

Elementary School Teachers' Referral Decision Making – A Biopsychosocial Approach

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Received July 24, 2021; Revised September 15, 2021; Accepted September 28, 2021

Cite This Paper in the following Citation Styles

(a):[1] Panagiotis Varsamis, Anastasia Gkouvatzi, Vasiliki Kalamaki, Athanasia Manola, Ioanna Papadopoulou, Stylianos Takaridis, Vasiliki Tanou, "Elementary School Teachers' Referral Decision Making – A Biopsychosocial Approach," *Universal Journal of Educational Research*, Vol. 9, No. 10, pp. 1785 - 1793, 2021. DOI: 10.13189/ujer.2021.091007.

(b):Panagiotis Varsamis, Anastasia Gkouvatzi, Vasiliki Kalamaki, Athanasia Manola, Ioanna Papadopoulou, Stylianos Takaridis, Vasiliki Tanou (2021). *Elementary School Teachers' Referral Decision Making – A Biopsychosocial Approach*. *Universal Journal of Educational Research*, 9(10), 1785 - 1793. DOI: 10.13189/ujer.2021.091007.

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Abstract Over the past years, the biopsychosocial model has had a significant impact on the field of Special Education. More specifically, the Children and Youth version of the International Classification of Functioning (ICF-CY, WHO, 2007) emerged as a useful screening tool. Within this framework, the aim of the present study was to explore the understanding of student referral to a pre-diagnosis support program or to a final diagnosis. Teachers' referral decision-making was examined in a structural equation model, which incorporated four latent variables, namely, students' Personal Factors, Activity Performance and Educational Support, as well as teachers' Referral Intentions. To test the capacity of this model, 62 teachers of elementary school classes documented all the needed information for each of their 1092 students. All variables were based on the ICF-CY and they were evaluated accordingly. The verified path structure was to a large extent consistent with the biopsychosocial model. Teachers relied primarily on students' prior educational support when they formed their opinion about student referral. Educational support received by students functioned as a mediator factor between activity performance and referral intention. Overall, results revealed a complex structure with regard to the teachers' decision making processes. The subgroups of students that emerged were discussed, and refinements for future studies were suggested. This study delivered useful implications for educational interventions, referral policy and teacher education.

Keywords ICF-CY, Screening, Special Education Needs, Cohort Study, Path Analysis

1. Introduction

Over the past two decades, the International Classification of Functioning (henceforth abbreviated as ICF [39]) has been disseminated in the scientific fields of health, rehabilitation, education and special education as a conceptually robust and an ecologically valid instrument which serves multiple purposes [13,16,24,33]. This tool is based on the biopsychosocial model and constitutes a comprehensive guide that contributes to the understanding of the dynamic interplay among the numerous individual and environmental factors of health and well-being. In particular, studies based on the ICF's version for Children and Youth (henceforth abbreviated as ICF-CY [40]) focused, among others, on the involvement of developing people in key life domains, on activity in everyday life situations, on the integration of challenged students in school settings, on the impact of critical environmental factors, and on the individual support needs assessment [3,5,26,37].

At the conceptual level, both ICF and ICF-CY consist of five large components, i.e., Body Functions and Structures, Activity, Participation and two contextual factors, namely, Personal Factors and Environmental Factors [39,40].

Whereas body structures refer to all anatomical entities of the human body, body functions describe the vast array of fundamental physiological and psychological human functionality. Activity stands for the execution of tasks, while participation has a social connotation denoting the involvement in life situations. Personal factors represent individual attributes that are not part of health conditions, but still may influence health/disability states. Lastly, environmental factors encompass the physical and social contexts in which humans live. At the classification/measurement level, ICF and ICF-CY name and define numerous unique domains for most of the components. All defined domains are alphanumerically coded and are briefly termed as 'codes' [39,40]. Then, in each code, a pair of qualifiers can be applied to achieve classification. In most cases, the severity qualifier is used to document the amount of difficulty in Body Functions and Structures, Activity and Participation [4,18,39,40]. At this point, it is necessary to state that personal factors do not contain any distinctive domains yet. Even though several personal factors—like gender, age, race, upbringing, life experiences and concurrent events—are named, codes and qualifiers are not available [36].

Studies around ICF-CY have demonstrated its value as an interdisciplinary and development-based screening tool, suitable for setting and monitoring relevant assessment-guided educational goals; at the same time, it enables the bridging of views of professionals, individuals served, and their families [1,2,18,25,31]. This model has been implemented in many groups of children and adolescents in need of special support, including those with Cerebral Palsy, Developmental Coordination Disorder, Autism Spectrum Disorders etc. [10,12,21,30]. In conclusion, ICF-CY can substantially broaden our understanding of the developmentally brighter and darker sides of growing people. Specifically, it can aid understanding school-aged persons' whole external and internal framework of reference [4].

Schools are the primary educational spaces for children and adolescents. They often constitute the grounds for multifaceted needs assessment and multidisciplinary supportive work [5]. This type of work often encompasses Individualized Educational Programs (henceforth abbreviated as IEPs). Therefore, teachers hold a prominent role in shaping the daily activity and participation of their students. In particular, they have a close relationship with their students and are thus in the position to a) observe students in a wide range of manifestations of their actions in the classroom and in the schoolyard, b) to form a good overview of the educational and psychosocial needs of their students, and c) to systematically record all this information [7,8,37,38].

Only recently empirical research has focused on confirming the interrelationships among the components and/or domains of the ICF-CY [15]. Nonetheless, these studies are still sparse. At the same time, many researchers stress the need for a better understanding of the complex and dynamic relationships among the ICF-CY components [3,15,16,35]. Within this context, the inclusion of students'

personal factors, the evaluation of the educational environment, the creation of short tools for screening and their adaptation to the specific country and culture of implementation are suggested [1,2,5,25,31,36,38].

The first purpose of the present study was to develop a short list of ICF-CY codes to be used for screening in Greek primary education [11]. The second purpose was to examine teachers' referral decision-making processes [26], after taking into account their students' school activity performance and the educational support they receive. Except these factors, the theoretical model under consideration includes also certain personal factors, such as sex, age and mother tongue of the students. This study constituted a novel approach to exploring teacher referral intentions through the ICF-CY model.

2. Methods

Participants

For the purpose of this research, 62 teachers, who were in charge of an equal number of classes in 11 elementary schools, were mobilized. The classes had an average of 21 students ($SD = 2.50$). All schools come from five Municipalities and are based in urban city clusters of Eastern Thessaloniki [29]. The teachers responded to the call of the Center of Differential Assessment, Diagnosis and Support of special education needs (henceforth abbreviated as CDADS) in charge, a public authority which provides services for the screening, diagnosis and support of pupils. After an examination of data for improper checking of answer boxes ($N = 36$), as well as for multivariate outliers ($N = 52$), 1092 pupils (550 boys, 542 girls) were included in the data set. The students came from all grades of the elementary schools, thus covering the modal ages from six to 12. Specifically, 145 students belonged to the 1st grade, 196 to the 2nd, 158 to the 3rd, 214 to the 4th, 170 to the 5th, and 209 to the 6th. In all classes the distribution of the students' sex was similar. Across the sample, the already diagnosed students were 91. Only 39 responses were given regarding the type of Special Education Needs (henceforth abbreviated as SEN). According to the multiple response sets, just over half of the reports relate to mild learning difficulties (56,4%). Each of the three categories "Special Learning Disabilities," "Autism Spectrum Disorders," and "Attention Deficit Disorders" with or without hyperactivity comprises 7,7% of the reports. The rates of other diagnostic categories, such as "Mental Retardation," "Neurological Disorders," etc., were below 5%.

Measures

For the purpose of this study, the calculation of the inverse probability of student selection was not deemed necessary. Hence, no population data of the geographical areas or the schools were recorded. Class size and schools' geographical region were documented in behalf of sample

and data inspection.

Personal Factors. Sex, class, modal age and SEN category were recorded for each student. Furthermore, data were collected about students' native language, however only for those cases where he/she arrived in Greece recently (refugee, immigrant, $N = 12$), or in those cases where he/she was Roma ($N = 12$). These selected personal factors were in essence student attributes, since students were actually the objects of the present study. As elaborated in the introductory section, all these factors belonged in the conceptual framework of the ICF-CY. Most of them were dummy-coded (value one was entered if an attribute was true for a student, whereas value two was assigned if that attribute was not true). Also, ordinal numbers were used to represent class and modal age.

Activity Performance. Five CDADS members, all of whom have been collaborating with teachers in their specialty for many years and have extensive experience as Primary Education teachers themselves, were informed of the ICF-CY rationale and were given the codes of the fields: Purposeful sensory experiences, Basic learning, Applying knowledge, Communication, and Mobility. Their task was to select those codes that usually weigh on their decision to assign or not assign a SEN to elementary school students. The group of members came up with 15 codes (Table 1). The language version of the codes was based on the Greek translation of the ICF [19]. Most codes were then

supplemented with examples of objectives for each class from the country's current curricula. The teachers answered apropos of each student in their class according to the answering key of Illum and Gradel [18]. With a range from zero to four, higher values correspond to greater difficulty in student activity performance. Exhaustive exploratory factor analyses [22] showed that the selected codes constitute a single factor. In order to reduce the number of variables, information from their correlations and distances was used. Thus, it was possible to create seven item parcels (Table 1), which showed excellent internal consistency (*Cronbach's Alpha* = .95).

General Educational Support. The educational support received by each student constitutes a variable of environmental factors according to ICF-CY. First, teachers were asked to rate the code e5850, i.e., Education services, with particular emphasis on how their current classroom teaching practices meet the needs of each of their students. Then the teachers decided on e5851, i.e., Education systems, focusing on the prevailing educational practices of their school always in relation to the capabilities of each of their students. For each code, teachers chose one of the levels from zero to four (0=no facilitator to +4=complete facilitator). According to the aims of the present study, there was no particular need for the distinction between facilitators and barriers. The internal consistency of the two codes was good (*Cronbach's Alpha* = .81).

Table 1. Descriptive statistics and parcels of the ICF-CY items

Code	Name	Parcel	Mean	SD	Skewness	Kurtosis
d 115	Listening	1	.48	.87	2.02	3.79
d 310	Communicating - receiving	1	.55	.89	1.75	2.56
d 330	Speaking	2	.62	.96	1.56	1.74
d 163	Thinking	2	.72	.98	1.35	1.17
d 140	Learning to read	3	.60	.95	1.70	2.32
d 166	Reading	3	.71	1.00	1.42	1.37
d 145	Learning to write	4	.82	1.06	1.25	0.78
d 170	Writing	4	.82	1.06	1.22	0.65
d 150	Learning to calculate	5	.64	.99	1.62	1.99
d 172	Calculating	5	.77	1.04	1.32	0.97
d 175	Solving problems	5	.89	1.08	1.17	0.58
d 131	Learning with objects	6	.54	.90	1.75	2.50
d 440	Fine hand use	6	.38	.82	2.59	6.80
d 160	Focusing attention	7	.75	1.01	1.33	1.02
d 161	Directing attention	7	.74	1.03	1.35	1.00

Note. Skewness Standard Error = .074, Kurtosis Standard Error = .148

Table 2. Frequencies of students to be referred or not

	SEN students			Typical students		
	Referred	Not referred	Sum	Referred	Not referred	Sum
Well supported students						
Learning sufficiency	6	43		29	28	
Psychosocial sufficiency	22	27		22	35	
Common N of students	22	27	49	31	26	57
Not well supported students						
Learning sufficiency	9	21		12	9	
Psychosocial sufficiency	19	11		9	12	
Common N of students	19	11	30	13	8	21
Not supported students						
Learning sufficiency	2	10		50	873	
Psychosocial sufficiency	1	11		33	890	
Common N of students	1	11	12	59	864	923

Note. Referred: Shows teachers' intention to (further) refer a student, SEN: Special Education Needs, Learning sufficiency; Psychosocial sufficiency: Reasons for referral according to teachers, N: Number

Special Educational Support. Here the teachers checked a list of six questions apropos of what kind of school and/or extracurricular support (e.g. Learning Support, Integration Class, Parallel Support, therapies, tutoring) each student has received systematically. These data qualitatively described the code e5853 (Special education services) of ICF-CY. The teachers then decided whether any of the aforementioned forms of support were, in their opinion, effective for the student or not. This gives a quantitative idea of the ICF's code e5853. The answering modus in each of these questions was Yes (coded as one) or No (coded as two). The internal consistency of the total of seven items was good (Cronbach's Alpha = .83). According to the combinations of answers, three gross categories of students emerged: "Well supported", "Not well supported", and "Not supported at all" (Table 2). We resorted to the afore-discussed way of evaluating special educational support, because only few of the 1092 students had already the need for remedial or special education.

Referral Intentions. Teachers' intentions to refer students reflect their decision-making processes. Apparently, they constitute a special form of the code e330 (People in positions of authority, see ICF-CY). Two questions were used for this issue. Specifically, teachers decided whether a student's first referral or a further referral was necessary or not for reasons of a) learning competence, and b) psychosocial competence. Referring a student for the first time meant that the student would be eligible for a pre-referral support program.

Procedure

The participating teachers had known their students for at least three months. They were informed about the purpose, topic, and content of the research. They received the questionnaire, code descriptions, and completion instructions in a hard copy. Before and during the completion of the detection questionnaires, they were free to request further clarification from the corresponding CDADS member.

Statistical Analyses

Basic analyses, such as cross tabulations, correlations, and internal consistencies were performed through the

SPSS [17]. The validity of the proposed model was checked by means of a path analysis with latent variables (LISREL, [20]). These statistical procedures can depict multiple relationships among variables, and give measurements of good data fit to the proposed models [32]. In all LISREL analyses, robust estimations and completely standardized solutions were used. However, significance values stem from the unstandardized solutions. Satorra-Bentler's adjusted chi-square statistics was also computed, because most of the variables were not normally distributed. The significance of mediation effects was checked through the Sobel test. In this test, the loadings of the tested path models were used [27].

3. Results

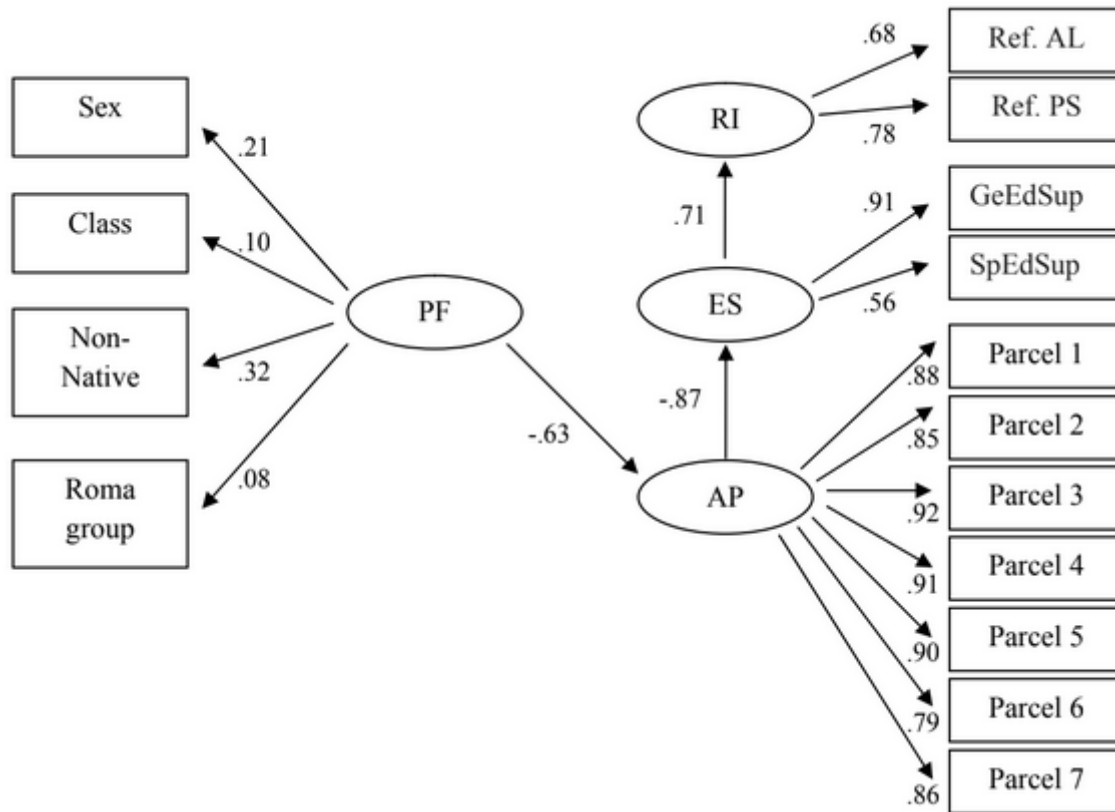
In the present research, 1092 students were evaluated by their teachers. Table 2 shows the distribution of students according to the intentions of the teachers and the support they received. Of course, regarding well-supported students, the referral was about receiving a diagnosis, while for the rest, the referral was about receiving pre-referral support or further support. In addition, this table illustrated the main reason for referral which concerns the learning and/or psychosocial competence of the student. As several students were referred for both reasons, the common numbers of students referred for at least one of the two reasons were also presented. We can observe that in SEN students the main reason for referral was the difficulties in the psychosocial field. In particular, to well-supported SEN students, special psychosocial support was suggested in 22 cases, and re-referral for diagnosis in 6 cases.

Table 3 shows the correlations between the research variables. Students' sex and mother tongue demonstrated negative correlations with several parceled activity performance variables. This means that boys, those who settled in Greece recently and/or Roma tend to have performance difficulties at school. Concerning these students, there is also a tendency for a referral due to academic/learning difficulties and for receiving special education support. In addition, boys tend to be referred for psychosocial difficulties too.

Table 3. Zero-order correlations among the variables

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Sex														
2	Class	-.01													
3	Non-Native	.05	.08**												
4	Roma group	.04	-.02	-.01											
5	Parcel 1	-.08**	-.09**	-.20**	-.06										
6	Parcel 2	-.09**	-.06	-.19**	-.09**	.86**									
7	Parcel 3	-.11**	-.07*	-.19**	-.06	.84**	.86**								
8	Parcel 4	-.16**	-.03	-.18**	-.10**	.76**	.81**	.86**							
9	Parcel 5	-.03	-.06	-.11**	-.07*	.75**	.79**	.81**	.82**						
10	Parcel 6	-.12**	-.10**	-.12**	-.01	.78**	.76**	.78**	.72**	.71**					
11	Parcel 7	-.16**	-.02	-.10**	-.03	.74**	.74**	.78**	.77**	.76**	.76**				
12	GeEdSup	.04	-.05	-.02	.14**	-.33**	-.45**	-.44**	-.47**	-.51**	-.35**	-.41**			
13	SpEdSup	.11**	.04	.13**	.14**	-.63**	-.68**	-.70**	-.73**	-.72**	-.61**	-.68**	.51**		
14	Ref. for AL	.11**	-.04	.08**	.07*	-.32**	-.35**	-.39**	-.43**	-.36**	-.28**	-.38**	.27**	.45**	
15	Ref. for PS	.13**	-.03	.05	.00	-.30**	-.37**	-.41**	-.43**	-.45**	-.35**	-.44**	.46**	.50**	.52**

Note. Class: Elementary school classroom (values: one to six), Non-Native: Native language other than Greek (values: one if yes, two if no), Roma group: Student belongs to a Roma group (values: one if yes, two if no), Parcel: ICF-CY code parcels according to Table 1, GeEdSup: General education support facilitation (values: one to four), SpEdSup: Special education support facilitation (each of the items: one if yes, two if no), Ref. for AL: Academic/Learning reasons for referral (values: one if yes, two if no), Ref. for PS: Psychosocial reasons for referral (values: one if yes, two if no), statistically significant at the 0.05 level, **: statistically significant at the 0.01 level.



Note. PF: Personal Factors, AP: Activity Performance, ES: Educational Support, RI: Referral Intentions, See also Table 3.

Figure 1. Path analytical structure of variables based on the ICF-CY

As far as the path analytical model was concerned, the whole data set was used, thus giving an idea of how the relationships among variables in the present study were structured. The model (Figure 1) was based on the creation of latent variables. At variance with the ICF-CY model, the direct relationships among latent variables were few. Any attempt to create more paths resulted in improper models. In this model, the selected personal factors of the students influence primarily and in the expected way their daily learning activity, i.e., their activity performance in school (see also Table 3). Of course, the secondary effects of personal factors exhibited on educational support (negative direction) and referral intention (positive direction) were statistically significant too (in each case: $p < .001$). Activity performance had a statistically significant negative effect on the bundle of educational support (difficulties in performance implied low general educational support and high special education support). Then, the kind of educational support was what primarily influenced teachers' intention to refer students ($p < .001$). At the same time, educational support played a mediator role in the relationship between activity performance and referral intention (*Sobel test statistic* = -194.056, *Standard Error* = 1.132, $p < .001$). Overall, the indices for the model presented in Figure 1 indicated an acceptable fit ($\chi^2(59) = 138.558$, $p = .000$, $\chi^2/df = 2.348$, *NFI* = .994, *NNFI* = .994, *CFI* = .997, *AGFI* = .966, *SRMR* = .022, *RMSEA* = .035, *CI*

90% = .028, .043). All parameter estimates as well as all primary and secondary effects of the variables were statistically significant (p varied between .001 and .050) in the standardized solution of this model.

4. Discussion

The main purpose of this study was to contribute to the understanding of the decision-making processes apropos the referral of students to a pre-diagnosis support program, or to a service for final diagnosis and consultation. For this purpose, the theoretical framework of the biopsychosocial model was used [40]. Experienced CDADS expert members put forward 15 relevant codes. Overall, the psychometric properties of the items, especially in terms of normal distribution and factorization, were low [25]. Therefore, we grouped the topics, on the one hand, in accordance with the theory, and on the other hand, in accordance with the correlations, especially distance correlations, of the topics.

Among other aspects, the list of codes included "learning with objects" and "fine hand activity," thereby endorsing the role of hand motor skills in children's development [14,23]. Although the significance of motor skills in the students' entire developmental progress is well documented, the integration of these aspects in screening is

still scarce [9,28,41]. Although the loading of the sixth parcel was acceptable, it was lower than the others. Therefore, hand activity and physical exploration may play a more complex role than being just a part of activity performance [38].

All correlations and structural relationships of the variables were theory-conform, and thus, expected [18]. The primary and secondary causal relationships that were confirmed through the path analysis corresponded to a large extent to the predictions of the biopsychosocial model. The selected personal factors of the students participated in the models in an expected and statistically significant way [36]. A central finding was the fact that teachers rely primarily on students' prior support when it comes to forming an opinion about student referral. At the same time, the support provided to the students constituted a mediator between the teachers' opinion about referral and the students' level of activity. Thus, students' activity performance participated in the formation of the teachers' referral opinion. This leads us to the observation that we need to focus even more on how teachers perceive the dynamic relationship between student activity and the educational support provided.

The intentions of the teachers revealed the heterogeneity of the students regarding the issue of the intended referral (Table 2). This has some implications on the development of student referral prediction models. In particular, it is advisable to examine the prediction within the same category of students in terms of the level of educational support and, if possible, in terms of the same age group [1]. In this way, interindividual differences in student activity can be better understood, and the needs of student subgroups can be identified and met [31]. On that account, all those variables that play a role in different types of referral can be more accurately identified. Longitudinal studies tracking students across multistep and multi-tiered educational interventions can contribute to the elucidation of these parameters [8].

Overall, findings of this study suggest that teachers take numerous variables into account, when they make decisions about their students' referral. Moreover, teachers may engage in complex and/or multi-level decision making processes, which they deserve further exploration and more specification to the context of each country. Concurrently, the emerged student subgroups indicate the diversity of students support needs. This may add useful information for understanding students' development in a comprehensive manner. On the whole, the ICF-CY represents a feasible measurement tool for documentation, screening and structural modeling. Stakeholders around educational policy, prevention/intervention, referral practices and teacher education may profit from these conclusions.

The present study is subject to certain limitations. Although the ICF-CY codes affect teachers, in the present study it was the CDADS members who decided about the

relevance of the codes. Therefore, the predictive value of activity items is primarily a matter of the diagnostic work of CDADS. In addition, general education teachers may need training in the use of ICF-CY, especially since teacher responses may not be unbiased [5,31]. Furthermore, some limitations arise from the cross-sectional nature of the present work. As a result, the proposed causal relationships have a limited validity. Lastly, the two aspects of educational support were measured with two different methods, making it a bit complicated to discuss the results.

Apart from the issues already mentioned, future research should employ longitudinal studies in order to shed light on how exactly ICF-CY components and domains influence the decisions of teachers. In such a case, there needs to be a wide agreement on the use of age specific codes among those involved in developing pre-referral support or IEPs [1,7]. Especially, when it comes to referral for reasons of psychosocial competence, codes covering social participation need to be included too [10], thus creating a universal scope in the screening process [6]. Likewise, the significant role of the perceptual-motor skills should be further explored. In addition, it would be useful to extend the use of personal factors in the prediction models [12,36]. Unquestionably, the integration of further environmental factors, e.g. classroom materials and other classroom-level characteristics [8,16] can add to the explanatory power of the statistical models. Finally, measurement refinements, such as those related to answer keys, may enhance the psychometric properties of the entities studied [16,34].

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