Journal of Cognitive Education and Psychology
Volume 18, Number 1, 2019

Integration of Israeli Students of Ethiopian Origin in Israeli Universities

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The current criterion for acceptance to universities in Israel is based on psychometric testing that presents a strong barrier for acceptance of students of Ethiopian origin (SEO) to the universities. Based on the sociocultural theories of Vygotsky and Feuerstein, we suggest an intervention aimed at integrating SEO, considered to be "culturally different," in universities.The intervention includes a novel screening process (based on dynamic assessment [DA] and an interview), academic oriented metacognitive course, and supportive counseling. A group of SEO (n = 665) with low psychometric scores, applied for assistance in admission to university, in seven cohorts (2010-2016). A group of 174 (26%) candidates were selected for the project and enrolled for studies in university; 49.4% enrolled in prestigious departments (e.g., medicine). The findings showed that despite the significant lower psychometric scores of the SEO as compared with the national average, only 4.6% have withdrawn at the end of first year as compared with 10.8% of the national Jewish sample and 12.4% among SEO population. A higher percentage of SEO in the current sample enrolled in high prestige departments than SEO in the population. No significant differences were found between dropped-out and continuing students in the psychometric test. Prediction of three-years' grade point average (GPA) by psychometric scores were not significant (R^2 = .03, p > .05) as compared to the prediction in SEO population (R^2 = .10, p < .001). The findings support Vygotsky's and Feuerstein's approach that standardized tests of students with deprived

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http://dx.doi.org/10.1891/1945-8959.18.1.18

cultural backgrounds do not reflect their learning potential and that the use short-term intervention may be an effective mechanism of preparing students for academic success.

Keywords: dynamic assessment; cognitive modifiability; learning potential; psychometric test; ethnic minorities; culturally biased testing

The current criteria for acceptance to universities in Israel is based mainly on psychometric tests and average scores on matriculation exams. These psychometric test criteria present a strong barrier for acceptance of students of Ethiopian origin (SEO) to the universities. In recent years, the ever-increasing argument has been that these tests are culturally-biased and discriminate against disadvantaged populations (Feuerstein, Feuerstein, Falik, & Rand, 2002; Tzuriel, 2001, 2012, 2018). The reasons they tend to score low is not necessarily a reflection of their learning potential; there are social and cultural factors which explain their low scores. In the 2015–2016 academic year, only 1.2% (3,194) of all students studying in institutions of higher education were of Ethiopian origin as compared to 2.5% in the population between the ages 20–29.[1] The August 2012 Student Union Report[2] found that the parents of the examinee and their level of education are the most significant predictors of achievement on the psychometric test. The report also states that the psychometric exam plays a significant role in replicating educational gaps in Israel. According to a 2014 report by the Knesset Research and Information Center,[3] the average psychometric score of the upper-class candidates is about 200 points higher than the average score of the lower-class candidates.

The criticism against conventional psychometric testing has led to development of dynamic assessment (DA). DA is focused on (a) identifying the learning potential of individuals, (b) providing information on deficient cognitive functions that are responsible for low academic performance, and (c) *mediated learning* strategies required to enhance cognitive development. The DA approach was guided by theoretical conceptualization about the nature of *cognitive modifiability* (Feuerstein et al., 2002) and *zone of proximal development* (ZPD) (Vygotsky, 1978). The educational necessity for changes in assessment procedures has been driven by psychologists and educators who asked questions about the plasticity of the human mind, the effect of socio-cultural factors on cognitive development, efficiency of cognitive interventions in modifying children's cognition, and specific factors responsible for cognitive modifiability (e.g., Carlson & Wiedl, 1992; Elliott, Grigorenko, & Resing, 2010; Feuerstein et al., 2002; Guthke, 1993; Haywood & Lidz, 2007; Haywood & Tzuriel, 1992, 2002; Lidz & Elliott, 2000; Sternberg & Grigorenko, 2002; Tzuriel, 2000, 2001, 2012, 2013, 2018). In the following sections we describe social and educational issues regarding SEO in Israel, the DA of learning potential, and the program for academic integration in universities of SEO; a program which includes DA as an integral component.

IMMIGRANTS OF ETHIOPIAN ORIGIN (SEO) IN ISRAEL

The Ethiopian community constitutes about 1.7% of the population in Israel.[4] The average income per household is 35% less than the average in the general population. In 2016, the proportion of SEO in higher education institutions was only 1.2%; disproportionately lower than their number in the population. This gap can be explained by two main factors: First, the psychometric scores of examinees of Ethiopian-origin are lower than the general average

(447.6 as compared to 576.0); therefore, their rejection rate from universities is 30.2% compared to 20.02% in the general population. Furthermore, their drop-out rate from higher education institutions, at the end of first year, is 12.8% as compared with 10.8% among Israeli-born Jewish students (Central Bureau of Statistics, 2013).

The Ethiopian immigrants, upon arrival to Israel, had to overcome a gap of civilization and information of several hundred years and had to adapt to the Israeli society (Tzuriel, 2012; Tzuriel & Kaufman, 1999). Coming from an illiterate society where their rich culture was transmitted orally, they had to go, upon arrival to Israel, through rapid change and adjust to differences in both material and symbolic tools (Vygotsky, 1978). For example, they might not see the importance of responding quickly to academic tasks, demonstrate a lack of proficiency in the dominant language, and function on a low level due to deficient cognitive functions required for successful academic achievements (Tzuriel & Kaufman, 1999). In addition, many immigrants experienced traumatic situations on their journey to Israel. For many the change in the role and status of the parents in the family, in the new land, caused difficulties of coping with a discriminating and threatening new environment. Because of the social difficulties and cultural difference, the learning potential of SEO may not be reflected accurately in psychometric tests.

In response to the difficulties to integrate SEO in universities, we developed an intervention program, based on four interrelated components: (a) DA of learning potential, (b) a personal interview process aimed at selection of students for academic studies, (c) a short-range academic oriented metacognitive program aimed at preparing SEO for academic studies, and (d) supportive counseling process during three years of studies. Before presenting our four components of academic integration of SEO, a brief discussion on DA which is a major component in our program is presented.

Dynamic Assessment of Learning Potential

Theoretical Aspects. DA refers to an assessment, by an active teaching process, of perception, learning, thinking, and problem solving. The process is aimed at modifying an individual's cognitive functioning and observing subsequent changes in learning and problem-solving patterns within the testing situation (Feuerstein et al., 2002; Tzuriel, 2001). The terms *static* (or *standardized*) about *testing* refers to an assessment where the examiner presents items to the child and records his/her response without any attempt to intervene to change, guide, or improve the child's performance.

The DA of learning potential approach presented in this articleis based mainly on Vygotsky's (1978) sociocultural theory, specifically the ZPD concept and Feuerstein's *mediated learning experience* (MLE) theory (Feuerstein et al., 2002; Haywood & Lidz, 2007; Haywood & Tzuriel, 1992; Lidz & Elliott, 2000; Sternberg & Grigorenko, 2002; Tzuriel, 2001, 2012, 2013, 2018; Vygotsky, 1978). Both Vygotsky (1978) and Feuerstein et al. (2002) claim that the gap between learning potential and its realization exists in everyone (Feuerstein et al., 2002; Vygotsky, 1978), but it is evident that this difference is particularly significant among minority groups. Vygotsky (1978) demonstrated that individuals' cognitive development can be understood only by considering the sociocultural aspects from which it derives. The concept of ZPD was coined originally by Vygotsky to address the problems of measurement of mental age and the prediction of future learning and development (van Geert, 1994). According to Vygotsky, in determining the child's cognitive development, one should consider both the *actual* development level and the *potential* level. The actual

level can be measured by observing the child's independent problem solving without any guidance or help, much like the static standardized testing approach, whereas the potential level can be observed after the child has been mediated how to perform, as is done in DA.

DA has been motivated by the inadequacy of conventional static tests to provide accurate information about the individual's learning ability, specific deficient functions, change processes, and mediation strategies that are responsible for cognitive modifiability. While static tests measures focus on manifested level of one's performance relative to his/her age-related group, DA is focused on change processes and the mediation strategies required to actualize the learning potential. DA produces change in the examinee—within the testing situation—and assesses the implementation of learned strategies and cognitive principles in progressively more difficult problems. The learner's level of performance after mediation points to the individual's ability to benefit from mediation and provides more accurate indications about future treatment procedures and the prognosis of academic success. For a more detailed discussion see Tzuriel (2000, 2001, 2012).

The need to develop DA tests has emerged because of criticism on static standardized tests and the difference in the type of questions asked by DA as compared with standardized testing. The main criticism was focused on (a) the bias of standardized tests toward minority groups, (b) selective administration procedures of children coming from low socioeconomic level, (c) lack of consideration of motivational, emotional, and personality factors that affect academic performance, (d) lack of information on learning and meta-cognitive processes that affect academic performance, and (e) inadequate recommendations on remediation processes, specific interventions strategies, and prescriptive teaching (Tzuriel, 2000, 2001, 2012).

Research Aspects of DA. Previous studies indicate that static testing is limited for identifying the learning potential of individuals coming from minority or culturally different groups and that DA reflects more accurately their learning potential (Feuerstein et al., 2002; Guthke, 1993; Sternberg & Grigorenko, 2002; Tzuriel, 2001, 2012; Vygotsky, 1978). Feuerstein et al. (2002) made a clear distinction between *culture difference* and *culture deprivation*. Culturally different individuals, as compared with children of mainstream culture, would show initial low performance on cognitive abstract tests but after a short intervention given within a DA procedure would improve their performance and narrow the gap with their counterparts of the mainstream culture. Culturally deprived individuals, on the other hand, are those who are deprived of mediation processes *within their own* culture. Consequently, they have a relatively reduced modifiability, which is attributed to insufficient mediation on a proximal level. Previous findings with SEO children and adolescents show that that they are culturally different but nor culturally deprived (e.g., Kaniel, Tzuriel, Feuerstein, Ben-Shachar, & Eitan, 1990; Tzuriel, Haywood, & Mandel, 2005; Tzuriel & Kaufman, 1999).

Several attempts have been made in the last three decades to develop and apply DA measures with minority and culturally different populations. In the United Kingdom, Gupta and Coxhead (1988) developed DA measures for evaluation of Asian children's learning efficiency. Other measures were developed by Guthke (1993) in Germany and by Hamers, Hessels, and Van Luit (1991) in the Netherlands. Previous studies with minority and culturally different children have shown that DA provides information different from standardized tests. Guthke and Al-Zoubi (1987) compared a sample of 200 Grade 1 children in Germany to a comparable Syrian sample on both a static measure—the Raven's Colored Progressive Matrices (RCPM; Raven,

1956)—and a DA measure. The findings showed that the German children scored significantly higher than did the Syrian children. However, after a training phase, there was only a slight difference between the two groups. These results were interpreted as an indication that both ethnic groups have the same intellectual endowments. Similarly, Hessels and Hamers (1993) reported that although minority children scored significantly lower than Dutch children on learning potential tests, the differences were markedly smaller than with IQ tests. In South Africa, Skuy and Shmukler (1987) and Shochet (1992) used the Learning Propensity Assessment Device (LPAD) (Feuerstein, Rand, & Hoffman, 1979) and other psychometric tests with groups of children and students of Indian, Black, and "colored" origin. Skuy and Shmukler (1987) reported that although mediation was not generally effective in producing change on transfer measures, it was effective with a subgroup of colored high-academic status students. The group that benefited most from mediation was the high academic-status colored students. Shochet (1992) investigated the predictability of success in the 1st year of studies in the university using indices of cognitive modifiability taken before admission on a disadvantaged student population. The findings showed significant prediction among "less modifiable" students but not among the "more modifiable" students (modifiability was measured by DA prior to start of the studies). It was surmised that the less modifiable students are less susceptible to being modified during the 1st year, either by direct exposure or by MLE.

In a study by Tzuriel and Kaufman (1999), a group of first-grade immigrants of Ethiopian origin in Israel were compared with a group of Israeli-born children on the RCPM and on two DA measures: The Children's Analogical Cognitive Modifiability (CATM; Tzuriel & Klein, 1985), and the Children's Inferential Thinking Modifiability (CITM; Tzuriel, 1992) tests. There were significant group differences on the RCPM and on the pre-teaching scores of both DA measures, indicating superiority of the Israeli-born comparison group. However, after a short but intensive teaching process of about half an hour in each DA measure, the Ethiopian group narrowed the gaps and performed at about the same level on post-teaching and transfer tasks. It should be emphasized that for the children of Ethiopian origin, the mental activities of the DA measures are new and have no similarity to the type of activities practiced or transmitted in their culture. The lack of significant differences on the transfer items indicates that the children of Ethiopian origin could benefit from the mediation given to them, internalize the rules, and use them efficiently in the transfer items. The fact that the children of Ethiopian origin have changed their performance after a relatively short mediation phase can be attributed to the previous cultural "bedrock" of mediational processes that enable them to benefit from the mediation given within the DA context. One of the most dramatic changes was on the Classification subtest of the CITM. All children were asked to classify a set of 24 cards representing six categories (i.e., clothes, animals, furniture, shapes, means of transportation, and plants). The test includes a pre- and post-teaching phase with a short-term teaching phase of 1–2 minutes in which the principle of classification was explained. The findings showed that the children of Ethiopian origin improved their score from 0.70 to 9.00, as compared to a small improvement in the Israeli-born children from 10.20 to 12.00 (maximal score). Although these findings should be taken cautiously because of the differences in standard deviations (*SDs*) and the ceiling effect, they nevertheless indicate very substantial differences between the two groups in their basic approach to the Classification task. It seems that the initial performance of children of Ethiopian origin was due to their lack of familiarity with classification tasks rather than with lack of ability. The fact that such a simple mediation with the task immediately changed their functioning raises serious questions about administration of unfamiliar tasks with culturally different children without

looking carefully into the children's cultural background. Sometimes simple attempts to clarify a rule or teach an unfamiliar strategy can change the children's performance in a meaningful way.

Similar drastic changes following a DA procedure was reported by Sternberg et al. (2002) on a sample of Tanzanian children in grades 2–5 who were assigned to experimental and control groups. Children in the experimental group were administered a battery of DA and static tests, whereas the control children received the pretest and posttest without the in-between teaching that the experimental group received. The authors showed, as expected, dramatic changes in performance because of teaching given in the DA measures. The findings showed that on tasks of Syllogisms, a Sorting Task, and Twenty Questions, given in a dynamic way, the children improved 117%, 111%, and 220%, respectively.

Intervention for Academic Integration in Universities of SEO

The Intervention for Academic Integration in Universities of SEO is based on four equally important components as described below. Because of the central role of the intervention and the DA procedure used within the intervention we specifically describe it in the introduction section. It should be noted that the intervention for academic integration in universities of SEO is more than a technique for screening but rather a holistic approach that includes synergistically selection of students using a DA approach followed by cognitive and metacognitive intervention procedures.

Dynamic Assessment: The Learning Propensity Assessment Device (LPAD). The LPAD is composed of a set of DA measures where the examiner intervenes during testing to assist the examinee to use effective cognitive strategies, rules, and behaviors to arrive at the correct response. In its test-teach-test version, the examinee is given a pre-teaching test followed by mediation (teaching) phase and parallel post-teaching test. The tasks are constructed to permit learning processes. The tasks do not tap specific contents but rather relate the general cognitive aspects (i.e., cognitive functions) that are responsible for success or failure. Most tasks are constructed to be sensitive to change through variation of task complexity and abstractness. In a typical task, the examinee is taught a problem using a mediational style and the application and transfer of learning of rules, principles, and strategies to other problems examined. A detailed description of the main characteristics can be found in Feuerstein et al. (2002). For the current study, we used three tests from the LPAD (see Method).

The Interview Process. The interview process and the outcome decision were based on four elements: DA scores provided to the interviewer before the interview, psychometric and "Bagrut" (matriculation)[5] test scores, assessment of motivation and personality resources, and the coherence between the students' test scores and the choice of university department. Each candidate was interviewed by an experienced interviewer for about 30 minutes. A consultation of two interviewers was carried out in cases of doubtful recommendations.

Academically Oriented Metacognitive Course. The course was constructed specifically for preparing students for academic life and was administered for 40 hours in a period of two weeks. The course is based on a synthesis of instruments from the Instrumental Enrichment program (Feuerstein, Feuerstein, Falik, & Rand, 2006) and a set of metacognitive skills required for success in academic life. For each topic, there was a specific activity on selected pages from the Instrumental Enrichment program. Students were taught how to control impulsivity (e.g., using Word Organization, Organization of Dots from the Instrumental Enrichment program), understand the deficient cognitive functions in the input, elaboration, and output phases of the

mental act, specific memory strategies (e.g., Rey's Complex Figure, 16 Words), the model of MLE, interpersonal communication (e.g., Instructions), analysis of informative and scientific verbal texts, comparison processes and decision-making (e.g., Comparisons), planning and organization strategies (e.g., Organization of Dots), time management (e.g., Temporal Relations), data collection techniques (e.g., Distribution, Diagrams), and problem-solving models.

Counseling and Support. All candidates received individual support throughout their studies in the university. The support, tailored for each student, was composed of individual lessons, planning and writing articles, and preparation for examinations. Most students received between 2 to 3 hours of individual lessons a week during the first year of studies. In the following years about a third of the students received (by request) between 2 to 3 hours of individual lessons a week. It should be noted that the universities provide a similar counseling and support to SEO that are not part of our intervention. All SEO received a full scholarship from the Ministry of Immigration.

Goals of the Study

The social implications of academic success of Israeli SEO are of great importance for their integration in Israeli society. There is a need to break down the barrier of the psychometric tests that serves as an "entry ticket" for admission to the university and especially to prestigious departments. Furthermore, DA practices create an atmosphere that should encourage higher education institutions to look for culturally fair alternatives to the psychometric exam. Other possible consequences are building professional and academic leadership among Israelis of Ethiopian origin and changing the self-image of SEO in terms of their ability to integrate at senior professional levels. These broader consequences, however, will be examined in the long run and are not within the scope of the current study.

The main goal of the current study was to demonstrate that an intervention based on selection of SEO by DA and personal interview accompanied by a short metacognitive intervention program and counseling and support has the potential to facilitate student's academic success in prestigious university departments. The level of success was measured by three criteria: (a) the dropout rate of SEO in the program at the end of the first year of studies as compared with dropout national rate of Jewish students, (b) completion of studies on time (as defined by the universities, i.e., between 3 to 5 years depending on the department) compared to the national rate, and (c) the grade point average (GPA) scores at the end of the first and third year in their bachelor's degree program of study. Our basic assumption is that the DA approach makes it possible to overcome some of the cultural limitations by providing mediation to cope with cognitive, situational, motivational, and attitudinal factors that are responsible for the relatively low cognitive performance of students in non-Western communities. Other goals were to explore whether the GPA scores of SEO could be predicted by either the DA or the psychometric scores and whether there is a difference in GPA of SEO studying in departments of different prestige.

One of the methodological problems we faced was that we could not have a conventional control group of SEO that is accepted to the university without receiving the intervention. Universities do not want to accept students if their psychometric test scores do not fulfill the requirement of high psychometric score, especially in departments of high prestige (e.g., medicine, computer sciences, psychology, engineering). They agreed, however, to accept SEO who received our intervention based on experimental pilot. To overcome this limitation, set up by universities, we used a comparison group of the whole population of SEO studying in Israeli

universities (Population Group) who were accepted to the universities outside of our intervention (students in our experimental pilot sample were excluded from the population sample). Data on the population group were analyzed for us by the Central Bureau of Statistics (CBS) which is a national bureau in Israel and were compared to data gathered on the experimental-pilot group that received the intervention.

METHOD

Participants

Candidates from the Ethiopian community were invited to apply to two universities after assessment and intervention developed at the Feuerstein Institute during seven academic years—2010/2011 to 2016/2017. SEO were defined as students who were born or their parents were born in Ethiopia. The intervention included a screening process that contains DA using the LPAD (Feuerstein et al., 2002), a personal interview, a short academically oriented metacognitive program supported by Instrumental Enrichment contents (Feuerstein et al., 2006), and a supporting counseling process throughout their studies (see description above). The basic condition for applying for the program was an average matriculation score of 85 and above. As of the 2016/2017 academic year, the minimum psychometric score for submitting applications to the program is 400. Following the assessment and the interview, the candidates received a notice of acceptance or rejection. For some, acceptance was conditional on choosing a different field of study that is more suited to their abilities. After placing an advertisement in the press, 665 students contacted the Feuerstein Institute, and 174 (26%) were accepted to the program. This group was labeled as experimental-pilot group. The dropout percent of the experimental-pilot group was compared to the population of all Israeli Jewish students and to the SEO population group studying in universities (n = 952) who completed their bachelor's degree at the same period of the study (2010–2017). In addition, we compared the prediction of GPA by psychometric score in both the experimental SEO sample (n = 174) and the SEO population group studying in universities during the same years of study.

Instruments

Learning Propensity Assessment Device (LPAD). The LPAD is a DA set of instruments, each includes pre-teaching, teaching, and post-teaching test. For the current study, we chose three tests: Numerical Progression, Organizer and Verbal Analogies.

The Organizer test consists of problems that require hypothetical thinking in the verbal domain. In each item, the student is presented with a series of statements or premises. Each statement provides part of the information required in organizing and placing objects in positions relative to one another. The location of each item is not precisely specified within any single statement and must be inferred from data presented about the position of other items or the position of a given item relative to others. An example of a problem from the Organizer test is presented in Figure 1.

Tasks vary in their level of complexity in terms of the number of items to be organized (from 3 to 8) and the level of inference required (e.g., negative statements and number of eliminated objects). The strategies and rules required for solving these tasks remain constant. This test requires a moderate to high level of abstract representation and hypothetical inferential thinking. The Organizer test is composed of 14 parallel items for the pre- and post-teaching tests; items increase in level of complexity and difficulty. For the teaching phase, two items

15. Place the six liquids in the appropriate bottles.

    A. In bottles 1, 2, 4, 5, and 6 are Beer, Oil, Soda, Vinegar, and Wine.
    B. B. In bottles 1, 2, 3, 5, and 6 are Beer, Juice, Oil, Soda, and Wine.
    C. C. The Wine and Oil are in bottles 1 and 6.
    D. D. The Beer is beside the Oil, but Not beside the Vinegar.
    The solution is:

1	2	3	4	5	6

FIGURE 1. Example of an item from the Organizer test.

of medium level of complexity were used. Cronbach-alpha reliability coefficients received in a group DA for the pre- and post-teaching phases were .73 and .87, respectively (Tzuriel & Alfassi, 1994). Cronbach-alpha reliability coefficients based on the current sample for the pre- and post-teaching phases were .86 and .78, respectively.

The Numerical Progression Test is a DA measure aimed at assessing the cognitive modifiability in a numerical domain. The test's goals are to assess the examinee's capacity to understand numerical relationships, define them as rules, and apply the rules in constructing new information. The Numerical Progression Test is composed of a set of problems requiring completion of a series of numbers. An example of an item is: 4-8-7-14-13-26-25- __- __. To solve the problem, the examinee must understand the rules of the numerical progression. In the teaching phase, the examinee is encouraged to formulate and state the rule by which the answers were achieved. The examiner teaches relationships that are not understood. The Numerical Progression Test is composed of 15 parallel items for the pre- and post-teaching tests; items increase in level of difficulty. For the teaching phase five items of medium level of difficulty were used. Cronbach-alpha reliability coefficients based on the current sample for the pre- and post-teaching phases were .81 and .91, respectively.

The Verbal Analogies test is composed of a set of classical verbal analogies. In each analogy, the examinee is presented with a pair of related words and four pairs of words out of which only one contains the same relationship as the first pair; e.g., Furniture – Chair: 1. Flower – Tree, 2. Chair–Table, 3. Clothes – Dress, 4. House – Garden. The Verbal Analogies test is composed of 15 parallel items for the pre- and post-teaching tests; items increase in level of difficulty. For the teaching phase five, items of medium level of difficulty were used.

Process

All candidates who applied to the program went through a screening process which contained DA (using the LPAD tests) and a personal interview (see above). The LPAD tests were administered in a group format by experienced examiners over a 9–12-hour period. The screening phase was followed by a short intervention phase of Academically Oriented Metacognitive Program

which included 40 hours of learning of a blend of metacognitive and cognitive skills. In addition, all students received counseling by senior staff at the Feuerstein Institute and were assigned a coordinator to accompany and support them throughout their years of studies. For each student, a psycho-educational report and suggestions for specific departments were given. GPA scores were collected at the end of each academic year. Data was gathered during seven cohorts during the academic years 2010/2011 to 2016/2017.

RESULTS

Preliminary Analysis of Data

The DA findings of the students accepted, showed significant improvement from pre- to post-teaching, $F(1,172) = 153.05$, $p < .001$, $n^2 = .47$, thus indicating high learning potential. The DA scores served the interviewers in the following interview of candidates. The psychometric mean score of SEO experimental group was significantly lower ($M = 514.04$, $SD = 78.12$) than the national average of all students ($M = 637.53$, $SD = 54.86$). However, the SEO experimental matriculation average score was higher (92.91) than the national average (82.00). The DA data of the students is displayed in Table 1.

The findings of the LPAD show that except for Verbal Analogies (see Table 1), in Numerical Progression and Organizer tests, the post-teaching scores are significantly higher than the pre-teaching scores.

Number of SEO in Departments of High, Medium, and Low Prestige Level

One of the indicators of integration of SEO in society is the level of prestige of the department chosen for study. The university departments were divided into three levels of prestige based on the psychometric score required for student acceptance (high – ≤ 699, medium – 650–698, low – 550–649). The distribution of SEO students in each level of department prestige in the experimental SEO and SEO population groups is presented in Table 2. A Chi-square analysis revealed significant group differences $\chi^2(1, 1,128) = 69.2$, $p > .001$, indicating that the percentage of

TABLE 1. LPAD Scores (in Percent) of the Students Accepted to the Program

Test		Mean	*SD*	*t*
LPAD Average	Pre	73.31	11.37	12.37*
	Post	82.90	9.17	
Numerical Progression	Pre	56.06	21.03	20.73*
	Post	83.28	13.26	
Organizer Test	Pre	87.92	13.11	6.43*
	Post	94.46	7.95	
Verbal Analogies	Pre	75.73	15.14	-1.17
	Post	74.13	14.92	

LPAD = Learning Propensity Assessment Device; *SD* = standard deviation.
*$p < .001$.

TABLE 2. Distribution of Students According to Level of Department Prestige Among SEO in the Population and in the Experimental Group

Prestige	Population (%)	Experimental (%)
High	228 (23.89)	86 (49.42)
Medium	305 (31.97)	64 (37.78)
Low	421 (44.13)	24 (13.79)
Total	954 (100)	174 (100)

Note. SEO = students of Ethiopian origin.

experimental SEO students in the high prestige departments was higher than that in the SEO population and vice versa the number of experimental SEO students in the low prestige group was lower than that in the SEO population. From a total of 174 students who began the program, 71 have gone on to study natural sciences and engineering (including 12 in medicine), and 103 have gone on to study humanities and social sciences (including 27 in Law and 8 in Psychology). In addition, 80 students have already completed (at the end of 2016/2017 academic year) the undergraduate degree requirements. No significant differences in GPA were found among experimental Should be SEO pursuing programs in departments of different prestige levels, $F(2,170) = .74$, $p = .84$.

Comparison of Average Psychometric Score in the Experimental SEO and the General Population

The average psychometric scores at every prestige level were compared to the average psychometric scores of the general population at each prestige level and in the whole sample (per Central Bureau of Statistics, 2014[6]). The findings indicate that the average psychometric scores of the general population at each prestige level as well as in the total group was significantly higher than the scores of the experimental SEO (see Table 3).

TABLE 3. The Psychometric Average Score of Experimental SEO Compared With the Average Score of the Population in Each of Department Prestige Level

	Population		SEO Experimental		
Prestige	Mean	*SD*	Mean	*SD*	*t*
Total	637.53	54.86	514.03	78.12	24.12**
High	673.08	33.22	545.45	74.04	18.10**
Medium	605.21	37.80	487.80	64.52	13.66**
Low	547.63	46.84	423.17	43.34	9.59**

Note. SEO = students of Ethiopian origin; *SD* = standard deviation.
** $p < .001$.

Dropout Rate

Out of all experimental SEO who began their studies at the university (N = 174), only 4.6% withdrew after the first year as compared with 10.8% of the national Jewish population and 12.8% among SEO population in all universities (Central Bureau of Statistics, 2016). No significant differences were found in our sample between dropped-out and continuing students in the psychometric test, $F(1,169) = .002$, $p = .97$ or in the matriculation average grade, $F(1,153) = .39$, $p = .53$.

Completion of Studies on Time

Among all the experimental SEO who began their studies since 2010, 77% (N = 89) completed their studies on time, compared to 39.5% among SEO who are not in the program, and 57.7% in the general population (Central Bureau of Statistics, 2018, 2019).

Prediction of GPA Scores by Psychometric and DA Scores

The GPA average of SEO in our experimental sample who completed their bachelor's degree was 80.66 (SD = 7.18, N = 80). To examine the prediction of GPA by psychometric score we applied two regression analyses, where the first criterion variable was first-year GPA and the second was three-years GPA. The predictive variables were cognitive modifiability index generated from the LPAD scores and psychometric scores. Students' cognitive modifiability scores were computed for each of the LPAD measures (i.e., Numerical Progression, Organizer and Words Analogies) by means of a regression analysis. A cognitive modifiability index was computed for each score. The cognitive modifiability index was computed by means of regression analysis in which the residual score on post-teaching was extracted after controlling for the pre-teaching score of the dynamic test. In other words, the residual of the post-teaching score was computed after controlling for the explained variance of the pre-teaching score; the residual values represent the unexplained variance left after subtracting the variance contributed by the pre-teaching score. This procedure is a better measure reflecting change than a simple gain score that has the disadvantage of possible ceiling effect and regression to the mean effect (Embretson, 1992; Tzuriel & Caspi, 2017). The findings of the regression analysis revealed that neither the prediction of first-year GPA, $R^2 = .03$, $F(2,165) = 2.11$, $p = .12$, nor the prediction of three-years GPA, $R^2 = .03$, $F(2,77) = .98$, $p = .38$, were significant. For comparative reasons, we also computed the prediction of three-years GPA by psychometric score of the population of SEO studying in all Israeli universities (n = 954) during the years 2010–2017. This analysis, carried out specifically for the current study by the CBS, revealed a significant prediction, $R^2 = .10$, $F(1, 952) = 97.40$, $p < .001$.

DISCUSSION

The findings indicate that use of an intervention may be considered as a more effective mechanism of selecting and integrating students with deprived cultural backgrounds to the university than the standardized psychometric test that is typically used. The DA and the interview applied with candidates were found to be effective factors in the selection process that enables students to be admitted to the university and succeed. Our findings clearly show that much higher proportion of experimental SEO were accepted to prestigious academic departments than SEO in the population that did not participate in the program. Furthermore, the dropout rate of SEO of the experimental sample was lower (4.6%) than that in the general Jewish university students

(10.8%) and nonparticipating SEO students (12.8%), and the completion of studies on time was higher (77%) that of nonparticipating SEO (39.5%) and their students in the general population (57.5%). These findings were despite the fact that both groups of SEO received similar counseling and support component. Our findings indicate that the SEO have similar intellectual skills to succeed in academic studies as that of other students. It should be emphasized that the success of integrating the SEO is attributed to the combination of all components of the intervention rather than to one or another. These findings support Vygotsky's (1978) sociocultural theory and Feuerstein et al. (2002) structural cognitive modifiability theory according to which social and cultural factors act as major barriers for academic success of individuals coming from deprived social background. The conventional practice of using standardized tests as measures of learning ability is problematic mainly because we can infer the existence of learning only through its distant outcome (end-result) performance (Haywood & Lidz, 2007; Kozulin, 2011; Tzuriel, 2001). Our findings are compatible with Rey's (1934) concept of "educability." Educability refers to the individual's ability to benefit from learning experience. In his experiments on children, Rey demonstrated that repeated presentation of similar tasks with a simple feedback generated learning profiles that are more informative than the children's static scores on the same tasks.

The relatively lower dropout rate of SEO as well as their academic success place in question the popular long years of use of the psychometric test as a major instrument for accurate selection in Israel. It should be further emphasized that about half of the SEO in the current sample chose to study in high-prestige departments. Although the GPA scores of SEO in the current study were significantly lower than the rest of the students, they still managed to succeed in their academic studies.

The relatively low dropout rates of SEO in the program, alongside their high percentage of completing their studies on time, as compared with other students indicates, among other things, that use of DA for screening and placement of students could be an important alternative to the psychometric test in the selection process of the university. It should be emphasized that we made a clear differentiation between use of DA for selection of students and use of DA for prediction of GPA. The DA process was aimed mainly to help identifying students showing high cognitive modifiability and in general successful completion of their studies. Even though we analyzed the prediction of GPA by DA and psychometric data, we were aware of the fact that GPA scores could be determined by various intellective (e.g., cognitive ability, metacognitive strategies) and nonintellective (e.g., intrinsic motivation, sociocultural background) factors.

The findings showing significant prediction of the GPA by the psychometric score among the SEO population ($R^2 = .10$, $p < .001$) as compared with the prediction in the experimental SEO ($R^2 = .03$, $p > .05$) means that only 10% of the variance in GPA for the SEO population could be explained by differences in psychometric scores as compared with 3% in the experimental SEO. The significant prediction in the SEO population can be explained by the large number of subjects in the SEO population ($N = 952$). However, one cannot avoid asking the following important questions: (a) What causes the other 90% and 97% of GPA variance in the SEO population and SEO experimental sample, respectively? (b) When a psychometric score predicts significantly the GPA, what is necessary to defeat that prediction? (c) What factors influencing the unexplained variance can help to defeat the prediction in the explained variance? Possible answers might be indicated in the findings of the experimental SEO group showing that a selection process guided by cognitive modifiability criteria accompanied with a short metacognitive intervention and supporting counseling process may "diffuse" the relation between psychometric and GPA scores. Based on the theoretical perspectives of Vygotsky and Feuerstein

there are a multitude of social factors responsible for academic success other than a static test result. The most acceptable explanation for the low prediction of GPA is the fact that the SEO students come from an impoverished social background where family, social, and cultural factors are prominent and override the impact of the cognitive scores. Support for this explanation may be derived from the findings showing significant predictions of first year GPA (46%) and bachelor's degree final GPA (41%) by psychometric scores in the overall students' population (Kenet-Cohen, 2016) as compared with the current experimental SEO (3%). This huge difference strengthens our position that psychometric scores may be nonrelevant in testing students coming from minority groups and/or impoverished populations.

Another possible explanation to the low prediction could be related to the limit of range of scores; only those demonstrating a relatively high cognitive modifiability (as indicated by pre- to post-teaching improvement on the LPAD) and motivation to learn (as observed in the interview) were selected. From a statistical point of view, we surmise that if all candidates would have been accepted, we probably would get a higher prediction (due to extension of scores' range). In other words, the ideal condition for examining the prediction of GPA by preliminary cognitive tests would be to accept all candidates (i.e., Positive–True, Positive–False, Negative–True, Negative–False). Unfortunately, the universities agreed to accept only the students considered to be successful in university studies (i.e., Positive–True and Positive–False) with an assumption that the number of Positive–False cases will be negligible. Another possible factor that limits the strength of prediction in the experimental SEO might be related to the compensatory orientation of some lecturers to give a higher grade to articles, (in courses where grades are determined by articless) submitted by SEO. These lecturers consider the difficulties of the students coming from a different sociocultural background and grade the article higher than usual. This compensatory grading might cause a depletion of the correlation between the cognitive test and the GPA.

The fact that the experimental SEO received higher average matriculation scores than the population average, despite their lower psychometric scores, indicates further that academic success does not derive necessarily from low cognitive skills as reflected in the psychometric scores.

Educational and Social Implications

Our finding indicates that DA is a useful procedure to identify the learning potential of students coming from impoverished backgrounds. The educational implications of our findings support academic institutions to rely less on psychometric tests as a primary or sole criterion for their selection process. The success of the SEO in being accepted into prestigious departments, their relatively acceptable GPA, their low rate of dropout and high percentage of completion of studies on time, shed a serious doubt about the effectiveness of psychometric tests as a major selection mechanism, especially with students coming from low socioeconomic levels. Our findings support the growing insight in academic circles and among decision-makers in Israel that the psychometric test creates unjust discrimination against minorities and students coming from different cultures or from low socioeconomic status. These results confirm the conclusion that psychometric tests constitute an impenetrable barrier for disadvantaged minority for accession to higher educational opportunities, with special regard for coveted subjects.

It is important to note that the intervention used with the experimental SEO students does not end upon students' admission to university. The students also receive cognitive tools,

tutoring and enough financial support to maintain their studies. Perhaps thanks to this inclusive system, the students can cope not only with the academic challenges, but also can persist throughout all the years and finish their degree program on time. The inclusiveness of the system shed light on important supporting variables, especially as applied to culturally and economically affected minority students.

The social implications of the project extend beyond the direct benefits to students who pursue higher education and receive a prestigious degree. The increase of percentage of SEO attending university enhances the chance of getting out of poverty and being integrated into society. Therefore, the process of integrating Ethiopian immigrants into the higher education system in Israel will encourage more young people to pursue higher education to serve as role models to peers, to decrease a stigmatized view of individuals of Ethiopian origin, and to increase their sense of competence to deal with the challenges at university, even in prestigious departments.

NOTES

1. The Ethiopian population in Israel - Selected Data for the Sigd holiday, November 11, 2017
2. The Psychometric Test as a Tool for Screening Applicants for Higher Education: For and Against - The Israel Student
3. Screening at Admission to Higher Education Institutions and the Psychometric Test - Knesset Research and Information
4. The Ethiopian population in Israel - Selected Data for the Sigd holiday, November 14, 2016
5. Bagrut examinations assess knowledge on subjects studied in high school. The process of matriculation in Israel is supervised by the country's Ministry of Education. The exams of all compulsory subjects and most elective subjects are designed and written by the Ministry, thereby creating a standard measure of the students' knowledge throughout the country.
6. Results of Applications of First-Degree Candidates in Universities, by Field and Subject, First Preference and Average

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Disclosure. The authors have no relevant financial interest or affiliations with any commercial interests related to the subjects discussed within this article.

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