

Interpreting Self-Directed Search profiles: Validity of the “Rule of Eight”

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ABSTRACT

Based on the standard error of measurement, Holland (1985) suggested the “rule of eight” for determining the meaningfulness of differences between two summary scores on the Self Directed Search. The present study empirically examined the rule’s validity for practice. The participants were 2397 (1497 females and 900 males) undergraduate students enrolled in the exploratory major at a large Midwestern university. The results strongly supported the interpretive rule of eight. For those participants who scored a primary-code distinction of eight or more points, the hit rate was 55% with a kappa of .38. This compared to a hit rate of 40% with a kappa of .21 for those participants with less than eight-point distinction between their top two scores. The authors also discuss the practical implications for interpreting SDS results using the “rule of eight.”

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Career practitioners commonly use Holland’s (1997) theory of vocational choice to assist their clients identify and explore vocational alternatives. The theory suggests that individuals differ based on their vocational interests, and may be characterized as resembling one of six personality types arranged on a hexagon according to degree of relatedness: Realistic, Investigative, Artistic, Social, Enterprising, and Conventional (RIASEC). The theory classifies work environments using the same RIASEC typology. Exploring vocational alternatives related to one’s personality then becomes a matter of matching oneself to a fitting work environment. To facilitate the matching process, Holland operationally defined the RIASEC types with the *Self Directed Search* (SDS), an intervention that could be self-administered and self-scored. The SDS scores are used to identify occupations for exploration. To help individuals and counselors use the SDS scores, researchers including Holland, Powell, and Fritzsche (1997) and Rayman (1998) have published interpretation guidelines. Many of these guidelines rest on empirical research. Yet, one of the most important guidelines has not been verified by empirical research. Therefore, the present study empirically examined the “rule of eight” to determine its validity as an interpretative procedure for the SDS.

The “rule of eight” states that the numerical difference between SDS scores for two RIASEC types must be at least eight points for the difference to be considered meaningful. This rule provides a guideline intended to avoid prematurely narrowing exploration. When selecting occupations to explore, it is not uncommon for individuals to concentrate on their three-letter RIASEC code, say ISA. *The Occupations Finder* (Holland, 2000) makes this process relatively simple because it lists occupations categorized by three-letter codes. However, considering occupations listed under the three-letter code may inappropriately narrow and prematurely circumscribe occupational exploration. Holland crafted the “rule of eight” to avoid circumscribed exploration and to encourage exploration of the full-range of appropriate occupations.

Holland (1985, p. 13) derived the “rule of eight” by estimating the error in SDS scores. Based on the information in the *Self-Directed Search Professional Manual* (1985, p. 49), the SEM for girls aged 14 to 18 ranged from 3.0 to 3.8 (2 SEM from 5.9 to 7.6) and for boys the SEM ranged from 3.1 to 4.4 (2 SEM from 6.2 to 8.8). For adult women, the SEM ranged from 2.8 to 3.5 (2 SEM from 5.7 to 6.8) and for adult men the SEM ranged from 3.0 to 3.3 (2 SEM from 6.1 to 6.5). Taking a SEM of 4 points, which is around the top

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end of the range across the four groups, and multiplying it by two produces a final value of eight that then became referred to as the “rule of eight.” In practical terms, the “rule of eight” purports to indicate when a difference in scores between two RIASEC types represents a meaningful difference. Following the “rule of eight,” counselors consider two classifications (i.e., designation of resemblance to theoretical types) as equally viable if the difference between the RIASEC summary scores falls within 8 points. For example, if an individual receives the following SDS scores, $R = 40$, $I = 38$, $A = 36$, $S = 15$, $E = 14$, $C = 13$, one might assume that this represents an RIA profile. Consequently, some practitioners might encourage the client to explore only occupations categorized under RIA. This would inappropriately narrow exploration. Because the top three scores are within eight points of each other, the individual should be encouraged to explore occupations categorized under all six permutations of the RIA code (i.e., RIA, RAI, IAR, IRA, AIR, and ARI).

While the SEM and the “rule of eight” may be statistically correct, empirical research should examine its validity for practice. Despite the extensive research conducted on the SDS, no study has examined the “rule of eight.” Thus, the present study examined empirically the “rule of eight” to identify when the distance between individuals’ first and second SDS scores represent meaningful differences in classification. We thought that eight points may be more than needed to meaningfully separate scores, especially because the standard error of measurement (SEM) is four points and Holland did not explain why he doubled the SEM to arrive at the rule of eight.

1. Methods

1.1. Participants

The participants were 2397 (1497 female and 900 male) undergraduate students enrolled in the exploratory major at a large Midwestern university. Students who choose to enroll in this major do so because they have not yet decided on an academic major. All participants attended a mandatory semester-long orientation program designed to enhance their chances of academic success. The program requires that students complete the SDS. Orientation instructors administered the SDS as a take-home assignment during week five of a sixteen-week semester. The distribution of SDS high-point codes for females across the RIASEC types was $R = 2\%$, $I = 5\%$, $A = 14\%$, $S = 61\%$, $E = 13\%$, and $C = 5\%$. The distribution of SDS high-point codes for males across the RIASEC types was $R = 21\%$, $I = 9\%$, $A = 17\%$, $S = 26\%$, $E = 24\%$, and $C = 3\%$.

1.2. Measures

Five variables were operationally defined by responses to the SDS: RIASEC summary code, RIASEC primary code, distinction between first two RIASEC codes, expressed occupational interest, and agreement between primary RIASEC code and expressed occupational interest. Composed of two parts, the SDS takes approximately 20 minutes to complete. Details supporting the psychometric properties of the SDS appear in the *Professional User's Guide* (Holland, Powell, & Fritzsche, 1997) and the *Technical Manual* (Holland, Fritzsche, & Powell, 1997).

1.2.1. Expressed occupational interests

Part 1 of the SDS asks individuals to list their occupational daydreams in chronological order, starting with the most recent. The space provided allows individuals to list eight entries. The occupational daydreams listed by each student were assigned three-letter SDS codes determined using the *Dictionary of Holland Occupational Codes* (DHOC; Gottfredson & Holland, 1996). When participants listed occupations that could not be located among the 12,860 occupations in the DHOC, two vocational counseling experts discussed and assigned the most appropriate three-letter SDS code. The first SDS letter of individuals’ most recent occupational daydream was used to assign a primary code based expressed interest.

1.2.2. Inventoried classification

Part 2 of the SDS is an inventory of the person's resemblance to the RIASEC types with 228 statements, organized into four sections: activities, competencies, occupations, and self-estimates. The highest RIASEC score is used to classify individuals according to the types that they most resemble. Organizing the highest three scores from these four sections in descending order provides individuals with a three-letter SDS summary code. The letter with the highest score indicates an individual's primary SDS code.

1.2.3. Hit rate

The primary RIASEC classification was compared to the RIASEC classification based on expressed interests. Expressed interests were used with the full understanding that they represent an intention, not a behavior such as enrollment in an academic major or entry into an occupation. Agreement was operationally defined as an exact match between the RIASEC classification based on an individual's primary expressed interest and the RIASEC classification based on an individual's highest SDS summary score.

1.2.4. Primary-code distinction

For the purpose of this study, we used the word “distinction,” to denote the numerical difference between an individual's two highest SDS summary codes. This is the value most pertinent to the “rule of eight.” We did not want to refer to this value as differentiation because that term denotes the value obtained by subtracting the lowest RIASEC score from the highest RIASEC

score. Moreover, differentiation has been examined in numerous studies, while distinction between two primary codes had not been similarly studied.

1.3. Data analyses

Participants were grouped using their scores for primary-code distinction. For example, participants who demonstrated a one-point difference between their two highest RIASEC scores were grouped together. We then calculated the percentage of agreement between expressed interest and inventoried classification, or hit rates, at each level of primary-code distinction.

However, the simple percent agreement between expressed interest and inventoried classification may be a misleading index because substantial hit rates may occur by chance alone. Although hit rates have appeal in indicating agreement, they incorporate chance agreement. To determine the agreement between expressed interest and inventoried type beyond chance we calculated coefficient kappa (Cohen, 1960). Kappa indicates the proportion of the greater-than-chance possible agreement that is observed. Kappa's value ranges from zero when agreement is at the level expected by chance to 1.0 when agreement is perfect. Kappa can be negative if the agreement is less than chance.

2. Results

The overall mean score for primary-code distinction was 7.35, with a standard deviation of 6.23. Females ($M = 8.08$, $sd = 6.50$) demonstrated higher primary-code distinction scores than males. Moreover, 1400 participants (58%) demonstrated primary-code distinction scores less than eight points. This level of distinction suggests that counselors cannot determine a primary classification for a typical client when following the "rule of eight." On average, primary-code distinction scores fall below the benchmark set by the rule of eight. This implies that, if counselors follow the rule of eight, they would encourage most users of the SDS to explore permutations of their first two RIASEC codes.

The next analyses examined hit rates for primary-code distinction scores above and below the threshold of eight points. Hit rate cannot be determined when primary-code distinction equals zero because this means two classifications have the same raw score. Therefore, we removed the data for 133 participants with primary-code distinction scores of zero, leaving 2264 participants. The overall hit rate for 2264 participants was 47% with a kappa of .29.

Then, we categorized the participants into two groups: those with primary-code distinction scores equal to or greater than eight points and those with primary-code distinction scores less than eight points. Of the 997 participants with primary-code distinction scores greater than eight points, the hit rate was 55% with a kappa of .38. For the 1267 participants with primary-code distinction scores less than eight points, the hit rate was 40.3% with a kappa of .21. We also calculated hit rates at a distinction level of four points because four points represents about one SEM. Those 840 participants scoring at 4 or below had a hit rate of 37% and a kappa of .19. Table 1 presents these results along with the results for each level of score distinction for the total group as well as for females and males separately. We could not calculate kappa after primary-code distinction exceeded 16 because there are not enough data values.

We performed the same calculations separately for males and females. The overall hit rate for 1416 female participants was 60% with a kappa of .28. For the 675 female participants who had a distinction score equal to or greater than eight points, the hit rate

Table 1
Hit rates and kappa coefficients for scores on primary-code distinction.

	Total			Female			Male		
	N	Overall hit rate %	Kappa	N	Overall hit rate %	Kappa	N	Overall Hit Rate %	Kappa
Total where PCD > 0	2264	47	.29	1416	60	.28	848	25	.27
PCD > 0, < 8	1267	40	.21	741	48	.20	526	29	.22
PCD >= 8	997	55	.38	675	73	.34	322	19	.35
PCD > 0, <= 4	840	37	.19	484	46	.16	356	26	.22
PCD = 1	239	34	.18	129	42	.20	109	27	.14
PCD = 2	231	38	.14	133	47	.07	98	27	.22
PCD = 3	195	36	.20	112	44	.16	83	27	.26
PCD = 4	175	40	.27	109	51	.25	66	23	.30
PCD = 5	165	43	.21	96	52	.21	69	32	.21
PCD = 6	131	47	.23	86	56	.30	39	36	.13
PCD = 7	131	48	.33	74	57	.37	57	39	.28
PCD = 8	116	42	.27	72	57	.30	44	18	.18
PCD = 9	109	45	.36	66	58	.35	33	33	.48
PCD = 10	97	49	.34	58	72	.15	37	14	.50
PCD = 11	103	52	.29	67	66	.32	35	26	.28
PCD = 12	92	53	.29	59	70	.28	28	21	.33
PCD = 13	72	63	.35	47	81	.35	22	27	.27
PCD = 14	64	53	.46	43	80	.44	16	31	.40
PCD = 15	50	60	.59	38	74	.57	10	20	.52
PCD = 16	60	63	.49	35	85	.22	19	16	.67

was 73% with a kappa of .34. Those 741 female participants below 8 had a hit rate of 49% with a kappa of .20. Those 484 female participants at four or lower had a hit rate of 46% and a kappa of .16.

We examined the hit rates for male participants in the same manner. The overall hit rate for 848 male participants was 25% with a kappa of .27. For the 322 male participants who had a distinction score equal to or greater than 8, the hit rate 19% with a kappa of .35. Those 526 male participants below 8 had a hit rate of 29% with a kappa of .22. Those 356 male participants at four or lower had a hit rate of 26% and a kappa of .22.

3. Discussion

This study examined Holland's "rule of eight" to consider its empirical validity. The findings strongly support Holland's wisdom in suggesting a cut-off score that is twice the standard error measurement ($2 \times 4 = 8$). Using cross-sectional data, the study compared agreement between RIASEC classifications based on highest SDS score and on first occupational daydream at different levels of distinction between first and second RIASEC classifications based on the two highest SDS summary scores. The results showed an overall hit rate for 2264 participants in this study was 47%, which falls in the middle of the 39–55% range for interest inventories that use a six-variable structure (Holland & Raylman, 1986, p. 26). The coefficient kappa value was .29, indicating a fair agreement.

If the rule of eight was empirically supported, then the hit rates would be substantially higher for students who had a difference of eight or more points between their top two RIASEC scores on the SDS. The results strongly supported the interpretive rule of eight. For those participants who scored a primary-code distinction of eight or more points, the hit rate was 55% with a kappa of .38. This compared to a hit rate of 40% with a kappa of .21 for those participants with less than eight-point distinction between their top two scores. While the hit rate increased only 15%, the kappa nearly doubled. We also calculated the figures for a distinction score of four or less points because four is the standard error measurement. The hit rate of 37% with a kappa of .19 was quite similar to that achieved with the less than eight-point distinction. This finding, combined with the results at a cut-off of eight points, strongly supports Holland's suggestion of using a cut-off score that is twice the approximate standard error measurement ($2 \times 4 = 8$).

The descriptive statistics for hit rate and kappa at each level of primary-code distinction showed that a positive relation exists between primary-code distinction and hit rate. This is especially clear in studying the progression of kappa coefficients. As the difference between the top two SDS summary scores increases, so does the greater-than-chance agreement for matches between RIASEC type and expressed interest. Furthermore, the kappa results generally suggest that a distinction score at one or less SEM indicated slight agreement; at less than two SEM it moves from slight to fair agreement; and at two or more SEM it moves to moderate agreement. There is no distinction score at which agreement between high-point SDS code and primary aspiration code is perfect. Agreement roughly follows an increasing monotonic function of the size of difference between two codes (shown in Fig. 1).

Practitioners may use the findings of this study to more confidently determine the primary RIASEC type in an SDS profile, and advise individuals accordingly. Specifically, practitioners should not consider primary-code distinction scores that fall below eight points as highly meaningful. Furthermore, differences beyond twice the rule of eight, or 16 points, may mean a more narrow exploration may be justified because agreement beyond chance is roughly 50% or more.

Certain factors may limit the generalizability of the conclusion drawn in the present study. The sample was limited to exploratory freshman students attending a large liberal arts university. Generalizability to other populations was not explored. The results are also delimited by the concurrent research design. The current study used a cross-sectional analysis of data to examine hit rates using two concurrent measures. Follow-up research should use longitudinal data to examine the rule of eight using a behavioral measure as a criterion. This study calculated hit rates by comparing individuals' classified inventoried interests and expressed interests. However, expressed interests only identify what an individual intends to do, not what they have actually done. Consequently, the future research on this topic should be longitudinal in calculating hit rates by comparing inventoried classification to occupation entered. Nevertheless, in conducting vocational guidance, the counselor has available only concurrent SDS scores and intentions. Thus, applying the rule of eight to interpret the scores is an important behavior on the counselor's part.

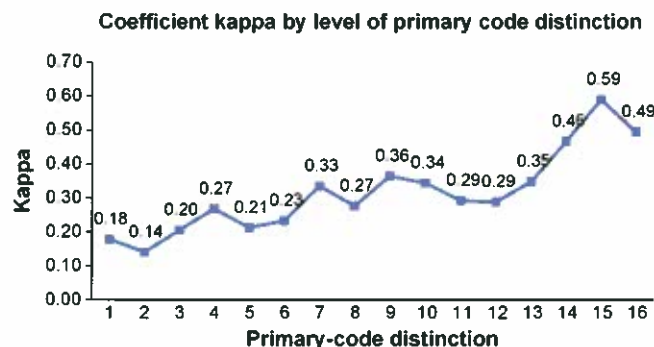


Fig. 1. Coefficient kappa by level of primary code distinction.

The ultimate test of the usefulness of the rule of eight is whether or not it is successful in getting counselors and clients to consider an appropriately broad range of occupational alternatives rather than focusing narrowly on the exact classification obtained from a SDS 3-letter code.

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