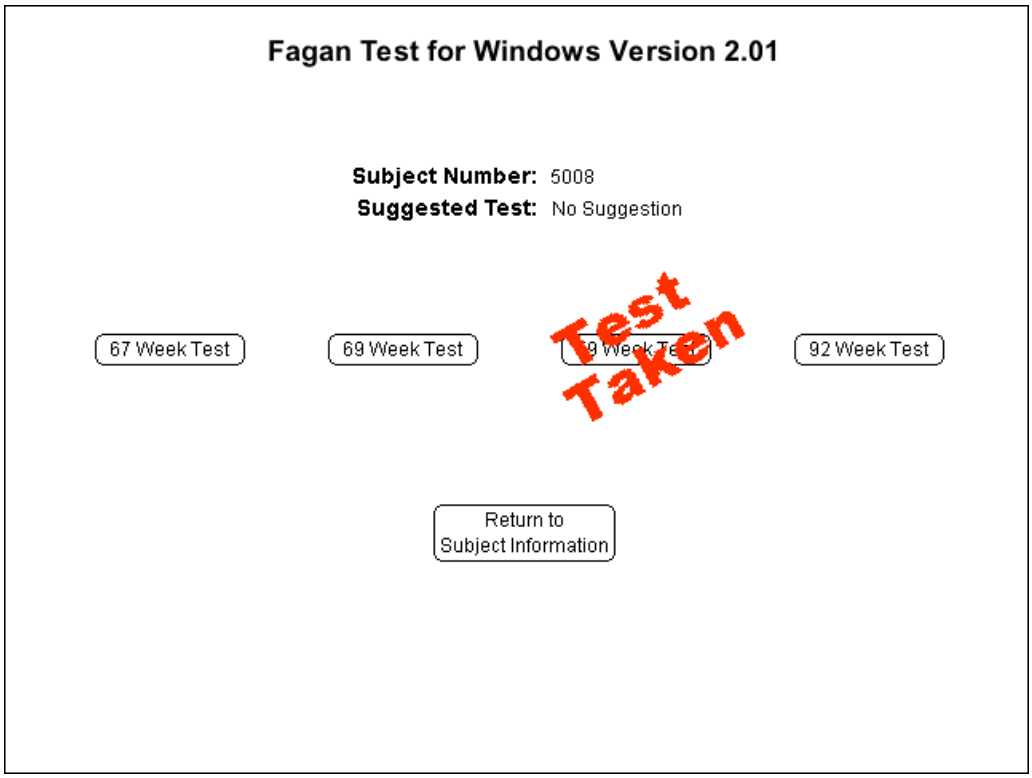


After you have entered the requested background information, you have another opportunity to change anything that was incorrectly entered. To change an entry in the background information, just press the <TAB> key until you are at the line you want to correct and enter the correct information.

Choosing the Appropriate Test

The next screen will suggest an appropriate test based on age (if you completed the Birth Gestational Age and Current Postnatal age). It will also tell you which tests have already been completed for that subject number. This is based on the data files located in the data folder and prevents accidental overwriting. You can choose to go back to the Subject Information screen (and change the subject number or any other piece of background information) or select the test to administer. The program only

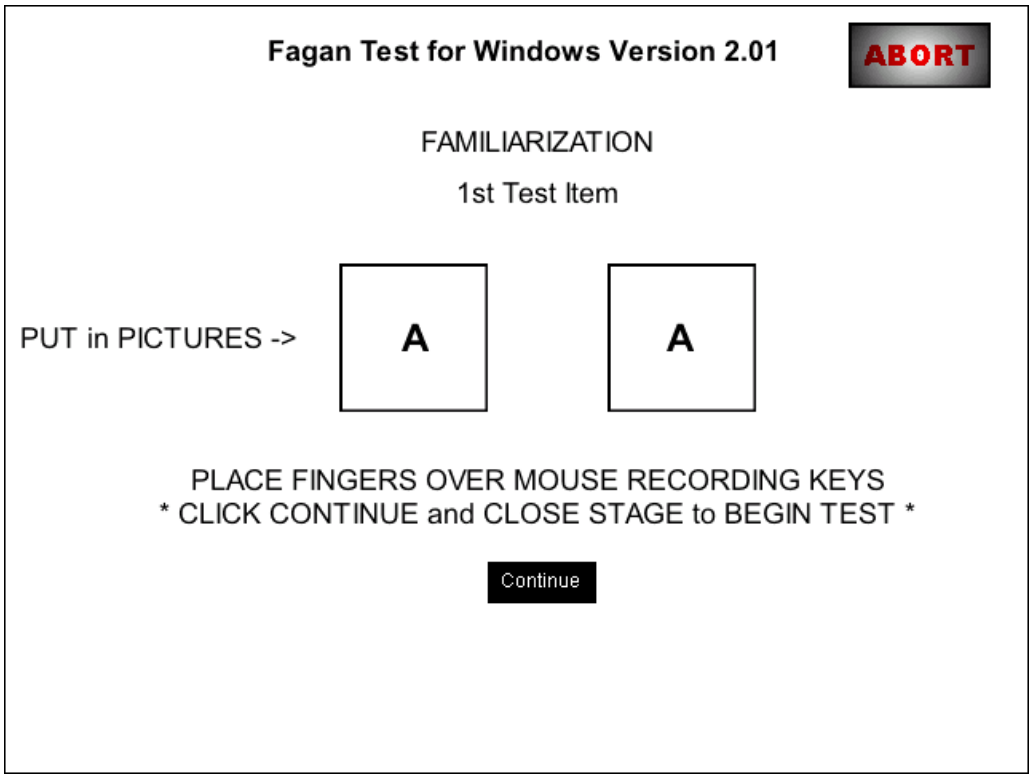
recommends an appropriate age test. You are free, however, to choose the test that you think is most appropriate. The program does not make the selection for you.



The program then prepares the tests and prompts you to place the appropriate pictures on the stage. There is an Abort button in the upper right hand corner of the screen. You can click on the abort button at any time and the Fagan Test will exit the test and save all the data that has been gathered to that point. (No summary results are computed only the raw data is saved)

Administering the Test

After you select which test to administer you will see the following screen:



FAMILIARIZATION indicates that the novelty problem has a familiarization period, i.e., a brief time during which one or two pictures are shown to the baby. During familiarizations, one or two identical pictures are shown to the baby. In the present example, there is one familiarization period during which two identical pictures are shown simultaneously.

1st Test Item tells you that this is the first novelty problem in the test. Each test is composed of ten unique novelty problems or test items. See **Appendix B** for details about Test Items.

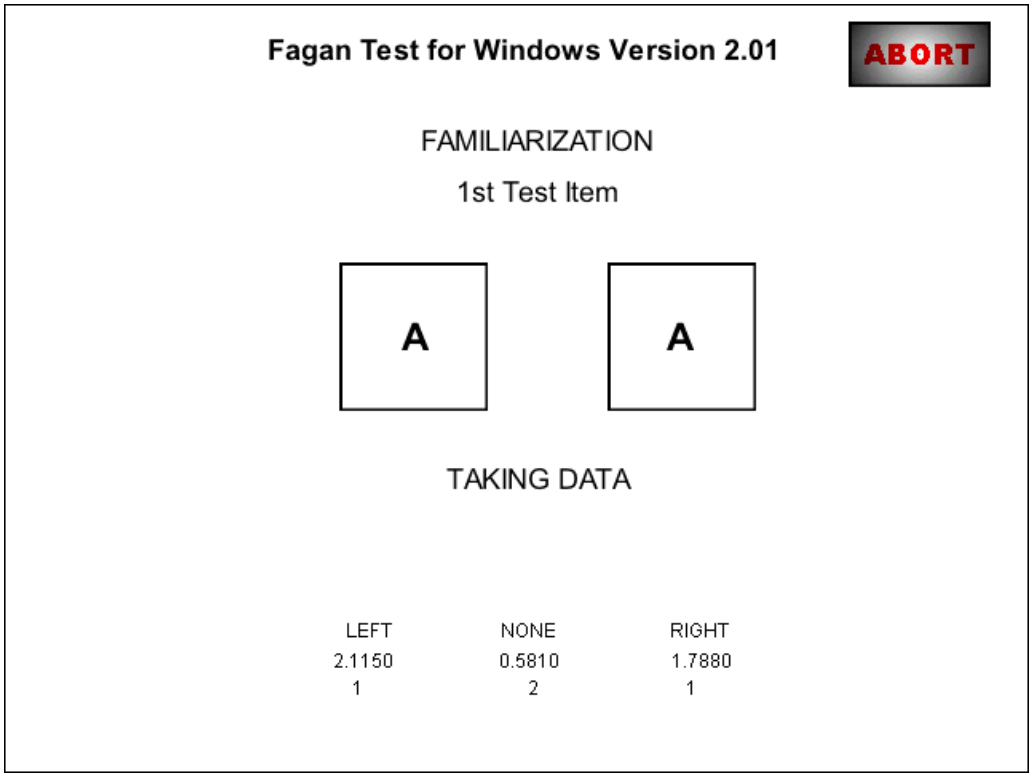
PUT in PICTURES A A means that you should now put the two pictures labeled "A" into the stage. The first letter "A" means that you should put Picture A onto the left side of the stage. Left is from your viewpoint as test administrator. (For the baby, the picture appears on his or her right.) The second letter "A" means that you should put Picture A onto the right side of the stage (i.e., the baby's left).

This convention, that the first letter always refers to your left and the second letter always refers to your right, is followed throughout the Test.

PLACE FINGERS OVER MOUSE RECORDING KEYS means that you should now get ready to test using the mouse buttons (see **Testing Controls**). The Training Film indicated the F9 and F10 keys but the updates software uses the mouse as the testing device and **NOT** the keyboard. See section **Testing Procedures** for more detail.

CLICK CONTINUE and CLOSE STAGE to BEGIN TEST means that your right hand index finger should be ready on the mouse buttons, your left hand should be used to close the stage. As you close the stage, peer through the peephole at the baby's eyes so that you can begin recording as soon as the baby looks at one of the pictures. Again, more detail is provided below in the section on **Testing Procedures**.

As soon as you click **CONTINUE** you will see:

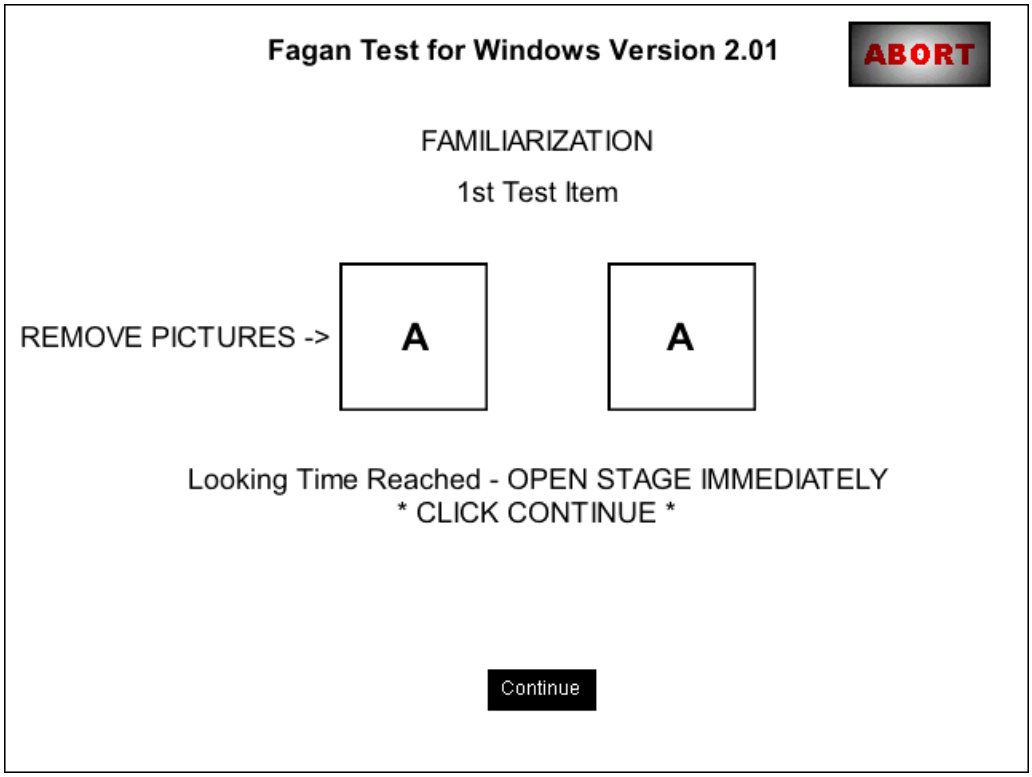


TAKING DATA means that the computer is waiting for you to begin recording looks to the pictures. Once you begin taking data (i.e., once the baby looks at a picture

and you press one of the data-recording keys), the LEFT, NONE, and RIGHT times and presses will advance (FYI the Left and Right times indicates the Baby's Left and Right and is reversed from yours)

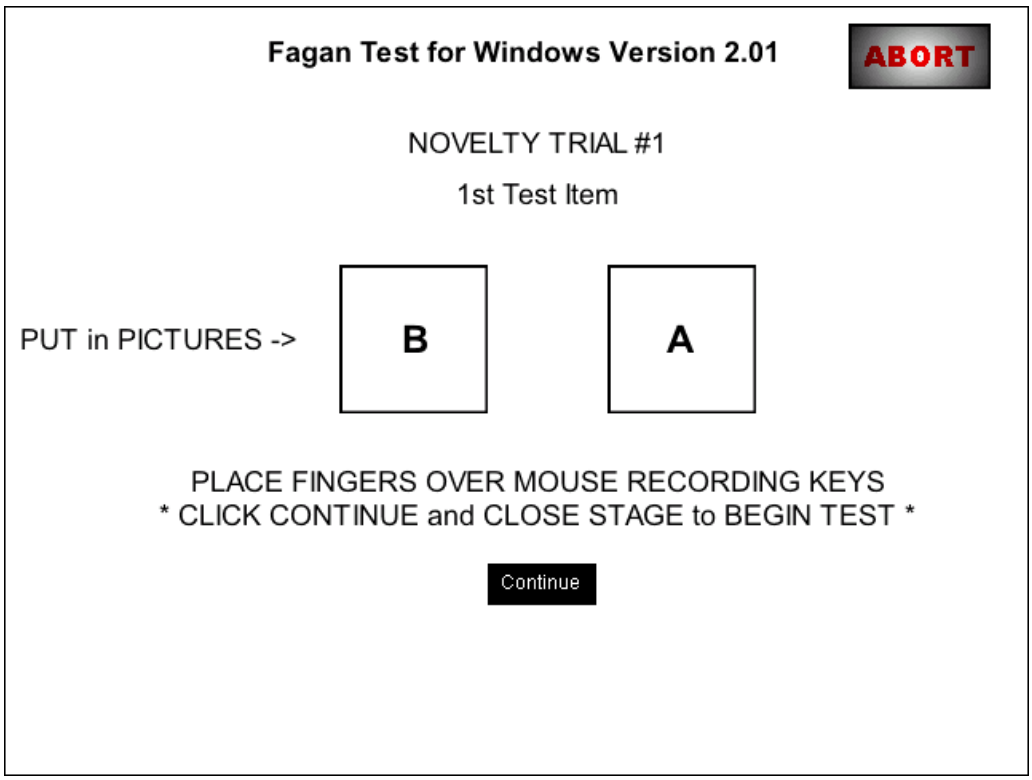
When the baby has looked at the pictures for the correct amount of time, a tone will sound from the computer. Lift your fingers from the mouse buttons and quickly open the stage, before looking at the computer monitor.

The monitor's message will look like this:



Looking Time Reached – OPEN STAGE IMMEDIATELY is telling you what you already know. The tone has already sounded, prompting you to open the stage before you read the computer screen. The messages are simply a reminder.

Clicking **CONTINUE** will take you to the Novelty Trial.

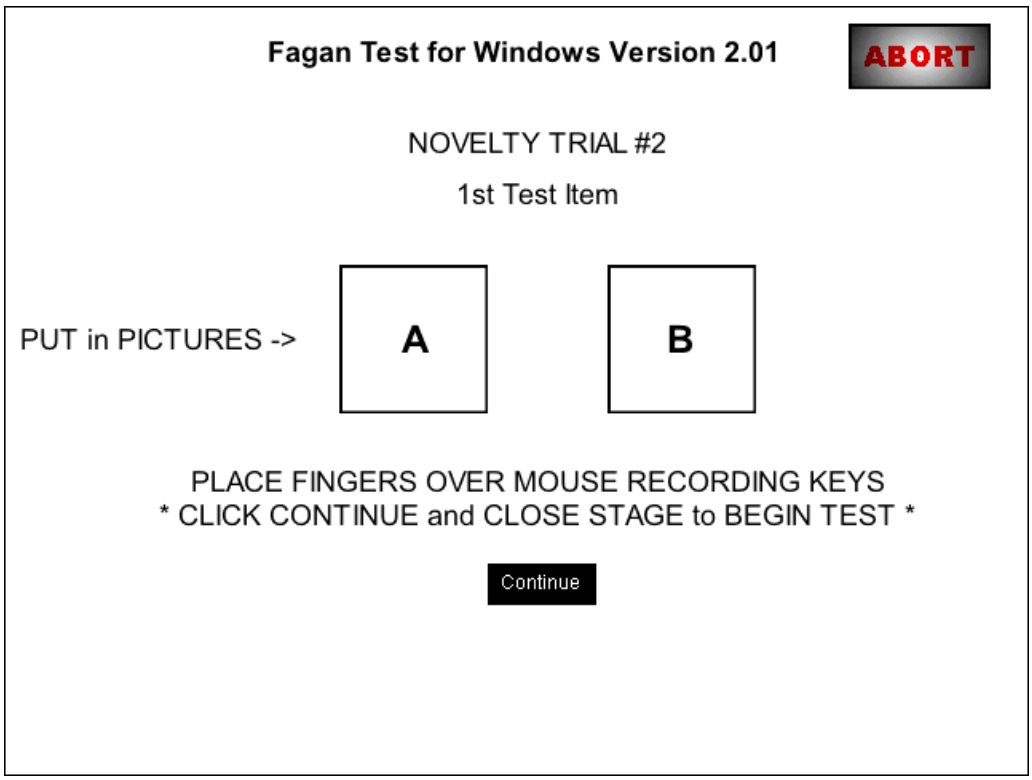


NOVELTY TRIAL #1 tells you that this is the first novelty test trial for the first novelty problem (i.e., the 1st Test Item). During novelty test trials, you will always be pairing two different pictures. In the present novelty trial you will pair Pictures B and A.

PUT IN PICTURES B A means that you should put picture B onto the stage to your left and picture A onto the stage to your right.

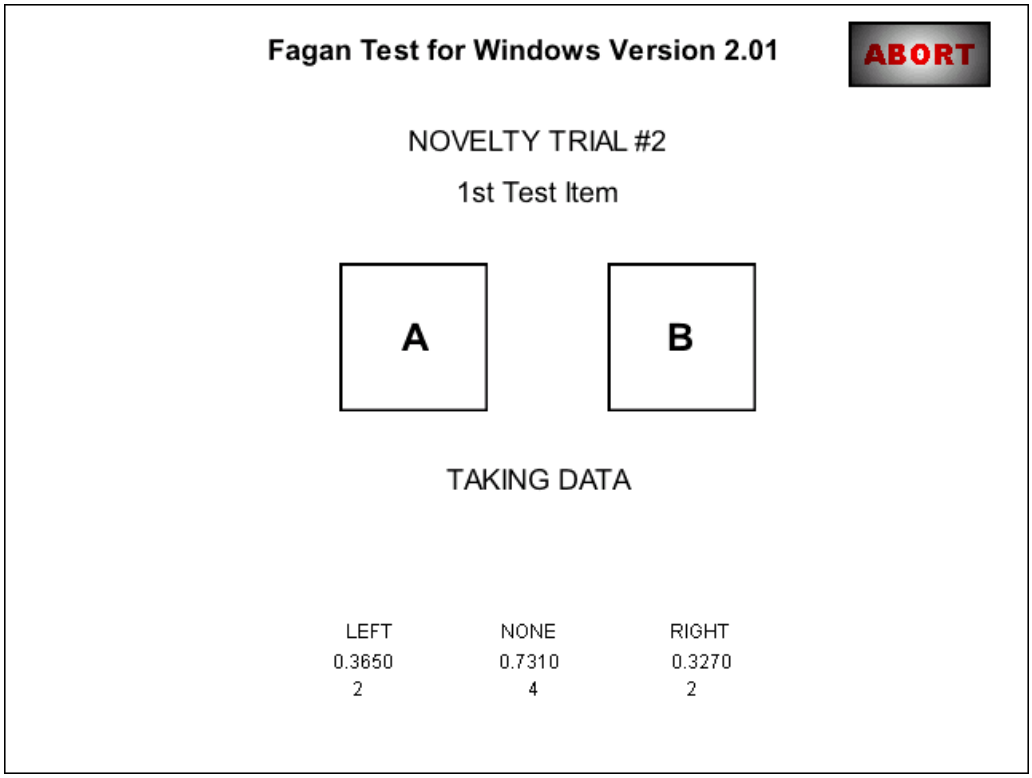
The rest of the instructions are the same as in the previous trials. After the **PUT in PICTURES** screen you will continue with a **TAKING DATA** screen and then a **REMOVE PICTURE** screen (this is the same for every trial – both familiarization and novelty).

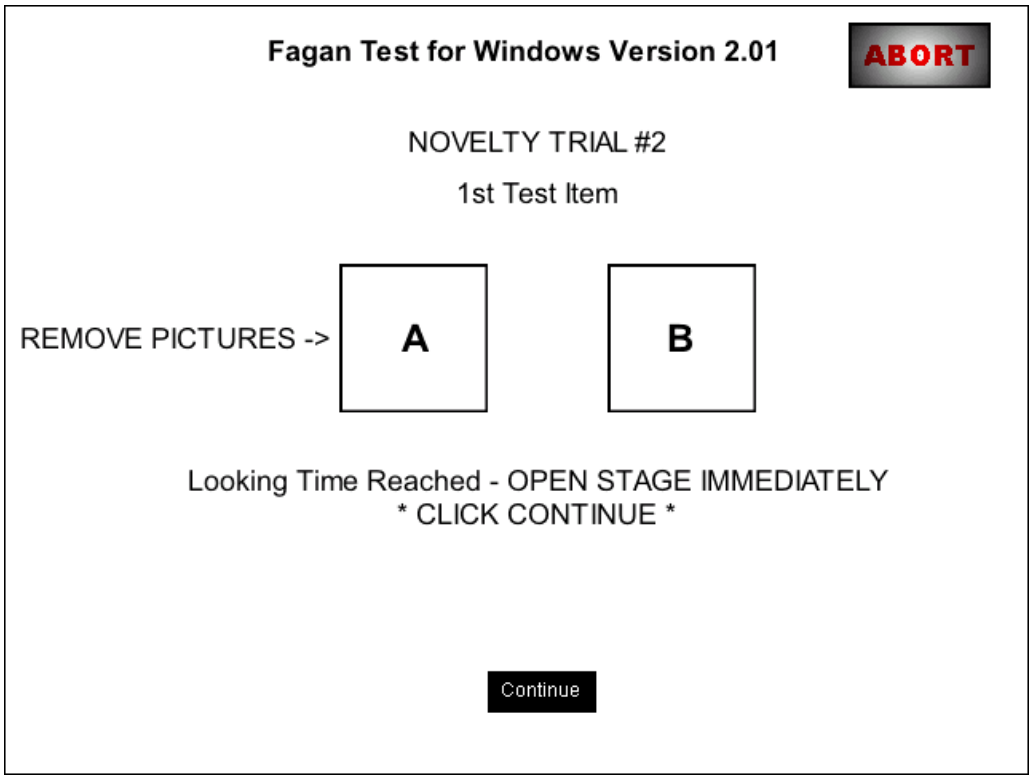
After Novel Trial #1 you will see:



This is the second novelty test trial for the 1st Test Item. The pictures are put into the stage as shown (i.e., A on your left; B on your right). Again, when you click **CONTINUE** the screen will display: **TAKING DATA**.

When the tone sounds, quickly open the stage, then check the computer monitor and see the following:

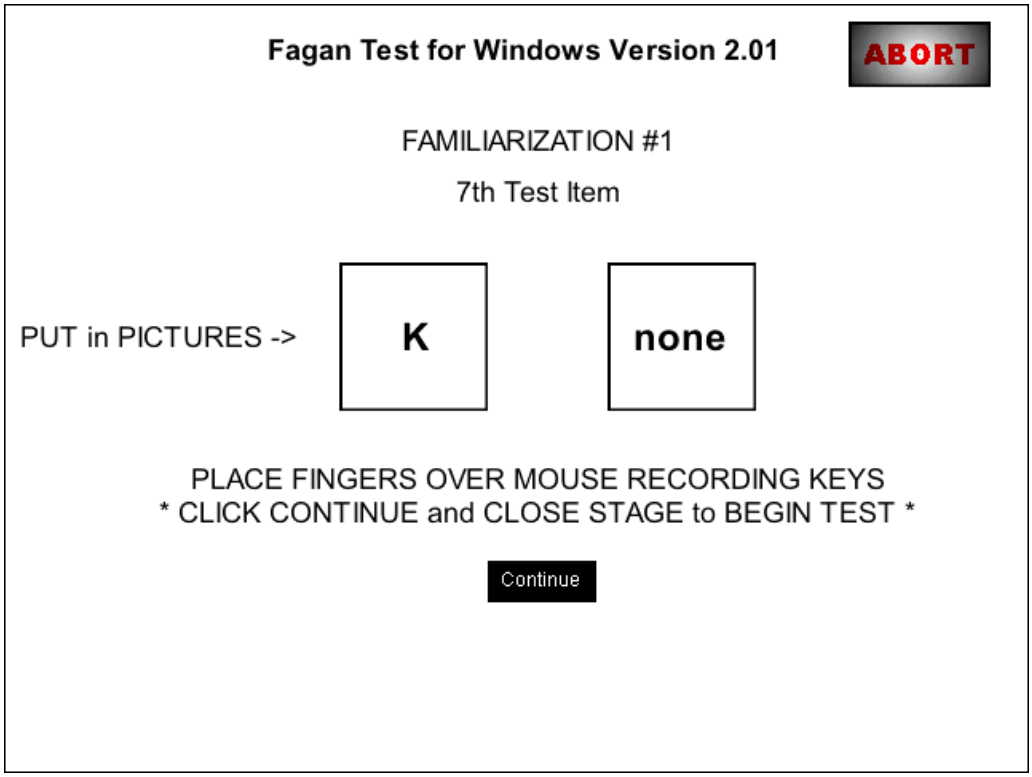




Now the screens should be self-explanatory.

The format you have just reviewed, a familiarization period followed by two novelty test trials, is the basic format for the entire test. However, some test items have only two novelty test trials and no familiarization periods (i.e., Test Items #4, #5, #6, & #9), while others have two familiarization periods followed by two novelty test trials (i.e., Test Items # 7, #8, & #10). See **Appendix B** for details about the arrangement of the pictures in the test.

When you reach Test Item #7, you will see the following on your screen:



FAMILIARIZATION # 1 tells you that this is the first of two familiarization periods.

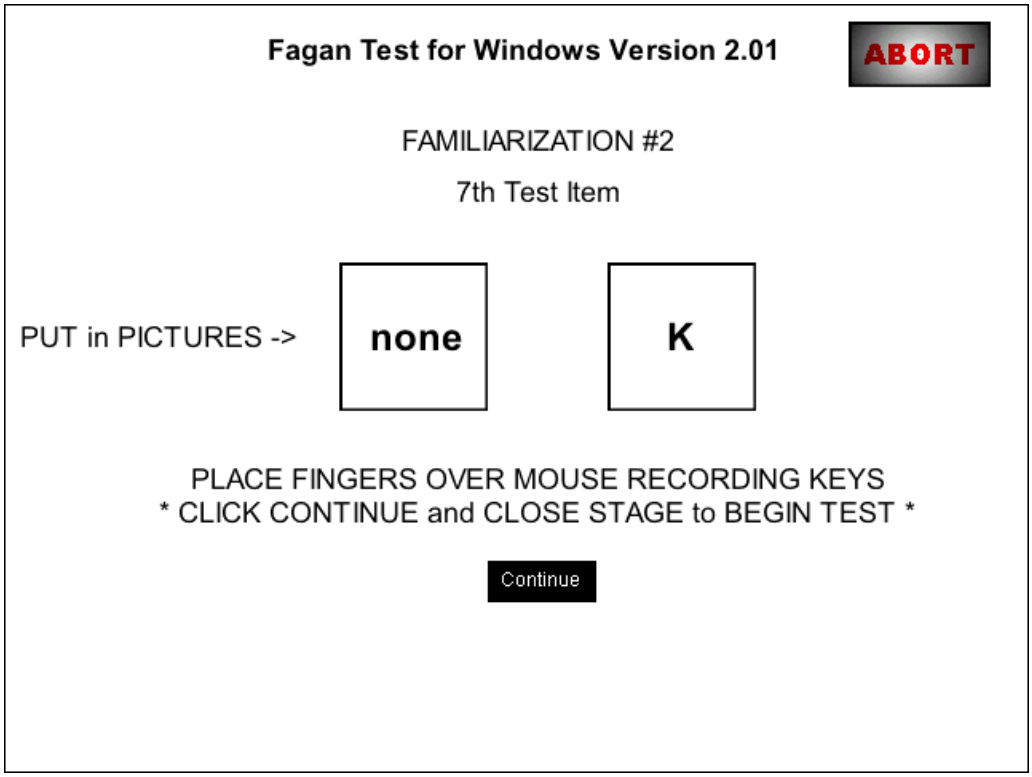
PUT in PICTURES K none indicates that you should put in Picture K on the left side of the stage (remember that left is your left). The **none** in the right position indicates that there is no picture to be placed on the right side of the stage for now. In other words, only one copy of Picture K should be placed on the left side of the stage.

When there is only one picture in the stage you should place your finger over the button corresponding to the location of the single picture. In the present example, you would place your finger over the looking-left mouse button. You would NOT record

anything with the right mouse button because there is no picture on the right for the baby to view. (However, recording when the baby looks to the side where there is no picture – in this case pressing the right mouse button when the baby is looking at the empty right side of the stage instead of not pressing anything – doesn't affect the test outcome.)

Continue testing as before.

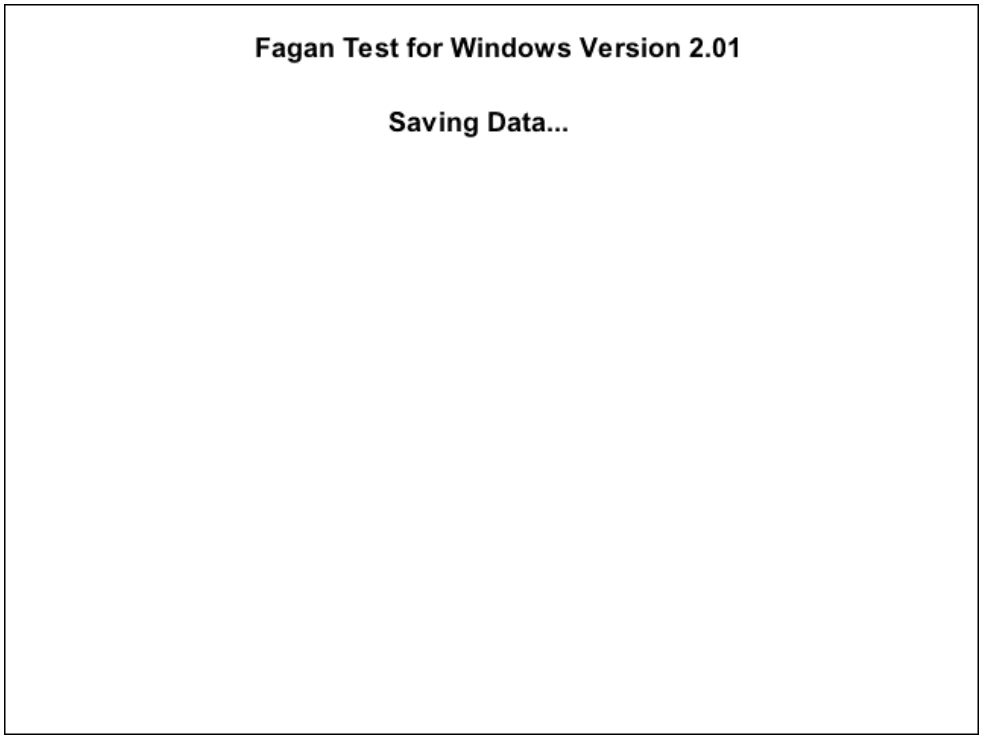
After the first familiarization trial has ended, you will see the following on your screen:

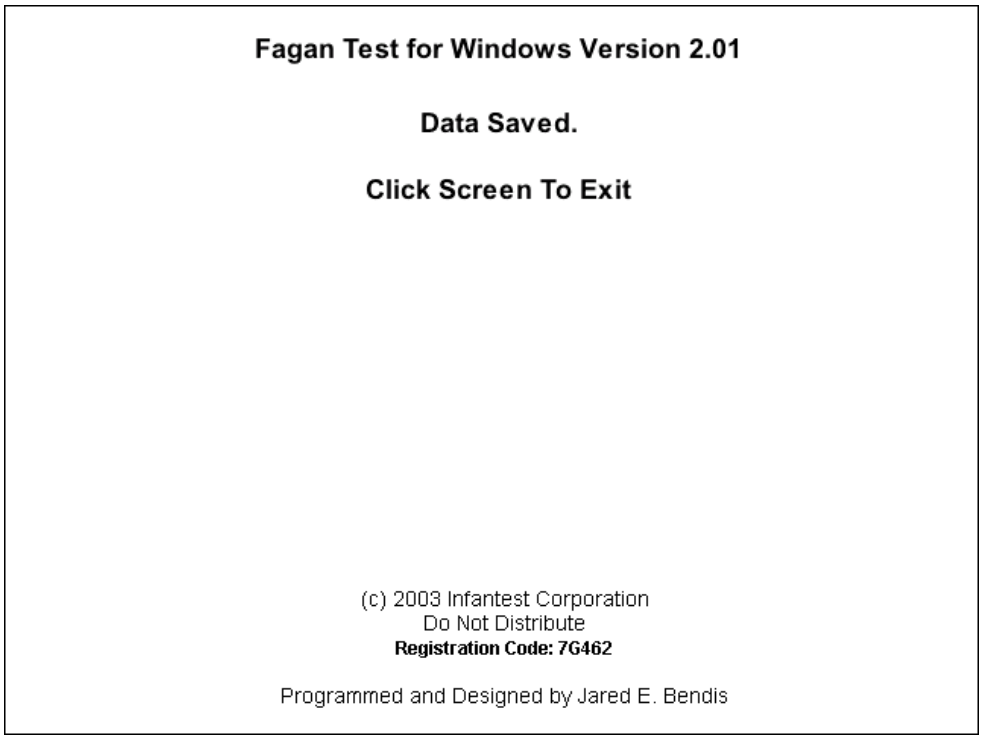


This is for the second familiarization trial. This time, the same picture will again appear alone but on the opposite side of the stage.

At this point all directions on the screen should be self-explanatory.

At the end of the 10th Test Item you will see:





The testing is over. The data has been saved and you can click on the screen to exit the software.

Viewing and Printing the Data

The Data files are automatically saved as the subject number with the extension F67.txt, F69.txt, F79.txt or F92.txt depending on the test given. The data is saved in a standard ASCII text format that can be opened in any text editor (notepad, WordPad, Word) and can be viewed and printed from there. **Appendix D** contains a sample data file. The data file is broken down into four sections: Background Data, Sorted Data, The Results, and Raw Data.

Background Data:

This is all of the data entered at the start of the test as Background Information.

Sorted Data:

The data is in the Sorted Data section is from the novelty trials. For each test item one picture is designated as Novel and the other Familiar (the familiar pictures having been seen in Familiarization periods or in previous test items). For each test item the pictures are given twice (the second time with the right and left reversed) this is referred to as Part 1 and Part 2. The novelty score for each item is:

$$(N1+N2) / (N1+N2+F1+F2) * 100 + \text{Adjustment}$$

Remember because there is off target time (when the baby is looking at neither picture) the bottom of that equation is NOT a constant.

The adjustment refers to standardization constants used to equally weight all of the items – Item #1 has an adjustment of (-5), Item #4 of (-6) and Item #6 of (+8). While both the Raw Novelty and Adjusted Novelty are recorded the Test Results are computed from the Adjusted mean novelty score. Only the adjusted novelty scores should be used for clinical evaluation, the raw novelty scores are only included for comparison and clarification.

Test Results:

There are three possible outcomes of the Fagan Test of Infant Intelligence. If the mean novelty is > 54.5 the **Test Results** line reads: **LOW RISK: RETEST OPTIONAL BUT ADVISED**. If the mean novelty is >53.1 and ≤ 54.5 the **Test Results** line reads: **SUSPECT: RETEST AT A LATER AGE**. If the mean novelty is ≤ 53.1 the **Test Results** line reads: **RISK: RETEST AT A LATER AGE**. The Test Results are only computed from a complete mean novelty score. Tests that are aborted will produce data but not a **Test Results** outcome.

Raw Data:

All of the raw data is saved with all information for complete analyses. However unlike the scored section the raw section does not sort which periods are novel and familiar. Since every analysis is run differently various approaches to the data structure may be taken. For more information contact Infantest for more details about the program's construction.

Technical Support

For technical support concerning the software please call Infantest at (216)-368-2720. For detailed technical help email jaredjared@earthlink.net (please put **Fagan Test Support** in the email subject). All non-technical questions should be emailed to jff@case.edu .

Testing Procedures

Conducting the Clinical Test

In order to properly administer the Fagan Test of Infant Intelligence to high-risk infants in a clinical setting, test administrators must be thoroughly familiar with all of the testing procedures. The comprehensive training system provided includes this Manual, the Training Film, and the recommendation that new Fagan Test administrators also practice test administration with at least four non-high risk babies. It is best if the practice administrations involve babies of different ages.

In addition to training on the Fagan Test of Infant Intelligence, administrators of the test should have experience with infants in general so that they feel comfortable while interacting with infants and their parents. Most particularly with high-risk infants and their parents. Experience with other kinds of evaluations for infants also would be valuable for the Fagan Test administrators.

Scheduling Tests

The Fagan Test of Infant Intelligence must be given at very precise times. In the present version of the Fagan Test of Infant Intelligence, tests are given at 67, 69, 79, and 92 weeks postconceptional age. That is, a term baby of 40 weeks gestation is tested 27, 29, 39, and 52 weeks after birth. A baby born after only 32 weeks of gestation would be tested 35, 37, 47, and 60 weeks after birth. In other words, term and preterm babies must be tested at the appropriate post-conceptional age. **Appendix C** lists different gestational ages at birth with the appropriate postnatal weeks for testing for each at the test ages.

Usually birth records will provide some measure of gestational age of each infant (e.g., date of last menstruation, or a Dubowitz examination performed at birth provide estimates of gestational age at birth). It is important to have as reliable an estimate of gestational age as possible, so that the results of the Fagan Test of Infant Intelligence can be accurately interpreted. If, for example, a baby were tested too early, or too late, the Fagan Test of Infant Intelligence would be uninterpretable.

The Fagan Test of Infant Intelligence must be administered within one week of the exact date on which the baby should be tested. For example, the 69 week test must be given no earlier than 68 weeks and no later than 70 weeks. Weeks must be counted

precisely. If a term, 40 week gestation, baby were born on a Monday, then the Monday 29 weeks later would be the target date for administering the 69 week test. The same is true for all of the test ages.

Ideally, babies must be tested at least twice on the Fagan Test of Infant Intelligence, i.e., at two different ages. Tests should be complete ones. That is, the baby must have been tested on every problem, if one or more tests are incomplete, retesting at a later age is necessary. Thus, it is advantageous to schedule the 67 week test as the first test. If all four tests can be given, do so. The greater the number of novelty problems given, the more reliable the test.

We advise that babies whose Fagan Test of Infant Intelligence scores place them in the low-risk category be retested at a later age, if possible. Babies whose Fagan Test of Infant Intelligence scores place them in the risk or suspect categories should definitely be retested with a later Fagan Test of Infant Intelligence.

Presumably, physicians will be referring parents to the Fagan Test administrator for testing. To schedule the test, we recommend that the test administrator make an appointment with the parent one week in advance. Parents are very busy and may easily forget appointments, so a reminder call the day before the scheduled test is a good idea. At the completion of a test, the next appointment can be scheduled. Again, a reminder call the day before the next test is advised. Try to choose a time that is convenient for the parent and one when the baby can be expected to be quiet and alert (e.g., try to avoid having to wake a baby from a nap for the test).

If a baby cannot be tested on the day scheduled (e.g., the baby cries and cannot complete the test), try the test again the next day. If the baby still cannot be tested, schedule the baby for the next age test and try again then.

Recording Background Information

As described in the Computer Operation section, you will be entering background information about the baby for the computerized scoring system. It is particularly important that the information be entered accurately, so that mistakes in scoring are avoided.

We recommend that you first list the information you will need for the computer on a handwritten form so that typing it into the computer is facilitated. **Appendix D** is a form that can be copied and used for the hand-recording of the relevant information. If this information is obtained in advance, you can have it already on the computer before the parent arrives with the baby for testing, thus reducing the time that the parent has to spend at the test site. Parents will appreciate this consideration and probably will be happy to give you any additional information that you might need over the phone.

Each baby's saved data contains the background information you entered about the baby. To create a print-out for the baby's file simply open the appropriate data file (it will open in Notepad, WordPad, or Word depending on your computer's configuration) and print it out. The print-out can be stored in the baby's file.

Establishing and Maintaining Rapport

In any situation where individuals are being evaluated, it is important that they feel as comfortable as possible. In administering the Fagan Test of Infant Intelligence, it is important for both parent and baby to be comfortable with the test administrator and with the test situation. Several steps can be taken to establish rapport.

First, a white coat is NOT advised for the test administrator since the parent and older babies may associate a white coat with painful experiences. A solid colored smock (not one with a patterned print), although rarely necessary, might be appropriate protection for the administrator's clothing, however.

Second, the test administrator should be pleasant, calm, and most of all, relaxed. Greet parents warmly, offer to hold the baby while they remove their coats, and talk gently and cheerfully to the baby. It is a good idea to approach babies cautiously and not abruptly. Wait until the parent and baby feel relaxed before proceeding with the test. Of course, it has to be remembered that although the tone of the situation should be relaxed, the testing must be completed as quickly and efficiently as possible. Thus, we emphasize the skill afforded by additional practice with several other infants before testing high risk babies.

Third, to make the parent comfortable from the start, briefly explain how the test will be conducted. In doing so, point out the equipment and discuss what each part of the equipment is for. Explain that no electrical current will be anywhere, since parents are often concerned that the baby or they might be shocked. Describe the test in general terms: for example, "we will be showing the baby some pictures and seeing how well the baby remembers them. We'll know how well the baby remembers the pictures by measuring the time that the baby spends looking at each of them". Also tell the parent that the test usually takes only a few minutes.

Parents generally will have some questions about the test before it begins. Often they ask what they will need to do and why. In the next section **Parent Testing Behavior**, the parent's role will be described.

In the interest of maintaining rapport during testing, some extraneous behaviors on the part of the administrator and the parent are permitted. See the sections **Administrator Testing Behavior** and "**Parent Testing Behavior**, for details.

After testing, the parents may want to see the pictures. You can show them the pictures, but try to keep the baby from looking at them, as the same pictures are used for the later tests. Frequently, parents say: "Why do you use so many black and white pictures? My baby loves color pictures". The answer is that these are the pictures that best measure memory of all the pictures that have been used the in the research that led to the test.

Sometimes during, and often after testing, parents comment that their baby "Doesn't (or didn't) seem to be looking at the pictures". The administrator can reply that it often seems that way to parents as they hold their babies, but that it is not true that the baby isn't looking. After all, were the baby not looking, the test could not continue. Sometimes parents add that their physician told them that babies "Don't see very well". While it is true that babies do not see the world as adults do, the size and nearness of the pictures assures that all but very visually impaired babies can see the pictures.

Almost invariably, parents afterward ask "How did my baby do?" or "Is my baby alright?" It is the role of the physician to give the parent feedback about all aspects of care, just as it would be the physician's responsibility to interpret the results of any test (e.g., a blood test). Thus, the Fagan Test administrator should defer the interpretation of the result to the physician for the parent and baby. It could be added that the parent should keeping mind that the Fagan Test of Infant Intelligence is only one evaluation of their baby, and that the physician knows more about their baby than the administrator of one kind of test.

In general, part of the rapport between administrator and parent depends on the parent feeling that his or her questions are respected and that the best possible answers will be provided at any time. Let parents know that they can ask questions later, even after leaving, if they want.

For the occasional baby who cries or fusses too much for testing to take place, part of making parents feel comfortable is letting them know that a baby's fussiness is normal, that you know it happens sometimes, and that they can come back the next day to try the test again. If the baby still cannot be tested, reassure the parent and schedule the next test. Rarely will a baby be totally untestable on the Fagan Test of Infant Intelligence.

Parent Testing Behavior

During the testing, the parent will be sitting in a chair provided, holding the baby on the table in front of the stage while the baby looks at the pictures. The parent should sit down in the chair while someone else (usually the administrator) holds the baby for them. This is for the safety of parent and baby and gives the baby a chance for more of the pleasant interaction with the test administrator. Of course, the chair should already be in the proper place for testing. Other seating options were previously explained in this manual in the section **Arranging Equipment for a Test**.

The parent's job during testing is to facilitate the baby's view of the pictures - while not in any way distracting the baby or unduly influencing the baby's behavior. The parent should be instructed to hold the baby securely on the table in front of the stage. Babies vary considerably in their head and trunk control. Those babies whose head and trunk support is not yet well developed, must beheld in such a way that they can comfortably view the pictures, while not allowed to fall forward. This may be done with a pillow or by the parent's placing one hand under the baby's bottom while the other hand is supporting the baby's chest. Babies with good head and trunk control can simply sit on the table while being held securely.

Also in holding the baby, the parent should be instructed to let the baby turn his or her head freely while looking, even if it means allowing the baby to look away from the pictures. The parent should never force the baby's head in a specific direction.

In order that the baby is not distracted while looking at the pictures, the parent should be instructed to keep conversation to a minimum, although "sweet nothings" quietly spoken, along with gentle pats, in reassurance to a fussy baby are allowed, if absolutely necessary. In particular, talking about the pictures is prohibited (e.g., identifying a picture as "daddy", "mommy", or "baby"), as is pointing to them. A pacifier maybe used, a thumb may be sucked, or a bottle may be taken while testing continues, provided that nothing impairs the baby's or the administrator's view.

If a baby is very upset, instruct the parent to comfort the baby between presentations of the pictures (not during presentations of the pictures). Comforting can be accompanied by whatever words and behavior typically comfort the baby. If this does not suffice, a very brief break can be taken for additionally comforting the baby. If no

comfort can be given, tell the parent that the test will have to end and that a second try will be made the next day.

Finally, when testing ends, have the parent hand the baby over to be held while they stand up and prepare to leave.

Administrator Testing Behavior

On the day that a test is scheduled, the Fagan Test administrator has several tasks to perform. Chronologically, the administrator readies the testing situation by preparing the stage and computer and sorting the pictures, enters background information into the computer, greets parents and explains the situation to them (including their role in the test), conducts the test, schedules any follow-up test, makes a print-out of the baby's Fagan Test results, and places the results into the baby's files. Each of test tasks not already described in preceding sections will now be described in detail (see **Stage Operation**, **Computer Operation**, **Establishing and Maintaining Rapport**, **Scheduling Tests**, and **Recording Background Information**).

Sorting the Pictures

The packet of pictures received contains all of the pictures that will be needed for the Fagan Test of Infant Intelligence. **Appendix A** shows the actual pictures along with their identifying letters or numbers. The identifying letters are found on the top back side of each picture. **Appendix B** provides complete information about where a picture should appear in the stage during the various parts of a test. A reminder: Left and Right locations are shown relative to the test administrator who places the picture in the stage for viewing by the baby.

To administer the test efficiently, it will help to place the pictures in alphabetical order with the letters facing you. As you proceed through the test, place used pictures in the back so they will be ready for you to administer the next test.

Conducting the Test: An Overview

The time that the baby spends looking at the various pictures is the most important aspect of the Fagan Test of Infant Intelligence. These are the data that determine whether a baby will be judged low-risk, suspect, or high-risk for later mental retardation. Equally important to the test is that the pictures be presented in precisely the order given on the test list. To make test administration as easy as possible, the computer monitor will show you when and where to present the next picture, or pictures, during the test. As administrator of the Fagan Test, you will be recording on the computer when, where, and for how long the baby looks at the pictures. Please review the sections on **Stage Operation** and **Computer Operation** before proceeding.

Ready the computer to record data.

After the parent and baby have been seated, you, as the test administrator, should be seated behind the stage. First look through the peephole of the stage. Push the stage toward the baby as close as possible to be sure the level and distance for viewing is correct.

Now place the pictures where they will be convenient and accessible for testing. Open the stage and insert the first pictures into their places.

Tell the parent that the test is beginning.

Position your finger over the buttons you will need for recording where and for how long the baby looks.

Quickly, but gently, close the stage, peering through the peephole as you do so.

As soon as the stage is closed, watch for the baby to look at the pictures. Begin recording as soon as the baby **looks at a picture,** you record how long, and to which picture the baby looks. You will see an image of the picture centered over the pupil of the baby's eye when the baby is looking at a **picture**. The image will be a bright square seen on the center of the pupil.

Only record a look when the image is **centered** over the pupil. Specifically, if only one picture is in place, you will press the button corresponding to the location of that picture when the baby begins to look at it. Hold the button down only until the baby looks away. Press the button again when the baby looks again at the picture and release the button when the look ends. Repeat this until you hear the tone from the computer that

signals the end of that part of the test. If two pictures are on the stage, you will press one of two buttons, each of which corresponds to one of the two pictures. That is, when the baby looks at the picture to your left, you press the looking-left button and when the baby looks at the picture to your fight, you press the looking-right button (see **Computer Operation**). If the baby is not looking at either picture, do not press any buttons. As the baby looks at the picture, continue to press the appropriate buttons until you hear the tone signaling the end of that part of the test.

When the computer tone sounds, quickly, but gently, open the stage.

Consult the computer monitor and place the next picture or pictures on the stage (see the **Training Film** and the section on **Stage Operation**). Continue testing in this way until the test is complete.

Closing Remarks

The purpose of the Manual has been to introduce you to the Fagan Test of Infant Intelligence, to provide you with background information about the research underlying the test, and to give you guidance in its use.

We are basic scientists. We consider the presence of other basic scientists to be vital to maintaining the quality of the Fagan Test of Infant Intelligence. We are especially interested in your creative ways of using the test and in your research findings. If you should use the Fagan Test for your research, we would appreciate receiving pre-prints or reprints of your articles. We consider each user of the Fagan Test a colleague and value your professional advice.

Appendix A: Testing Pictures

	A
	B
	C
	D
	E
	F
	G
	H
	I

	J
	K
	L
	M
	N
	O
	P

Pictures H,I, and J, are the same picture but rotated in different directions. The picture is marked on the back in 3 different locations to indicate proper orientation.

Appendix B: Picture Testing List

The Fagan Test of Infant Intelligence consists of the same ten Test Items (or novelty problems) for each of the four tests. The four tests differ only in the amount of study time allowed for each part of the test.

Familiarizations are always cumulatively timed. That is, the baby must accumulate a specified amount of study time before the test will advance to the next part of a Test Item.

Novelty Test trials are not time cumulatively. That is, the baby can look as much or as little as he or she likes and the test will advance when a specified period of time has elapsed. Novelty Test Trails always involve the pairing of two different pictures simultaneously.

The following page gives the order of testing.

Part 1:

Test Items #1, #2, and #3 involve one Familiarization, during which the same picture is paired with itself for a specific period of time.

Part2:

Test Items #4, #5, and #6 have no Familiarizations - each of the Test Items consists only of two Novelty Test Trials.

Part 3:

Test Items #7 and #8 consist of two Familiarizations, during which only one picture is shown at a time on each side of the stage in turn. Each Familiarization is followed by two Novelty Test Trails.

Part 4:

Test Item #9 consists only of two Novelty Test Trials, and #10 consists of two Familiarizations followed by two Novelty Test Trials.

It is imperative that the exact order of testing be followed. Any deviation invalidates the test. The computer will guide you through the administration of the tests by telling you when and where to locate the various pictures during the administration.

Instructions on Computer (reversed of what Baby Sees)	What the Baby Sees	Test Item
A A		1st Test Item Familiarization
B A		1st Test Item Novelty Trial #1
A B		1st Test Item Novelty Trial #2
B B		2nd Test Item Familiarization
B C		2nd Test Item Novelty Trial #1
C B		2nd Test Item Novelty Trial #2
D D		3rd Test Item Familiarization
E D		3rd Test Item Novelty Trial #1
D E		3rd Test Item Novelty Trial #2
F E		4th Test Item Novelty Trial #1

E F			4th Test Item Novelty Trial #2
F G			5th Test Item Novelty Trial #1
G F			5th Test Item Novelty Trial #2
H I			6th Test Item Novelty Trial #1
J H			6th Test Item Novelty Trial #2
K none			7th Test Item Familiarization #1
none K			7th Test Item Familiarization #2
K L			7th Test Item Novelty Trial #1
L K			7th Test Item Novelty Trial #2
none K			8th Test Item Familiarization #1
K none			8th Test Item Familiarization #2

K M			8th Test Item Novelty Trial #1
M K			8th Test Item Novelty Trial #2
N O			9th Test Item Novelty Trial #1
O N			9th Test Item Novelty Trial #2
none O			10th Test Item Familiarization #1
O none			10th Test Item Familiarization #2
P O			10th Test Item Novelty Trial #1
P P			10th Test Item Novelty Trial #2

Appendix C: Test Scheduling Table

Test ages: (Weeks Post-conception)	67	69	79	92
Gestational age (weeks at birth)	**Postnatal age (weeks since birth)**			
27	40	42	52	65
28	39	41	51	64
29	38	40	50	63
30	37	39	49	62
31	36	38	48	61
32	35	37	47	60
33	34	36	46	59
34	33	35	45	58
35	32	34	44	57
36	31	33	43	56
37	30	32	42	55
38	29	31	41	54
39	28	30	40	53
40	27	29	39	52

Appendix D: Sample Data File

```
~ BACKGROUND DATA
Test: 79
Subject Number (NN..N): 5008
Baby's Name: Baby Jared
Baby's Hospital Number (NN..N): 277585555
Tester's Name: Joseph Fagan
Sex (M/F): M
Race (W B A H U O): W
Month of Birth (NN): 01
Day of Birth (NN): 26
Year of Birth (NNNN): 2005
Birth Weight (Grams/NNNN): 1500
Birth Gestational Age (Wks/NN): 42
Current Postnatal Age (Wks/NN): 42
Birth Order (NN): 02
Parental Education-Mother (NN): 16
Parental Education-Father (NN): 12
Notes Line 1:
Notes Line 2:
Notes Line 3:
~ SCORED DATA
~ F1=Familiar Part 1      F2=Familiar Part 2
~ N1=Novelty Part 1       N2=Novelty Part 2
~ ITEM       F1       N1       F2       N2    %RAWNOVEL    %ADJUSTED
~   1      0.00     0.76     0.33     0.36        77.24           72.24
~   2      1.20     1.10     1.34     1.31        48.69           48.69
~   3      1.21     1.54     1.17     1.27        54.14           54.14
~   4      0.99     0.73     1.09     1.06        46.25           40.25
~   5      1.35     1.24     1.49     1.16        45.80           45.80
~   6      1.10     1.49     1.57     1.24        50.56           58.56
~   7      0.94     0.98     1.21     1.68        55.30           55.30
~   8      1.30     1.63     1.78     1.24        48.24           48.24
~   9      1.16     1.85     1.49     1.24        53.83           53.83
~  10      0.37     1.05     1.35     1.61        60.73           60.73
~ RAW NOVELTY SCALED NOVELTY
~ 54.08   53.78
~ TEST RESULTS
SUSPECT: RETEST AT A LATER AGE
~ RAW DATA
~ RIGHT AND LEFT ARE TESTERS RIGHT AND LEFT
~ LT=Left Time  RT=Right Time  NT=No Time
~ LP=Left Press RP=Right Press NP=No Press
~ ITEM       LT       RT       NT     LP     RP     NP
   1F      1.79     2.12     2.28      1      1      2
   1N      0.76     0.00     8.87      1      0      1
   1N      0.33     0.36     9.00      2      2      4
   2F      9.95     2.11     1.32     10      8      8
   2N      1.20     1.10     0.73      5      5      8
   2N      1.31     1.34     0.36      6      7      5
   3F     10.10     1.97     1.31     11     10     12
   3N      1.54     1.21     0.29      4      4      4
   3N      1.17     1.27     0.58      5      5      7
   4N      0.99     0.73     1.30      3      2      3
```

4N	1.06	1.09	0.87	6	5	10
5N	1.35	1.24	0.43	5	4	6
5N	1.16	1.49	0.36	5	6	5
6N	1.10	1.49	0.44	5	6	6
6N	1.24	1.57	0.22	6	7	3
7F	6.01	9.61	0.37	3	2	3
7F	0.32	6.06	0.07	1	1	1
7N	0.94	0.98	1.10	6	5	4
7N	1.68	1.21	0.14	4	4	2
8F	1.31	2.00	0.00	5	6	0
8F	2.03	3.45	0.00	7	7	0
8N	1.30	1.63	0.07	6	6	1
8N	1.24	1.78	0.00	6	6	0
9N	1.16	1.85	0.00	5	6	0
9N	1.24	1.49	0.29	6	7	4
10F	0.29	2.02	0.07	1	2	1
10F	2.01	0.00	0.00	1	0	0
10N	0.37	1.05	1.62	1	2	2
10N	1.61	1.35	0.07	3	3	1

Registration Code: 7G402

Fagan Test – Background Information Form

Subject Number:_____

Baby's Name:_____

Hospital Number:_____

Tester's Name:_____

Sex: Male Female

Race: White Black Asian Hispanic Unknown Other

Birth Date: Month:_____ Day:_____ Year:_____

Birth Weight:_____grams

Birth Gestational Age:_____weeks

Current Postnatal Age:_____weeks

Birth Order: _____

Parental Education: Mother _____ (last year completed)

Father _____ (last year completed)

(01-12 = First Grade – High School, 13-16 = College, 17+ = Post College)

Reason for Referral (Up to 3 lines of text):

_____

_____

_____

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