

## All-language verbal tests free from linguistic barriers

Manuel A. Sedó, & Lora DeCristoforo

*Boston Public Schools, Boston, MA; and Wright Institute, Berkeley, CA*

**Abstract:** The assessment of foreign subjects does often require the use of professionals or interpreters with specific language skills, or even the administration of “culture-free” psychological tests. This one may provide an accurate picture of the “spatial talents” of the subjects but not of their “conceptual” talents, particularly when a definite “cognitive” style (or a language disability) are also present. One possible solution is to measure the “verbal” talents with “all-language verbal tests”, administered *in their primary language*. This may be quite easy, if we think of measuring talents such as word-finding, serial organization or inhibition of responses. Actually, neuropsychologists do often measure “processing” rather than “knowledge”, and many of our neuropsychological tests are already –whether we notice it or not – “verbal not-language-bound” tests that can be easily administered in other languages. Even tests not originally conceived or designed in that format (“Color-Word Test”, “Trail Making Test”) can be easily adapted to an all-language verbal form by stepping down their cognitive requirements. Traditional and non-traditional forms of both tests were compared. Correlations suggest that both (traditional and non-traditional forms) can be used interchangeably, without any loss in the validity of the test, and with a definite increase in the applicability of the test to younger subjects, foreign-language speakers, recent immigrants, and uneducated or dyslexic subjects. **Key words:** verbal not language-bound, multicultural, prefrontal, executive functions

### Tests verbales no ligados al lenguaje libres de barreras lingüísticas

**Resumen:** La evaluación de sujetos extranjeros requiere a menudo profesionales o intérpretes con talentos lingüísticos especializados; o la administración de “tests libres de cultura”, que proveen sólo una descripción de la inteligencia “espacial” de los sujetos, cuando el sujeto posee un estilo cognoscitivo poco conceptual, o cuando existe una discapacidad de aprendizaje y lenguaje. Una solución posible es el uso de tests “verbales todo-lenguaje”, administradas *en el idioma original*. Esto puede resultar muy simple, particularmente para el neuropsicólogo acostumbrado a medir el procesamiento lingüístico del sujeto, su acceso semántico o su capacidad de inhibición mental. De

hecho, muchos tests neuropsicológicos – nos demos cuenta o no – ya son “verbales todo-lenguaje” y pueden ser administrados sin dificultad en otros idiomas. Incluso algunos tests que no han sido originalmente concebidos o diseñados así (como el test de “Nombres de colores” de Stroop, o el “Trail Making Test”) pueden ser fácilmente adaptados a un formato “verbal todo- lenguaje” cuando disminuimos sus requerimientos cognitivos. Formas tradicionales y “todo-lenguaje” de ambos tests correlacionan de forma elevada, lo que sugiere que ambas formas podrían ser enteramente intercambiables, y aumentar la aplicabilidad del test a poblaciones más jóvenes, a individuos de idioma extranjero o vernáculo, a emigrantes recientes, y a individuos ineducados o disléxicos. **Palabras clave:** tests verbales independientes del lenguaje, multicultural, prefrontal, función ejecutiva.

Mainstream psychologists are often unwilling to test foreigners, recent immigrants and other linguistically-diverse patients - as they may distrust their own ability to understand and appraise their underlying language abilities. Measuring the “verbal” skills of a foreign-language speaker whose language we don’t even understand – let’s say: a French, a German or even a Servo-croatian, a Manchurian or a Quechuan subject - has probably become a practical need for any psychologist at some time or another. In a modern world where emigrations and cultural exchanges are bound to become more intense it is probably unavoidable that we may have to think of testing some of our foreign or bilingual clients *by using their verbal skills in their own primary language.*

This paper suggests the need for a style of verbal testing that is free from language barriers and can be useful with every subject and in every language: a test that could be administered to all (or nearly all) foreign, or vernacular, or bilingual speakers *in their own familiar language.* “All-language verbal tests” imply the feasibility of testing the subjects in their native language while preserving the validity of our test results. “All-language verbal tests” are meant to be used by the mainstream psychologist not just on mainstream subjects (those that do speak the dominant language of the country), but also on foreigners, bilingual or vernacular patients who are “felt” to be unable to use the familiar language in a way that is consistent with the purposes of testing. This may make it unnecessary to refer the client to a “bilingual” psychologist or use a “bilingual” translator (which may be obviously difficult to find); and may also make it unnecessary to administer a “culture-free” test (a sort of test which may not always yield totally valid results in all of our foreign-speaking clients). It is now well known and accepted that culture-free tests cannot be said to measure the “fluid” intelligence of the subject (as the test manuals are fond of saying) and may not lead to any valid insight on the verbal talents of the subject. In fact, psychologists working with a number of specific populations may strongly reject the use of

culture-free tests for a technical reason: the final raw scores may not at all represent the “fluid” cognitive mental skills of the subject - but only the presence of a “figural” or “contextual” cognitive style which may be based on a strength (“Altus effect”) of spatial performance that is totally unrelated to the presence or absence of developed verbal-conceptual talents (Altus, 1953; Gutkin, 1979; Kaufman, 1994; Lesser & al, 1965 ; Meeker & Meeker, 1973; McShane & Cook, 1985; Ortiz & Polyzoi, 1986; Poon-McBrayer & Garcia, 2000; Weiss & al., 1993).

The task may not be as impossible as it sounds, particularly for a practitioner in neuro-psychology, more accustomed to the testing of “level of performance” than to the more traditional testing of “level of knowledge”. Many neuropsychologists are familiar with the testing of *speed of mental functioning* in their everyday subjects: any particular slowness in the initiation of their conceptual reactions to the stimulus or any loss of effectiveness in their mental planning or conceptual steering; any perceived difficulty in the “initiation” or in the “transitioning” between abilities or in the choice of alternative mental behaviors; that is, any loss in the speed of passive “filtering” or active “orientation” to the stimuli (Posner & al, 1984). Neuropsychologists are already keenly aware of this fact: that any slowing of the passive mental processing or in the active mental tracking done by the subjects goes hand in hand with their neurological immaturity or their neurological deterioration (Carroll, 1997; Jensen, 1998; Sternberg, 1969; Verster, 1983). We may not be quite aware of it, but many of the neuropsychological tests have *already* adopted an “all-language” design, although this fact is not always perceived or recognized (Denkla & Cutting, 1999; Posner, 1978; Stuss & al, 1987, 1988 and 1989; Wolff, 1999). The discovery of “all-language verbal” testing of foreign-language subjects is not really a discovery, but a systematic tradition that goes often unrecognized, and is already present in many of our neuropsychological tests that are not even presented as multilingual. The awareness of this fact may help enhance our ability to deal with many new kinds of testing of foreign, vernacular and bilingual subjects – and in many kinds of clinical, educational, penal, or ethnological settings. And even if a neuropsychological test was not conceived for “verbal not-language bound” performance, it is even possible to simplify it so as to adapt them to the all-language verbal format.

## Method

### *Participants*

DeCristoforo (2000, 2001a, 2001b) administered the “FIVE DIGIT TEST” and the Stroop’s “COLOR-WORD TEST” (Stroop, 1935) to 91 older adults in three age groups (aged 60, 70 and 75 or higher) in three successive age groups, as a part of her study of the “FIVE DIGIT TEST” in senescent subjects. All the subjects lived in the Western Coast of the United States. Excluded from her groups were older adults with medical, neurological or psychiatric conditions, or with a history of learning disabilities.

Sedó (1995) administered the “ORAL TRAILS” and the classic “TRAIL MAKING TEST” (Reitan, 1955) to a group of 60 otherwise unselected college students found on the streets of a college city of the American Northeast: obviously, their admission to a college program was the reason for our choice of students, and implied a rigorous preselection of cognitive levels. Subjects had an average age of 23.5 years with a standard deviation of 1.8 years and a range of ages going from 20.7 to an extreme 27.9 years.

### *Material*

Two of our better known tests of executive function, such as the “COLOR-WORD TEST” (1938) and the “TRAIL-MAKING TEST” (Army Intelligent Test Battery, 1944), can be quite easily adapted to this kind of use, just by curtailing their reliance of factors such as written language, reading competence, perception and naming of colors or mental tracking of the automatic series of letters of the alphabet. This has been precisely the purpose of “FIVE DIGIT TEST” and “ORAL TRAILS” (Sedó, 1995): to convert two of our classical tests into testing instruments that are free of linguistic barriers and can be administered, not just in the dominant language, but also in many other languages. The language of both tests has been simplified to eliminate the need for a mastery of the dominant language, the need for color perception or naming, the need for school-learned reading and memory routines, the need for school-learned and school-rehearsed planning and tracking behaviors: as a consequence, both tests are now meant to be easily administered in languages other than the dominant language of the country without any loss in their validity; and both tests can be easily administered to much younger, or much more dysfunctional subjects without any perceptive or linguistic barriers and without any kind of “ceiling effect” created by the linguistic difficulties of the test. On the contrary, the new tests aim at avoiding floor effects, even on seriously

disadvantaged or neurologically impaired subjects.

“FIVE DIGIT TEST” (the “all-language verbal” form of the well known “COLOR WORD TEST”) requires only the reading and counting of the five lower quantities from one to five, which of course can take place in any language, and eliminates the reading of individual color words – that can only take place in the language that is proper to the test. Digits are arranged in the spatial patterns used by playing cards and dominoes: in this way, digits can be featured in congruous and incongruous ways (for instance: two 2s, three 3s and four 4s rather than one 5, two 3s and three 4s. Obviously, the perception and abstract naming of colors has been entirely bypassed by the use of the lower digits. The five lower digits (as we know after Braga, 1997, and Reis & al., 1994) are easily accessible even to non-reading and dyslexic subjects. Both tests included the “fourth situation” that was originally introduced by Bohner & al. in 1992 and that is already included as a part of the “Delis-Kaplan Executive Function System” (2001).

“ORAL TRAILS” (adaptation of the well known “TRAIL-MAKING TEST”) has requirements that go just slightly above that. The test requires the conceptual knowledge of the automatized series of the initial 20 natural numbers; the recognition of the 20 numbers; and the systematic spatial search of these numbers which appear all scattered on the printed page, in boxes offering a number paired with a familiar fruit that must be read together (“1- apple, 2- grapes, 3- orange, 4-banana”, etc). The test does only require the recognition and naming of four familiar fruits, and the level of concreteness of the test (naming actual objects rather than abstract colors) has lowered its difficulty by an extra year, putting it at a level consistent with Kindergarden expectations. In the second Trail (Trail B, the one with additional cognitive requirements) we use a Stroop interference procedure, printing the fruits in a different and totally inappropriate color, announcing that “now all the colors are right but the fruits are wrong” and asking the subject to name “the fruits that should have been there”. As far as we know, fruits of incongruous colors have only been used by Santostefano, who included this “cognitive control” procedure in his “Fruit Distraction Test” (Santostefano, 1978).

Figures 1, 2, 3, and 4 (taken from Sedó and from Sedio & Hsieh, 1997) present samples of each of the tasks in our two “all-language verbal” tests. FIGURE 1 reproduces samples of the four basic tasks of the “FIVE DIGIT TEST”, and Figure 2 reproduces Part III of the ideographic version that was administered in Continental China (Hsieh & al, 1996, 1998) in a comparison of poorly educated against highly educated adults and older subjects. Administration of this test actually took place in Mandarin Chinese; but administration would have been

entirely possible in “any” of the several languages actually spoken in the Chinese People’s Republic. FIGURES 3 and 4 represent samples of the tasks on Trails A and B, involving their initial Trial runs.

As a rule, Arabic digits are nearly universally used and accepted in most languages and cultures – thus the Arabic number version is entirely valid not just in Europe and America but even in several countries of the Orient.

### *Procedures*

Both studies reported here were originally unrelated, as the results of both studies were meant to be presented elsewhere. The traditional Stroop and its “all-language” form were used by Lora DeCristoforo (2000, 2001a, 2001b) on an adult and senescent population. It replicated the data already obtained by Hsieh and al (1998) and her finding of very large time lags in her senescent subjects, and particularly on her less educated senescent subjects.

Traditional and “all-language” forms of the “TRAIL MAKING TEST” were administered to much younger and much better educated students, and aimed at establishing the norms for young well-educated adults, as a complement to the norms already obtained for elementary, middle and high school students (Sedó, 1996).

The traditional and the “all-language” forms of both tests, “COLOR WORD TEST” and the “FIVE DIGIT TEST” (on the one side); and “TRAIL MAKING TEST” and the “ORAL TRAILS” (on the other) were administered to our older subjects in California and to our younger well-educated Northeastern subjects in Massachusetts. In both cases, the order of presentation of the traditional and the non-traditional tests was counterbalanced, to avoid systematic serial effects. In the first case, 12 other cognitive tests were also administered, and a validation study was followed by a factor analysis of the task. In the second study, the Stroop and the Five Digit Test were also administered in the three-part version that we were using at the time. Those scores are not reproduced here.

Our statistical analysis consisted on the comparison of Pearson correlation coefficients 1) between the traditional and the “verbal not language-bound” version of each test; b) in each specific population.

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**Results and discussion**

Tables 1 and 2 reflect these two statistical comparisons.

“FIVE DIGIT TEST”	STROOP “COLOR-WORD TEST”		
	Part I	Part II	Part III
<u>Part IV</u>			
Part I	.71*	.65*	.56*
Part II	.72*	.64*	.51*
Part III	.51*	.65*	.66*
Part IV	.50*	.59*	.67*

\*  $p=.01$

Table 1. *Correlation Coefficients Between the Five Digit Test (FDT) and the Stroop Color-Word Test on three mature and senescent adult populations (DeCristoforo, 2001a).*

“ORAL TRAILS”	“TRAIL MAKING TEST”	
	Trail A	Trail B
Trail A	.66*	.66*
Trail B	.59*	.70*

$p= .01$

Table 2. *Correlations between the Oral Trails and the Trail-Making Test on a young adult, college-educated population (Sedó, 1996).*

The correlations obtained in both studies (always significant at or beyond the  $p= .01$  level) are high enough to suggest that both two tests in the pairing (traditional and unconventional “COLOR-WORD TEST”

and “FIVE DIGIT TEST” and traditional and unconventional “TRAIL MAKING TEST” and “ORAL TRAIL MAKING”) can be very easily substitute for each other without any loss in the validity of the diagnosis obtained.

There is little doubt that their diminished requirements (in terms of conceptual development, mental tracking, and spatial tracking) make them uniquely appropriate for a number of atypical populations: foreigners, bilinguals, recent immigrants or vernaculars.

The diminished requirements may make our "verbal all-language tests" particularly useful in countries with a large number of foreign, immigrant or bilingual subjects; or in regions with a very large number of national or vernacular languages (like Belgium, Bolivia, Canada, Catalonia, Mexico, or South Africa).

### Conclusions

The all-language verbal format exemplified by the conceptual “FIVE DIGIT TEST” and its spatial counterpart the “ORAL TRAILS” are indeed possible valid alternatives to the now classical “COLOR-WORD TEST” and “TRAIL-MAKING TEST” used at this time by most neuropsychologists. Its use may be strongly suggested in the case of atypical subjects presenting a different set of sociological characteristics: for instance, foreign subjects, bilingual subjects and subjects speaking any kind of vernacular languages.

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Appendix A  
 "FIVE DIGIT TEST"  
 STRUCTURE OF THE TEST  
 A- REACTIONS

1- READING

1	2 2	3 3 3	4 4 4 4	5 5 5 5 5
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( 50 items)

2- NAMING

*	* *	* * *	* * * *	* * * * *
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( 50 items)

B- PROJECTS

3- PLANNING

4	5 5	1 1 1	2 2 2 2	3 3 3 3 3
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( 50 items)

4- CHOOSING

3	4 4	2 2 2	1 1 1 1	5 5
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( 50 items)

"ONE"

"TWO"

"THREE"

"FOUR"

"UNO"

"DOS"

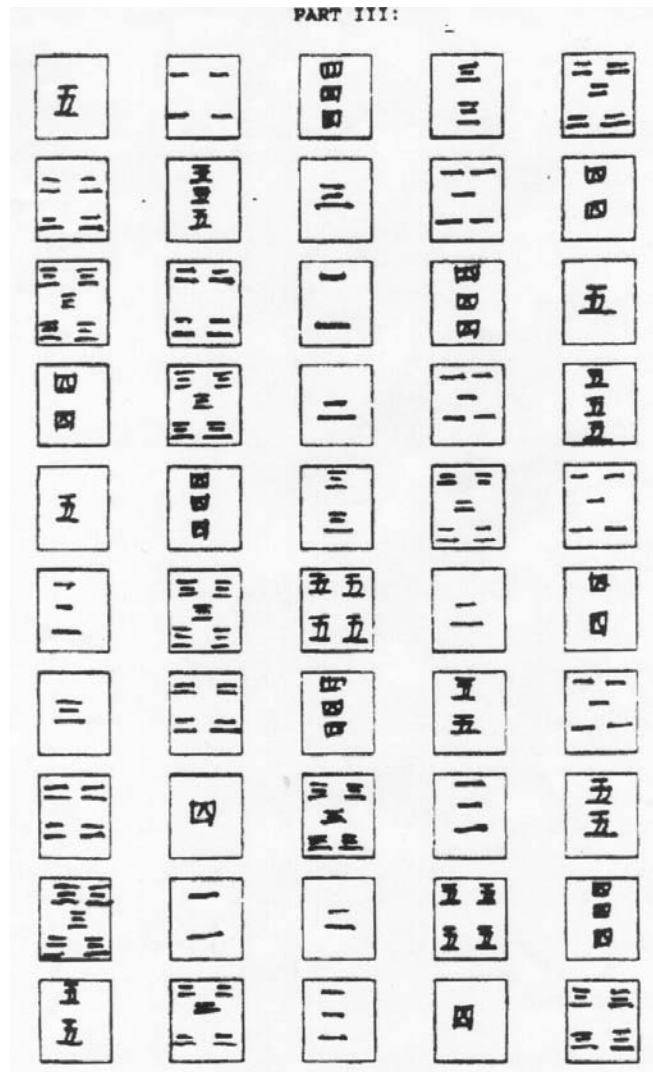
"TRES"

"CUATRO"

(or any other set of number words in other languages)

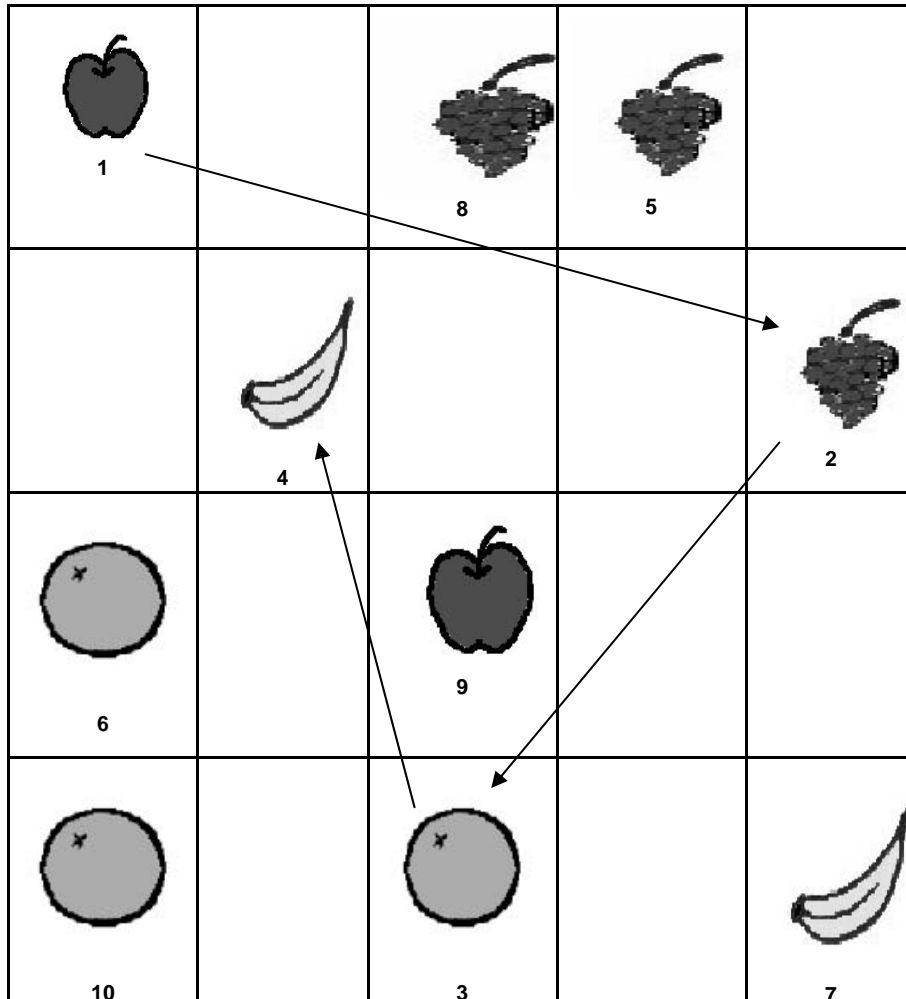
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Appendix B



Appendix C  
 "ORAL TRAILS: STRUCTURE OF THE TEST"  
 TRAIL A: SPEED OF SEARCH

TRIAL: "A number of fruits are scattered all over this page; you must follow the numbers in succession, from 1 to 20, read the number and tell me the name of the fruit you see with each number. For instance: "1- apple, 2-grape..." [3- orange, 4- banana].

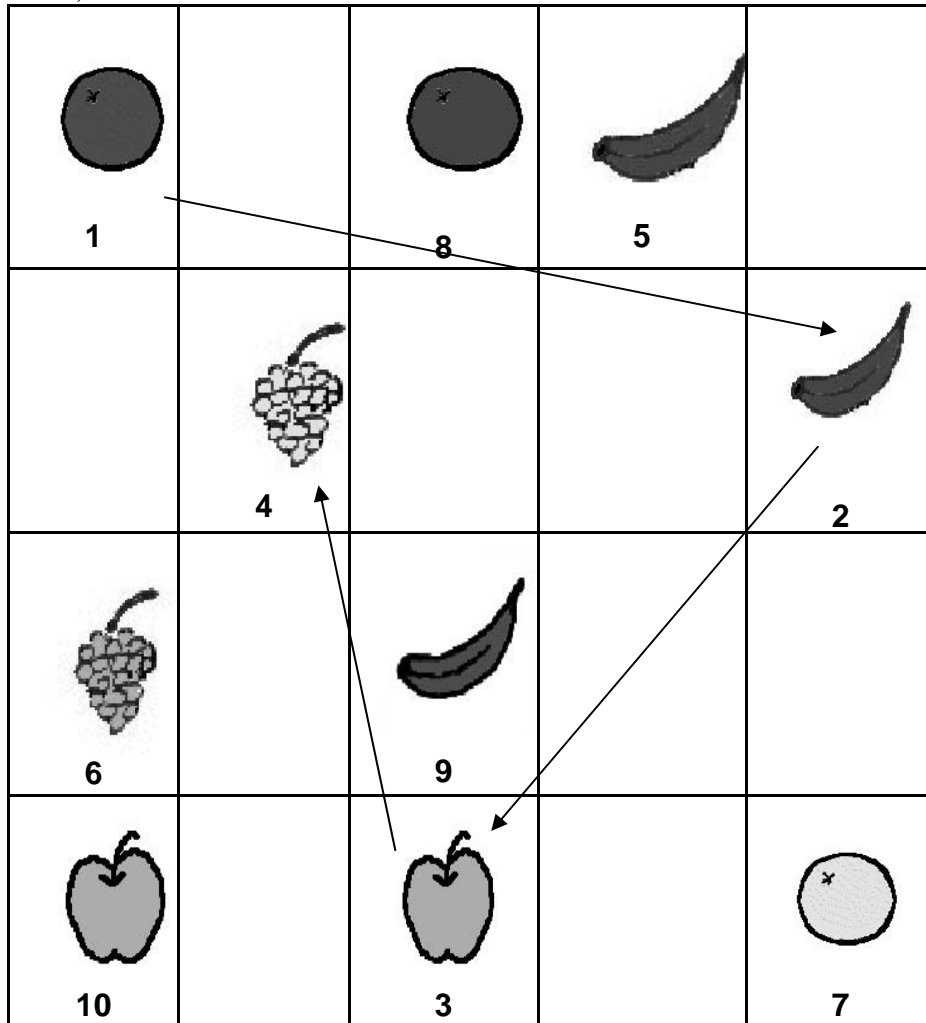


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(Test: 20 items)

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 Appendix D  
 "ORAL TRAILS: STRUCTURE OF THE TEST"  
 TRAIL B: CONCEPTUAL PLANNING

"Now, all the fruits are wrong but the colors are right. I want you to look for the number and tell me the number and the real fruit that should be there: 1-apple, 2-pear (3- orange, 4-banana)"



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(Test: 20 ITEMS)