



# Operationalization of Bachman's model via a multimodal reading comprehension test: Screening test method facets and testees' characteristics



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## ARTICLE INFO

### Article history:

Received 19 March 2016  
Received in revised form 26 September 2016  
Accepted 27 September 2016  
Available online xxx

### Keywords:

Test method facets (or test format)  
Test takers' characteristics  
Target ability  
Bachman's model

## ABSTRACT

Test performance is a function both of the test takers' personal attributes and of the test method facets. However, much of the previous research has addressed the covariates of assessment preferences of pupils rather than those of their actual performances. Following the microsystem perspective and as part of a larger project, this study was set out to detect the learner factors and linguistic parameters which mediate performance on different test formats. A number of language learners responded to the group embedded figures test, willingness to communicate scale, Michigan proficiency test, and a reading comprehension test battery. Based on the previous empirical research, a hypothetical model was designed and tested using structural equation modeling. The findings were as follows: (a) Performance on controlled and constructed response tests is substantially mediated by testees' characteristics (cognitive source); (b) Target ability (linguistic source) is the most significant determinant of performance on free-response tasks.

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## 1. Introduction

As Bachman comments,

*"Some test takers find a cloze test intimidating, and do poorly, while at the same time performing well on a test consisting of the completion of individual sentences, or a multiple-choice test based on a reading passage...If an individual's field dependence, for example, affects his performance on one cloze test, it is likely to affect his performance on any cloze test"* (Bachman, 1990, pp. 111–164).

Further instances were provided by Bachman to substantiate that test score is affected by three systematic factors, including the target ability, test method facets (i.e. characteristics of the methods used to elicit knowledge or ability), test takers' personal attributes (i.e. testees' individual or group characteristics), and one unsystematic or random factor (i.e. testees' emotional state and physical health). In this model, *test method facets* and *test takers' characteristics* are of particular significance in designing and using a test,

since they are the only potential sources of error in measurement over which test developers have some degree of control.

Given this conceptualization, in this study we have adopted a microsystem view<sup>1</sup> towards test performance, in that multiple individual differences were investigated in order to detect the correlates of students' scores on a triangulated reading test. Built on the previous research, a hypothetical model was initially designed, subsuming performance on three test formats (i.e. multiple-choice, short-answer, and essay-type tests) as the dependent variable. Four factors (i.e. willingness to communicate, field sensitivity, word size, and proficiency) also served as the independent variables, where willingness to communicate and field sensitivity represented test takers' characteristics (learner factors) and proficiency and word size served as the indices of target ability level (language factors). An assumption was made early in the study that success in doing any test format calls for certain learner characteristics and language capabilities. The model was then tested through structural equation modeling, and a final model of test performance in language learning contexts was developed.

The rest of the article is structured as follows. Section 1.1 provides an overview of the empirical studies on the most common test formats and cognitive correlates of language tests performance. Section 1.2 outlines the specific objectives of the study, the

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target variables, and the research questions. The hypothetical model and the rationale for its development are described in Section 1.3, followed by methodology, results, and discussion sections.

### 1.1. Test performance and its microsystem elements: review of relevant research

According to Bachman (1990), test performance (or test score) is affected by a multitude of test-internal and -external forces, which he divides into systematic and unsystematic sources. Whereas target ability (e.g., language proficiency), test method facets (e.g., test format, time allocation, and rubric), and test takers' characteristics (e.g., individual styles like field sensitivity and group characteristics like race, education, and gender) constitute the systematic elements, testees' emotional, mental, and physical statuses at the time of testing represent the unsystematic or

random factors, over which test developer has little control or preplanning power.

Over the history of language testing, a spectrum of *test formats* has been employed, among which are cloze, c-test, gap-filling, matching, multiple-choice, open-ended, ordering, and summary writing. They range from the most objective to the most subjective forms (e.g., Alderson, 2000; Kobayashi, 2002). Whereas assessing objective tests like multiple-choice and dichotomous ones does not involve reliance on examiner's personal judgment, subjective tests such as open-ended or short-answers are scored based on the personal judgment of the rater. In the present research, performance on three test formats of multiple-choice (a controlled test), short-answer (a constructed response test), and essay-type (a free-response test) has been explored in relation to the test takers' target ability (here language competence) and individual characteristics.

**Table 1**  
Previous Research Comparing Various Test Formats and Their Correlates.

Research	Objective(s)	Result(s)
Hansen and Stansfield (1981)	Exploring the relationship between performance on various language test formats and sensitivity styles	A positive relationship was detected between field independency (analytic style) and scores on language tests, particularly in the case of cloze tests
Jamieson (1992); Fehrenbach (1994)	Delving into the association of field sensitivity and language learning success	(a) A positive relationship was reported between field independence and success on the Test of English as a Foreign Language (TOEFL) (b) Field dependents (the holistics) had difficulty restructuring ideas from text and tended to summarize less accurately than field independents (c) Field dependents had difficulty assessing the differences among multiple choices and often returned to the text for validation of an answer
Tinajero and Paramo (1998)	Screening the influence of field sensitivity on academic achievement	Field independent subjects performed better on standardized tests, in general, and on multiple-choice tests, in particular
Danili (2004); Cao (2006)	Investigating the relationship between performance on various paper-and-pencil classroom test formats and testees' cognitive styles, personal preferences, and intellectual development	(a) Short-answer and open-ended questions were favored over objective tests by divergent pupils (b) Field independent pupils outperformed in multiple-choice, short-answer, and structural communication grid tests (c) Field independency was associated with better performance in almost all assessment formats
Blanton (2004)	Examining the effect of field sensitivity style on test performance	(a) Field independent students performed better on both timed and un-timed multiple-choice tests (b) Cognitive styles had more influence on performance on standardized tests of reading comprehension than did ethnicity and gender
Danili and Reid (2006)	Detecting the cognitive correlates of pupils' test performance	(a) Field dependency was related to performance on all assessment formats (b) Convergent/divergent style correlated with performance on language assessments, except for algorithmic types of questions where there was a greater use of symbols and less use of words
Liu (2009)	Assessing the effect of three test methods of multiple-choice, gap-filling, and short-answer on reading comprehension	(a) Gap filling task was the most difficult and short-answer was the easiest test (b) Both low and high proficient learners were affected by test method
In'nami and Koizumi (2009)	Assessing the effect of multiple-choice and open-ended test formats on reading and listening test performance	(a) Multiple-choice test was easier than open-ended format in reading and listening, with the degree of format effect ranging from small to large in reading and medium to large in listening (b) Format effects favoring multiple-choice formats were consistently observed
Teemant (2010)	Detecting the predictors of university students' classroom testing practices	Language proficiency, test anxiety, and preferences for particular test formats, such as multiple-choice over essay questions, contributed to difference in their ability to demonstrate content knowledge
Hassani and Maasum (2012); Sawaki (2003); Yu (2008)	Investigating the impact of summary writing and open-ended questions on students' reading performance and its relationship to English language proficiency	(a) Summary writing task was more challenging to the students than open-ended questions (b) Both intermediate and low achievers had better performance on summary writing than open-ended questions
Bazargani and Larsari (2013)	Identifying the cognitive correlates of multiple-choice test performance	Impulsivity/reflectivity cognitive style influenced on multiple-choice test performance, but gender did not

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