

Level of Differentiation of Vocational Interests Profiles: Comparative Study by Age and Schooling in a Brazilian Sample

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Abstract: Vocational interests can be defined as standards of preference, aversion or indifference to professional activities, but little is known about the factors involved in their development. From this perspective, this study attempted to clarify which variable, age or schooling, better fit comparisons of profile differentiation index. To this end, we analyzed the Escala de Aconselhamento Profissional (Professional Counseling Scale) responses of 6,824 Brazilian students between 14 and 50 years old with various levels of education. Differentiation of the interest profile was observed by subtraction between dimensions with lower and higher scores. Normality of the distributions was verified and then Analysis of Variance and Tukey's post hoc test were conducted in relation to groups of age and schooling. The results suggest that schooling is a more appropriate variable to compare the differentiation of interests. The implications and limitations of this study are discussed, and suggestions for future studies are given.

Keywords: vocational guidance, occupational choice, professional development, professional interests

Nível de Diferenciação do Perfil de Interesses Profissionais: Estudo Comparativo por Idade e Escolaridade em Amostra Brasileira

Resumo: Os interesses profissionais podem ser definidos como padrões de preferência, aversão ou indiferença em relação a atividades profissionais, mas pouco se sabe sobre os fatores envolvidos em seu desenvolvimento. A partir dessa perspectiva, este estudo teve como objetivo clarificar qual variável, idade ou escolaridade, melhor se ajusta às comparações dos índices de diferenciação dos perfis. Para tanto, foram analisadas as respostas à Escala de Aconselhamento Profissional (EAP) de 6824 estudantes brasileiros entre 14 e 50 anos com vários níveis de escolaridade. A diferenciação do perfil de interesses foi observada pela subtração entre as dimensões com pontuações mais altas e mais baixas. A normalidade da distribuição foi verificada e então Análises de Variância e prova post hoc de Tukey foram conduzidas em relação aos grupos de idade e escolaridade. Os resultados sugeriram que a escolaridade é a variável mais apropriada para comparar a diferenciação dos interesses. As implicações e limitações deste estudo são discutidas e sugestões para estudos futuros são fornecidas.

Palavras-chave: orientação vocacional, escolha profissional, desenvolvimento profissional, interesses profissionais

Nivel de Diferenciación del Perfil de Intereses Vocacionales: Estudio Comparativo por Edad y Escolaridad en una Muestra Brasileña

Resumen: Los intereses profesionales pueden ser definidos como padrones de preferencia, aversión o indiferencia a las actividades profesionales, pero se sabe poco acerca de los factores que intervienen en su desarrollo. Desde esta perspectiva, este estudio trató de aclarar cual variable, edad o escolaridad, mejor se ajusta a las comparaciones de los índices de diferenciación de los perfiles. Con este fin, se analizaron las respuestas a la Escala de Aconselhamento Profissional (Escala de Orientación Profesional) de 6.824 estudiantes brasileños con edades entre 14 y 50 años de edad, con diversos niveles de educación. La diferenciación del perfil de interés se observó por sustracción entre dimensiones con puntuaciones más bajas y más altas. La normalidad de las distribuciones se verificó y Análisis de Varianza y test post hoc de Tukey se llevaron a cabo en relación con los grupos de edad y escolaridad. Los resultados sugieren que la escolaridad es la variable más apropiada para comparar la diferencia de intereses. Son discutidas las implicaciones y limitaciones de este estudio, y son dadas sugerencias para futuros estudios.

Palabras clave: orientación vocacional, escogimiento profesional, desarrollo profesional, intereses profesionales

The construct interest was a main focus of research and practical application in the field of vocational guidance throughout the twentieth century, both in the Brazilian context and abroad. However, some conceptual diversity is still found in the literature concerning both the definition

of vocational interest and the variables embedded in its development (Betz & Borgen, 2000; Savickas, 1999).

According to Savickas (1995), although the assessment of interest has been part of career guidance since its inception, in 1909, only in 1931 the first work that sought to clarify the construct was published, namely *The Measurement of Interests*, by Douglas Fryer. At the time, interest was defined in terms of acceptance-rejection and pleasure-displeasure toward a given activity. Since then, little progress has been

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made in the definition of interest, and Fryer's idea about its affective basis remains (Leitão & Miguel, 2004).

This notion of affection can be seen in the definition of interest suggested by Lent, Brown and Hackett (1994), i.e., the patterns of like, indifference or dislike toward professional activities. This approach was supported by Savickas (1995), although the same author (Savickas, 1999) later added a cognitive variable, defining interest as a state of readiness to respond positively or negatively to any object (a professional activity, for example). This disposition starts a state of selective attention, which would help the person direct his/her action towards one object. Note that the Professional Counseling Scale [Escala de Aconselhamento Profissional (EAP), in Portuguese] (Noronha, Santos, & Sisto, 2007), applied in this study, has been constructed under the definition of Savickas (1995).

Despite the relative congruence in the views of different authors about vocational interest concept, the discussion about interest development is still open. Lent et al. (1994) suggested a model to explain this process from a social cognitive theory perspective, which stipulates that interests are the result of an iterative process and constant exchange between a person and his/her environment. According to these authors, genetically inherited traits, available environmental resources and early learning experiences promote the development of self-efficacy beliefs and outcome expectancies relative to certain activities. These beliefs and expectations help people develop the patterns of preference, indifference and rejection that characterize vocational interests, which they tend to refine throughout life as new academic and labor experiences are gained.

Previously, Holland (1975) indicated that environmental interactions are important variables for understanding vocational interests and that the congruence between vocational interests and characteristics of the work environment are important for satisfaction with career choice. This idea is justified by several studies conducted in many countries worldwide, with the typological theory of Holland being the most researched in the context of careers according to Sharf (2006). Holland's typology is based on the assumption that the interests and characteristics of work environments can be described using six types: realistic, investigative, artistic, social, enterprising and conventional (RIASEC).

Holland (1975) suggested that an important variable to observe in the assessment of interest is the differentiation of the profile, i.e., a person's preferences for various professional activities can be quantitatively differentiated by their distances through a comparison of intra-person preferences (Iachan, 1984; Primi, Mansão, Muniz, & Nunes, 2010). This index can facilitate the interpretation of an interest profile because it can indicate how the preferences are defined by evaluating the professional activities that may be relevant to the definition of intervention strategies in situations of career guidance. Although Nauta (2010) had asserted that this concept lacks empirical consistency and its predictive power is only median,

it's important to note that profile differentiation seems to be predictor of annual income (Huang & Pearce, 2013), positively associated with readiness for career decisions (Hirsch & Läge, 2008), vocational identity, self-efficacy, maturity for professional choices (Hirschi, 2011; Im, 2011; Nauta & Kahn, 2007) and negatively with job instability (Wille, De Fruyt, & Feys, 2010).

There are many ways to calculate the differentiation index. The two most traditional are related to the performance of a subtraction operation between the extreme preferences, and the use of standard deviation of all types or dimension assessed. In both case, the higher is the resulting value of this transaction, the greater is the difference between extreme scores, indicating greater differentiation (Davis, 2007; Hirsch & Läge, 2008; Monahan, 1987; Sackett & Hansen, 1995). Huang and Pearce (2013) related a correlation of .77 between both approaches. Lately, Tracey, Wille, Durr and De Fruyt (2014) proposed an alternative strategy, a cosine operationalization, that can be applied uniquely to Holland's model because of its geometrical disposition in an hexagonal model.

In the literature, results indicating that vocational interests tend to become further clarified with advancing age and education can be found. In general, there is a tendency of instability when considering both the ages (12-17 years) and the schooling between the end of elementary school and the end of high school (Low, Yoon, Roberts, & Rounds, 2005; Tracey, Robbins, & Hofsess, 2005) and increased stability and refinement of the profile of interest from the end of adolescence through adulthood, specially when enrolling in university or entering and performing in the world of work (Donohue, 2014; Hirschi, 2010; Huang & Pearce, 2013; Johnson, Schamuhn, Nelson, & Buboltz, 2014; Louis, 2010; Nye, Su, Rounds, & Drasgow, 2012; Tracey et al., 2014). The cited studies share two characteristics: a longitudinal research design and the independent analysis of age and education. Findings obtained using other research methodologies and analyses suggest similar results, namely, an increasing tendency regarding the stability and crystallization of preferences over time (Ambiel, 2010; Godoy & Noronha, 2010; Sartori, Noronha, & Nunes, 2009).

Therefore, an important question to ask is which of the variables, age or schooling, can provide more clarification when comparing differentiation in vocational interest profiles. The answer would contribute to theoretical discussions about educational and developmental issues in the context of career counseling.

This knowledge becomes critical when considering the Brazilian educational system. The following information was based on official data available in the Brazilian Ministry of Education website. Basic education is the foundation of the education system in Brazil, and it is divided into kindergarten, elementary and high school. Elementary education is compulsory for children between six and 14 years old, but high school is optional for teenagers between 15 and 17 years old, despite being a requirement for college entry.

Official data from the Brazilian government show that over eight million young people were in high school in 2009. Concerning higher education (e.g., college and university), according to 2010 official microdata available in internet (<http://portal.inep.gov.br/basica-levantamentos-acessar>) in the first decade of the 2000, the number of students enrolled increased by 110%, with over six million people enrolled in 2010. The most typical ages were 19 at enrollment and 23 at graduation. However, the dropout rate ranges from 15% in public institutions to 25% in private ones.

Although young people are culturally driven to make decisions about their career at the end of high school (corresponding to approximately 17 years old), there are no public policies aimed at facilitating this choice (Munhoz & Melo-Silva, 2011). Unsystematically, various isolated initiatives by schools or non-governmental organizations take on the responsibility of guiding young people towards the labor market. In addition, it is not uncommon for teenagers and young adults who are still or should be in school to engage in work activities (Rizzo & Chamon, 2010; Souza, Menandro, Bertollo, & Rolke, 2009). Thus, intending to contribute to the discussion about interest development in this context, the present study aims to compare the differentiation of vocational interest profiles as a function of age and schooling.

Method

Participants

The total sample of this study was composed by smaller samples of several studies (i.e., master's dissertation, doctoral thesis and papers). Almost all participants were students, enrolled in elementary or high schools, technician's institutes and universities, but some of them were workers and were not studying at the moment of the data collection (Table 1).

The total of participants in the initial database was 7,424. All participants with item missing responses were deleted, remaining 6,824 people, including 4,269 women (62.6%) and 2,555 men (37.4%) ranging in age from 14 to 50 years ($M = 20.72$; $SD = 6.5$). All of them reported their ages, but 1,117 participants did not report their schooling or this information were not recorded in the database, and 120 did not fulfill criterion (see Data Analysis section) and were deleted; therefore, analyses concerning schooling are based on 5,587 responses. Table 1 shows the distribution of the sample by schooling and indicates the sample source.

Instruments

The *Professional Counseling Scale* - Escala de Aconselhamento Profissional (EAP) (Noronha et al., 2007) consists of 61 items describing activities of various professions at the university level. The response options are expressed by a 5-point Likert scale, ranging from *I would never do this activity* (1) to *I would do this activity*

Table 1
Participants Schooling Description

Level of schooling	Frequency	%
No course	45	0.7
Attending elementary school	260	3.8
Attending high school	2594	38.0
Attending college	2478	36.3
Entrance exam preparation course	25	0.4
Out of school - Elementary school completed	17	0.2
Out of school - High school completed	255	3.7
Out of school - College completed	33	0.5
Schooling Missing	1117	16.4
Total	6824	100

often (5). Point 3 is neutral. The EAP assesses professional interests in terms of seven dimensions: Exact Sciences (14 items), Arts and Communication (14 items), Biological and Health Sciences (nine items), Agricultural and Environmental Sciences (13 items), Human and Social Applied Sciences (10 items), Bureaucratic Activities (13 items), and Entertainment (six items). Some items are included in two dimensions. The technical manual of the EAP presents validity evidence based on internal structure and the relationship with external variables using as criteria the university career of the participants, noting that the scale discriminates among students' interests by factor. The Cronbach's alpha coefficients ranged between .75 and .91. In this study, because each factor has a different number of items, scores were standardized to a range of 1 to 5, admitting decimal points.

Procedure

Data collection. Data were collected in different studies between 2006 and 2010, as previously referred in Table 1. All cases were collected in groups between 30 and 40 participants, in elementary and high schools, universities and work places, in pencil-and-paper format.

Data analysis. In the initial analyses, the ages of the participants were considered, adopting a minimum of 100 people by age as an arbitrary criterion adopted by the authors to perform the analysis. When this criterion was not satisfied a priori, we resorted to grouping adjacent ages, as necessary for the ages of 28 and 29 years (175 persons, 2.6% of the total), 31 and 32 years (101 persons, 1.5%), 33 to 35 years (142 persons, 2.1%), 36 to 38 years (110 persons, 1.6%), 39 to 43 years (107 persons, 1.6%) and 44 to 50 years (102 persons, 1.5%). All other ages fulfilled the criterion a priori. Similar criterion was adopted for the educational variable. Thus, the options "not attending any courses," "pre-university preparatory course", "primary school completed" and "university degree", with 45, 25, 17 and 33 people, respectively, were excluded from the database, remaining 5,587 participants classified as follows: attending

elementary school ($n = 260$, 3.8%), attending high school ($n = 2,594$, 38%), high school completed ($n = 255$, 3.7%) and attending college ($n = 2,478$, 36.3%). Age and education variables were correlated with $r = .54$ in this sample.

To determine the degree of differentiation of the interest profile, we considered the dimensions with lower and higher scores (x^1-x^7) obtained for each individual as suggested by Holland (1975), with possible variation between 1 and 5. A subtraction operation with these values was performed, interpreting higher values after subtraction as indicating greater differentiation of the profiles. To standardize the scores, the averages were considered based on the Likert scale of the EAP (1-5); however, the degree of differentiation could vary between 0 and 4. It was observed that the average index was 2.03 ($SD = .73$). As mentioned earlier, there is another traditional way to calculate the differentiation of interest profile, which is based on the standard deviations. In this study, it was performed too and the correlation between both approaches was .97. The last step was to verify the normality of the distributions of the scores (skewness and kurtosis) and verify the variance between groups, using Levene test. Afterall, analysis of variance (ANOVA) were conducted, including Tukey's *post hoc* test, of the differentiation index in relation to groups of age and schooling.

Ethical Considerations

All projects whose samples composed this study (including undergraduate course completion research, master's degree and Ph.D.) were examined and approved by the Research Ethics Committee at Universidade São Francisco. Data collection procedures were according to National Health Council Resolution 196/96 and all adult voluntary participants assigned the Terms of Free Prior Informed Consent (TFPIC). The adolescents had been authorized by their parents or guardians. The use of the database was authorized by approval of a project under Protocol no. CAAE: 0227.0.142.000-07.

Results

Initially, Table 2 shows the descriptive statistics of the total sample ($N = 6,824$) for each dimensions of EAP, such

as for the profile differentiation index. Results show that minimum and maximum possible scores were observed in this sample, and that the mean was around the medium point for every dimension and PD. Skewness values ranged from -.036 to .546, indicating a nearly symmetric distribution, and kurtosis ranged from -1.022 to -.405, that is, acceptable values indicating a shape close to normal, but a little peaked.

Intending to achieve the objective of this study, we verified that the differentiation index had approximately normal distribution across the two set of groups used to perform the ANOVA (ages and schooling), with skewness and kurtosis values ranging very similarly to the values observed in Table 2 for the total sample, and that the variances of the groups for both variables were not significantly different, once that Levene's test had $p = .170$ for schooling and $p = .199$ for ages. So, ANOVA was proceeded to verify the profile differentiation by age. Results can be seen in Table 3.

Significant differences were observed between two subsets. In the first subset, with the lowest means, were 14-year-old participants. In the second subset, the participants aged 19, 20, 21, 25, 28 and 29 years had the highest levels of differentiation. It should be noted that 20 years old participants had the highest means. Next step was to investigate the differentiation related to schooling. Table 4 shows the results.

Analysis of variance indicated that the individuals who were in college had the highest differentiation and those attending elementary or middle school had an intermediate level. Interestingly, the lowest average was observed for people who had completed high school and were not studying at the time of data collection.

Discussion

The question that motivated this study was which of the variables, age or schooling, could provide better information about the comparison between differentiation in interest profile. This question emerged from a review of the scientific literature on the subject, which indicates that the level of differentiation is related to favorable aspects of career decisions (Hirsch & Läge, 2008; Im, 2011; Nauta & Kahn, 2007) and that its refinement is enhanced by academic

Table 2
Statistic Descriptives of the EAP Dimensions and Profile Differentiation Index

	ES	AC	BHS	AES	BA	HSAS	E	PD
<i>M</i>	2.44	2.63	2.86	2.98	2.82	2.90	2.68	2.03
<i>SD</i>	1.02	.95	1.10	.91	.84	.85	1.09	.73
Variance	1.04	.899	1.211	.827	.705	.725	1.187	.534
Skewness	.546	.332	.121	-.036	.050	.049	.214	.085
Kurtosis	-.658	-.706	-1.022	-.686	-.583	-.591	-.912	-.405
Minimum	.00	.00	.00	.00	.00	.00	.00	.00
Maximum	5.00	5.00	5.00	5.00	5.00	5.00	5.00	4.00

Note. ES: Exact Sciences; AC: Arts and Communication; BHS: Biological and Health Sciences; AES: Agricultural and Environmental Sciences; BA: Bureaucratic Activities; HSAS: Human and Social Applied Sciences; E: Entertainment; PD: profile differentiation.

Table 3
Analysis of Variance Between Age Groups

ANOVA			Ages	n	Subsets for alpha = .01	
df	F	p			1	2
20	3.488	.000	14	104	1.788	
			39-43	107	1.895	1.895
			15	675	1.905	1.905
			36-38	110	1.931	1.931
			44-50	102	1.966	1.966
			31-32	101	1.969	1.969
			18	507	1.973	1.973
			26	151	2.003	2.003
			16	967	2.030	2.030
			23	252	2.050	2.050
			17	1,243	2.054	2.054
			33-35	142	2.055	2.055
			22	389	2.056	2.056
			27	131	2.057	2.057
			30	99	2.076	2.076
			24	207	2.088	2.088
			28-29	175		2.095
			25	160		2.096
			19	325		2.103
			21	455		2.115
			20	422		2.149
			<i>p</i>		.01	.105

and work experiences (Lent et al., 1994). On the other hand, Savickas (1995, 1999) noted that the development of interests can also be explained by various activities throughout life that are not necessarily linked to the world of work.

In this sense, it is important to note that age and schooling were only moderately correlated in this study, but the developmental nature of both could suggest a stronger relationship. This result indicates that although there is a trend of increasing schooling with age, the linearity of the relationship was weakened in many cases by participants with low levels of education relative to their age.

When considering age we noticed that the 14 years old participants had the lowest rate of differentiation, significantly different from those aged 19, 20, 21, 25, 28 and 29 years. The greatest differentiation was exhibited by the 20 years old participants. The 14 years old subjects represent

the youngest portion of the sample and this age generally corresponds to the end of elementary school and beginning of high school. There is a gradual increase in the clarity of the profile between 14 and 17 years of age, usually associated with high school. Interestingly, at age 18, there is a sudden drop in scores, with resumption at 19 and 20 years, when the differentiation peaks. These data are consistent with the findings of Low et al. (2005) and Tracey et al. (2005) regarding the instability of interests through adolescence.

Regarding the result for 18 years of age, it can be stated that, in the Brazilian educational system, this is an age at which young people are leaving high school and may experience uncertainties about their life and career, when the decision about to engage in a course of training or enter the labor market needs to be made. This condition seems to be characterized by decreased sharpness of the profile of interest, which can be interpreted as uncertainty about professional preferences.

Furthermore, ages 19, 20 and 21 may mark the first definition relative to the occupation and a time at which the profile becomes sharper. It is possible that this definition explains individual's first professional choices, fundamental for entry into university. Remaining on the list of ages with sharper profiles, ages 25, 28 and 29 years may be related to the timing of exit from university and entry into employment or post-graduate courses. However, it is noteworthy that the observed results were not linear; for example, at age 26, there is a drop in the level of sharpness, signaling an inconsistency in the explanation given above. The same can be observed at ages above 30.

Assuming that interest development occurs throughout life and via individuals' interactions and exchanges with their environment (Lent et al., 1994), one can understand these variations in the levels of differentiation of the profiles as diversifications of professional interests in light of new experiences gained throughout life. Despite this explanation, these data contradict the results of other studies, which suggested a refinement of the profile with increasing age and work and academic experiences (Donohue, 2014; Godoy & Noronha, 2010; Hirschi, 2010; Huang & Pearce, 2013; Johnson et al., 2014; Louis, 2010; Nye et al., 2012; Sartori et al., 2009; Tracey et al., 2014). Furthermore, by observing the analyses related to schooling, independent of age, the relationships become clearer. The subsets revealed three levels of differentiation: the highest corresponds

Table 4
Analysis of Variance Between Schooling Levels

ANOVA			Scholarships	n	Subsets for alpha = .01		
df	F	p			1	2	3
3	44.774	.000	High school completed	255	1.674		
			Attending high school	2,594		2.007	
			Attending elementary	260		2.028	2.028
			Attending college	2,478			2.159
			<i>p</i>		1.000	.968	.029

to participants enrolled in a college course, followed by participants attending elementary or high school, and finally those who had completed high school but did not progress to college.

This result can suggest that people in a higher education level exhibit higher profile differentiation, especially when compared with those who had completed high school. This result can be interpreted by two bias. On one hand, the lower differentiation profile of people in high school may have served as a barrier to decision-making for enrolling in college, according to the findings reported by Hirsch and Läge (2008), Im (2011) and Nauta and Kahn (2007), with respect to such variables as maturity and readiness for career choice. On the other hand, the fact that the participants who did not complete high school experienced a discontinuity in their studies may have contributed to a lower specification of their interests (Lent et al., 1994; Savickas, 1995).

However, one cannot ignore a limitation of this study that is the fact that these hypotheses focus exclusively on the process of career choice while ignoring other variables of social competition with similar levels of importance, such as the need to enter the labor market in one's late teens and poor access to higher education (Munhoz & Melo-Silva, 2011; Rizzo & Chamon, 2010; Souza et al., 2009). Furthermore, another limitation is related to the use of raw data about schooling and age, without controlling variables such as more specific characteristics of the sample (i.e., public or private institutions, freshmen or veterans, or socioeconomic level of the participants). In further researches these variable, and many others intervenient variables, should be looked with more attention and provide more reliable data about the vocational interest development.

Thus, even taking into account the instability of the differences observed, specially those related to ages, this study could make a small contribution to the discussions about the development of vocational interests. Based on findings, it can be stated that in this study, schooling was more informative than ages about the differentiation of interest profiles because its results were more interpretable, though operational and conceptual questions still need to be approached.

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