

L'ORÉAL USA

September 1, 2000

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via Fed Ex courier

Docket Management Branch (HFA-305)
Food and Drug Administration, Room 1061
5639 Fishers Lane
Rockville, Maryland 20857

Re: Docket No. 78N-0038: Sunscreen Drug Products for Over-the-Counter Human Use

Dear Sir/Madam:

As the Agency is preparing to issue a comprehensive rulemaking on sunscreen products for over-the-counter (OTC) use, L'ORÉAL Research / L'ORÉAL USA Products, Inc. is pleased to submit the findings from a consumer research study assessing the response to various UVA labeling systems. This study was conducted in support of on-going discussions concerning sunscreen products, and in particular, the evaluation of UVA test methodologies and a corresponding means for presenting clear and accurate information of a product's UVA protection level to the consumer.

Currently sunscreen products that provide UVA protection are typically labeled with the phrase, "*broad spectrum sunscreen; provides protection against UVB and UVA radiation*" consistent with the labeling text described in the 1993 Tentative Final Monograph¹. The '*broad spectrum*' designation has been described by some as a "*simple pass/fail designation for labeling products*".² However, the results of our study show the above labeling to be inadequate in its ability to convey sufficient information concerning the level of UVA protection to consumers, i.e., panelists found this designation to be "not as clear/not as specific/not easy to understand" and "not easy to compare against other products".

Moreover, our results unequivocally show the preference of consumers for verbal descriptors as compared to numbers, symbols and/or the pass/fail '*broad spectrum*' designation. Additionally, these results demonstrate the ability of consumers to distinguish between four levels of choice for each of the labeling systems tested (with the exception of the '*broad spectrum*' category which was a single choice option).

In the August 30, 2000 submission of the Industry Association of Interested Parties to this Docket, a proposal is made for the evaluation and labeling of UVA protection based on concepts of proportionality and a quantitative measurement of product efficacy. In this submission, a simple descriptive labeling scheme for the clear and concise

¹ 21 CFR Part 352: Sunscreen Drug Products for Over-the Counter Human Use; Tentative Final Monograph, *Federal Register* Vol. 58, No. 90 May 12, 1993 p.28233

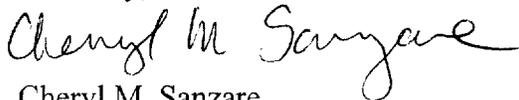
² The Procter & Gamble Company submission of May 2, 2000 to Docket 78N-0038 page 2.

presentation of this vital information to consumers has been developed which facilitates proper product selection based on an individual consumer's need for different levels of UVA protection. The results of our consumer labeling study complement this proposal and show the inherent flexibility to incorporate additional UVA labeling descriptors, corresponding to the concept of proportionality ratios (SPF to UVA-PF values), as sunscreen technologies advance, providing an incentive for manufacturers to pursue development of new and better products.

Educating consumers is a joint responsibility between this industry, the medical and scientific communities and the media. Today, as consumer product choices become increasingly more sophisticated in the realm of everyday living, there is a corresponding increase in the consumer's ability to select the product which best meets their needs. Consumers understand, prefer, and should be allowed to choose between different levels of UVA protection in the same manner that they choose SPF protection. This will allow individuals to select the appropriate sunscreen, in conjunction with medical advice and other educational information, for their specific circumstances (e.g. skin type, intended use, medical condition, etc.). When coupled with the industry's use of an appropriate *in vivo* test method and a guaranteed UVA/UVB proportionality for products claiming UVA protection, this approach ensures a comprehensive system for both consumer choice and safety.

In our September 1, 2000 submission to this Docket on UVA issues, we have shown the biological relevance of UVA photoprotection and the necessity for quantifying the magnitude of protection using *in vivo* methods against UVA exposure for any product claiming to provide UVA protection. However, it is equally important that this information be captured together with SPF, and conveyed to the consumer to enable the proper selection of a sunscreen product. We trust the information presented herein will sufficiently dispel the notion purported by the Procter and Gamble Company that simplicity in its most basic form, i.e., pass-fail, '*broad spectrum*', is a sufficient threshold for UVA product labeling. It is clearly insufficient and we trust that the Agency will reach this conclusion as well.

Sincerely,



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A CONSUMER'S EVALUATION OF UVA LABELING
FINAL STUDY REPORT

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A CONSUMER'S EVALUATION OF UVA LABELING

FINAL STUDY REPORT

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A CONSUMER'S EVALUATION OF UVA LABELING FINAL STUDY REPORT SUMMARY

Manufacturers of sunscreen products containing a high level of UVA protection are searching for ways to best express to consumers the superiority of their products. The results of three (3) consumer UVA labeling studies, conducted by the CTFA, Cosmair/L'Oreal USA, and Procter & Gamble, were not in agreement as to which labeling system was most preferred by US consumers. This study was conducted as an expansion of L'Oreal's previous study to assess American consumers' preference on ways to label sunscreen products containing UVA protection.

This mall-intercept study was conducted at twenty (20) sites throughout the United States. Panelists were screened according to the inclusion and exclusion criteria. Four (4) labeling systems were presented in twenty-four (24) combinations randomly assigned, according to a randomization list. Of the four (4) labeling systems, three (3) were four- (4) level labeling systems: Numbers, Symbols, and Descriptors. The Pass/Fail labeling system was shown as "Broad Spectrum UVA/UVB Protection", i.e., with/without UVA protection. After reading the educational material, the panelists were asked to complete a questionnaire. The panelists were asked to rank their labeling system choices and to provide their reasons for their choices. Ranking scores were compared using the Repeated Measure ANOVA with the Student-Newman-Keuls multiple comparison. The Chi square test was used to compare the percentages of the "most preferred" among the four (4) labels.

Two thousand eighteen (2,018) panelists were enrolled into the study. The ethnic background of the panelists reflected that of the US population. All other demographic characteristics (gender, age, educational background, and geographic location) were well distributed. Of the 1,921 panelists whose case records were included in the analysis, the Descriptors labeling system was ranked first with a mean score of 1.97 (\pm 1.05). The Numbers labeling system was ranked second with a mean score of 2.21 (\pm 0.92). The Symbols labeling system was ranked third with a mean score of 2.68 (\pm 0.96). The Pass/Fail labeling system was ranked fourth and last with a mean score of 3.14 (\pm 1.15) (p = 0.001). When analyzed by frequency (percentage), 874 (45.4%) panelists selected Descriptors as their first choice, 816 (42.6%) panelists selected Numbers as their second choice, 816 (42.6%) panelists selected Symbols as their third choice, and 1107 (57.7%) panelists selected Pass/Fail as their last choice (p = 0.001). This order of selection was consistent when analyzed across educational background, gender, ethnic background, age, and geographic location. The main reason(s) selected for the panelists' first and second choice was "clearer/more specific/easier to understand" (p = 0.001). The main reason(s) selected for the panelists' fourth (last) choice was "not as clear/not as specific/not easy to understand" and "not easy to compare against other products" (p = 0.001).

Panelists across the US preferred a four- (4) level labeling system using descriptive words or numbers based on label clarity, specificity and ease of comprehension. The Pass/Fail system was judged by our panel to be unclear, non-specific, not easy to understand, and lacking in sufficient information for comparison to other products. The Pass/Fail system was also the fourth choice, the last choice, among the labeling systems presented.

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A CONSUMER'S EVALUATION OF UVA LABELING

FINAL STUDY REPORT

Background:

Ultraviolet A (UVA) radiation has been associated with changes in the skin that establish UVA exposure as a risk factor for premature aging of the skin and certain skin cancers.^{1 2 3 4 5} Manufacturers of sunscreen products containing a high level of UVA protection are searching for ways to best express to consumers the superiority of their products. The Cosmetic, Toiletry and Fragrance Association (CTFA) submitted to the FDA Sunscreen Docket a study report ascertaining consumer understanding and preference of various UVA protection labeling systems. A qualitative research study was conducted with thirty (30) consumers in July 1994 and a quantitative research study was conducted with two hundred thirty-five (235) consumers at ten (10) sites throughout the United States in July 1995. The consumers reviewed three (3) labeling options: numeric, symbolic and descriptive. In its report, the CTFA concluded that the descriptive system "better conveys to consumers the added benefit of UVA protection and does not detract from the SPF". Additionally, the CTFA report concluded that a second number or symbols confused consumers. In the study design, consumers were exposed to one (1) of the three (3) designs in detail and then reviewed all three (3) labeling options. The data analysis did not reflect if there was any influence of labeling system presentation or any demographic factors on the consumers' responses.

In a consumer study conducted by Cosmair/L'Oreal USA in September 1996 and submitted to the FDA Sunscreen Docket, two hundred seventy-five (275) consumers from two (2) sites in the Northeast United States provided their understanding and preference of two (2) UVA protection labeling systems: grapho-numeric and descriptive.⁶ The results of this study indicated that consumers were equally able to understand the information about UVA protection conveyed by both labeling systems and preferred the grapho-numeric system over the descriptive

¹ Oikarinen, A., Peltonen, J., Kallioinene, M.: Ultraviolet Radiation in Skin Ageing and Carcinogenesis: The Role of Retinoids for Treatment and Prevention, *Ann. of Med.*, 23(5): 497-505, 1991.

² Matsui, M.S., DeLeo, V. A.: Longwave Ultraviolet Radiation and Promotion of Skin Cancer, *Can. Cells*, 3(1): 8-12, 1991.

³ Farmer, K. C., Naylor, M.F.: Sun Exposure, Sunscreens, and Skin Cancer Prevention: A Year-round Concern, *Ann. of Pharma.*, 30(6): 662-673, 1996.

⁴ Bernerd, F., Asselineau, D.: UVA Exposure of Human Skin Reconstructed in vitro Induces Apoptosis of Dermal Fibroblasts: Subsequent Connective Tissue Repair and Implications in Photoaging, Cell Death and Differentiation, 5(9): 792-802, 1998.

⁵ Berneburg, M., Grether-Beck, S., Kurten, V., et al: Singlet Oxygen Mediates the UVA-induced Generation of the Photoaging-associated Mitochondrial Common Deletion, *Journ. of Biol. Chem.*, 274 (22): 15345-15349, 1999.

⁶ Penicnak, A.J., Cosmair/L'Oreal USA, A Comparison of 2 Labeling Systems for the Expression of UVA Protection, Filed Jan 2, 1997, Received Feb 4, 1997 into the FDA Sunscreen Drug Products Docket 78N-0038.

one. In this study, the geographic location was limited and the majority of the consumers had college degrees.

In 1999, Procter & Gamble conducted a consumer survey whose objective was "to identify the best means of communicating UVA protection without undermining the SPF" and presented the results at the American Academy of Dermatology Consensus Conference on UVA Protection of Sunscreens.⁷ One thousand eighty-two (1,082) consumers from throughout the United States completed a questionnaire in the spring and one thousand one hundred fifty-six (1,156) consumers replicated the study in the fall. Two thousand two hundred thirty-eight (2,238) consumers evaluated three (3) labeling systems: pass/fail, three- (3) tiered verbal descriptor and three- (3) tiered grapho-numeric system. Procter & Gamble concluded that the "pass/fail label was significantly superior to the other labels with respect to ease of product selection", and that the "selection of the higher level of protection and SPF remained the primary indicator of sunscreen product efficacy".

In light of the various results regarding UVA protection labeling preference by consumers, L'Oreal USA conducted a second study to ascertain which labeling system best expresses the level of UVA protection preferred by American consumers.

Objective:

This study was conducted to assess the American consumer's preference on ways to label sunscreen products containing UVA protection using labels with multi-levels of UVA protection, and using descriptive words, numbers, symbols, and with/without UVA protection.

Methods:

This mall-intercept study was conducted at twenty (20) urban and suburban locations throughout the United States. The sites were selected for their geographic location, demographic make-up, and median household incomes. Four (4) labeling systems (Numbers, Symbols, Descriptors, and Pass/Fail) were evaluated by the respondents. The numerical labeling system (Numbers) was shown as Arabic numbers " 1, 2, 3, 4" with the number "2" highlighted. The symbolic labeling system (Symbols) shown was a picture of four stars with two stars highlighted. The descriptor labeling system (Descriptors) was shown with the words "Minimum, Moderate, High, Maximum" with the word "Moderate" highlighted. The Pass/Fail labeling system was shown as "Broad Spectrum UVA/UVB Protection" as currently described in the 1993 Sunscreen Tentative Final Monograph issued by the FDA. Three labeling systems, Numbers, Symbols, and

⁷ Nash, J. F., Procter & Gamble Company, Sunscreen Labeling Communicating Product Efficacy, presented Feb 4, 2000 at American Academy of Dermatology Consensus Conference UVA Protection of Sunscreens, Washington, D.C.

Descriptors, were four- (4) level systems of UVA protection whereas the Pass/Fail labeling system was shown as "with or without UVA protection".

To eliminate biases on the order of presentation, each of the four (4) labeling systems was presented first, second, third, or fourth in equal frequencies. The twenty-four (24) combinations were randomly assigned to respondents according to a randomization list. At each study site, the respondents were asked to read the educational materials prior to reading the questionnaire. Interviewers read the first question to the respondents to ensure understanding on the part of the respondents. The respondents then completed the questionnaire on their own. See Appendix I, Protocol, for a detailed description of the study.

The data collected were keypunched twice. In addition, using a computer-generated list, forty percent (40%) of the records were randomly selected for verification to ensure the accuracy of the data entry. The data were then analyzed according to the Statistical Plan outlined in the Protocol, Appendix I.

Results and Discussion:

1) Demographics:

Two thousand eighteen (2,018) panelists were enrolled into the study from the twenty sites. The number of panelists enrolled was comparable among the twenty sites. Nationwide, the median age group of the panel was between 35-44 years, ranging from 18 to 65+ years. Nine hundred three (903) or 44.7% were men, and 1,115 (55.3%) were women. In this panel, 1,559 (77.3%) were Caucasian, 231 (11.4%) were black, 166 (8.2%) were Hispanic, and 61 (3%) were other minorities. One (1) panelist's record had a discrepancy regarding ethnic background; this case record was not included in the ethnic demography section. In terms of education, five (5) panelists elected not to disclose their educational background; for the remaining panel, 204 (10.1%) individuals had graduate school education, 563 (27.9%) completed college, 565 (28%) had some college education, and 681 (33.7 %) completed high school or less. See Table 1 for demographics.

Table 1
Demographics

GENDER	Frequency (%)	Cumulative Frequency	Cumulative Percent
Male	903 (44.7)	903	44.7
Female	1115 (55.3)	2018	100.0

AGE	Frequency (%)	Cumulative Frequency	Cumulative Percent
18-24	341 (16.9)	341	16.9
25-34	433 (21.5)	774	38.4
35-44	460 (22.8)	1234	61.1
45-54	324 (16.1)	1558	77.2
55-64	193 (9.6)	1751	86.8
65+	267 (13.2)	2018	100.0

EDUCATION	Frequency (%)	Cumulative Frequency	Cumulative Percent
Completed High School or Less	681 (33.7)	681	33.7
Some College	565 (28.0)	1246	61.7
Completed College	563 (27.9)	1809	89.6
Graduate School	204 (10.1)	2013	99.8
Omitted	5 (0.2)	2018	100.0

ETHNICITY	Frequency (%)	Cumulative Frequency	Cumulative Percent
Caucasian	1559 (77.3)	1559	77.3
African American	231 (11.4)	1790	88.7
Hispanic	166 (8.2)	1956	96.9
Asian/American Indian/Other	61 (3.0)	2017	100.0
Omitted	1 (0.0)	2018	100.0

Table 1
Demographics (cont.)

SITE	Frequency (%)	Cumulative Frequency	Cumulative Percent
Albuquerque, NM	100(5.0)	100	5.0
Atlanta, GA	101(5.0)	201	10.0
Boston, MA	100(5.0)	301	14.9
Charleston, WV	100(5.0)	401	19.9
North Riverside, IL	100(5.0)	501	24.8
Cleveland, OH	101(5.0)	602	29.8
Aurora, CO	101(5.0)	703	34.8
West Des Moines, IA	100(5.0)	803	39.8
Boynton Beach, FL	100(5.0)	903	44.7
Ft. Smith, AR	109(5.4)	1012	50.1
Houston, TX	98(4.9)	1110	55.0
Indianapolis, IN	100(5.0)	1210	60.0
Jackson, MS	103(5.1)	1313	65.1
Downey, CA	100(5.0)	1413	70.0
Memphis, TN	102(5.1)	1515	75.1
Minnetonka, MN	102(5.1)	1617	80.1
NYC, NY	101(5.0)	1718	85.1
Nashua, NH	100(5.0)	1818	90.1
Vancouver, WA	100(5.0)	1918	95.0
Wayne, NJ	100(5.0)	2018	100.0

2) Case Records Included in the Analysis:

One thousand nine hundred twenty-one (1,921) case records were included in the analysis. Of these case records, five (5) case records were incomplete, but did not require exclusion (the protocol permitted no answer where panelists did not understand the question). These blank answers were neither "coded" nor included in that part of the analysis. See Table 2 for a detailed description of these panelists' case records.

Table 2
Records with Minor Deficiencies Included in Data Analysis

Panelist Initials	Respondent ID Number	Combination Number	Panelist Number	Location Number	Reasons for Inclusion
LH	1799	09	050	09	Left question blank (Questionnaire Q3); all other entries completed
BW	2321	21	044	12	Left part of question blank (Questionnaire Q4); all other entries completed; no inconsistency
FM	3344	21	066	17	Left question blank (Questionnaire Q2&Q3); all other entries completed
DR	3346	04	080	17	Wrote comment (Questionnaire Q6); did not choose answer; all other entries completed
EB	3533	14	025	18	Education level (Screener Q9) omitted; all other entries completed

3) Case Records Excluded from the Analysis:

Ninety-seven (97) case records or 4.8% of the panel were excluded from the analysis. See Table 3. Forty-six (46) or 5.1% were men, 51 (4.6%) were women; all were of similar distributions in geographic location, education, age group, and ethnic background. The excluded records were categorized into two groups. The first group was comprised of 16 panelists who were enrolled into the study in violation of the entry criteria listed in the protocol. See Table 3.1.1 for detailed information on these panelists and Table 3.1.2 for listed protocol violations. The second group was comprised of 81 panelists who did not understand the questionnaire and gave contradictory answers. See Table 3.2.1 for demographic details, and Table 3.2.2 for detailed reasons for exclusion.

**Table 3
List of Exclusions**

Gender	Exclusion Frequency	Overall Frequency	Percent (%)
Male	46	903	5.1
Female	51	1115	4.6
Total	97	2018	4.8

Age	Exclusion Frequency	Overall Frequency	Percent (%)
18-24	10	341	2.9
25-34	25	433	5.8
35-44	22	460	4.8
45-54	15	324	4.6
55-64	8	193	4.1
65+	17	267	6.4
Total	97	2018	4.8

Education	Exclusion Frequency	Overall Frequency	Percent (%)
Completed High School or Less	45	681	6.6
Some College	23	565	4.1
Completed College	21	563	3.7
Graduate School	8	204	3.9
Omitted	0	5	0.0
Total	97	2018	4.8

Ethnicity	Exclusion Frequency	Overall Frequency	Percent (%)
White/Caucasian	62	1559	4.0
Black/African American	27	231	11.7
Hispanic	5	166	3.0
Other(Asian/American Indian)	2	61	3.3
Omitted	1	1	100.0
Total	97	2018	4.8

**Table 3
List of Exclusions (cont.)**

Sites	Exclusion Frequency	Overall Frequency	Percent (%)
Albuquerque, NM	6	100	6.0
Atlanta, GA	17	101	16.8
Boston, MA	4	100	4.0
Charleston, WV	17	100	17.0
North Riverside, IL	8	100	8.0
Cleveland, OH	4	101	4.0
Aurora, CO	10	101	9.9
West Des Moines, IA	1	100	1.0
Boynton Beach, FL	1	100	1.0
Ft. Smith, AR	4	109	3.7
Houston, TX	4	98	4.1
Indianapolis, IN	4	100	4.0
Jackson, MS	3	103	2.9
Downey, CA	1	100	1.0
Memphis, TN	1	102	1.0
Minnetonka, MN	3	102	2.9
NYC, NY	3	101	3.0
Nashua, NH	4	100	4.0
Vancouver, WA	2	100	2.0
Wayne, NJ	0	100	0.0
Total	97	2018	4.8

**Table 3.1.1
Records Excluded Due to Protocol Violations**

Gender	Frequency	Overall Population		Overall Exclusion	
		Frequency	%	Frequency	%
Male	5	903	0.6	46	10.9
Female	11	1115	1.0	51	21.6
Total	16	2018	0.8	97	16.5

Age	Frequency	Overall Population		Overall Exclusion	
		Frequency	%	Frequency	%
18-24	3	341	0.9	10	30.0
25-34	1	433	0.2	25	4.0
35-44	3	460	0.7	22	13.6
45-54	3	324	0.9	15	20.0
55-64	2	193	1.0	8	25.0
65+	4	267	1.5	17	23.5
Total	16	2018	0.8	97	16.5

Education	Frequency	Overall Population		Overall Exclusion	
		Frequency	%	Frequency	%
Completed High School or Less	8	681	1.2	45	17.8
Some College	5	565	0.9	23	21.7
Completed College	2	563	0.4	21	9.5
Graduate School	1	204	0.5	8	12.5
Omitted	0	5	0.0	0	
Total	16	2018	0.8	97	16.5

Ethnicity	Frequency	Overall Population		Overall Exclusion	
		Frequency	%	Frequency	%
Caucasian	11	1559	0.7	62	17.7
Black (African American)	4	231	1.7	27	14.8
Hispanic	1	166	0.6	5	20.0
Other (Asian/American Indian)	0	61	0.0	2	0.0
Omitted	0	1	0.0	1	0.0
Total	16	2018	0.8	97	16.5

**Table 3.1.1
Records Excluded Due to Protocol Violations (cont.)**

Sites	Frequency	Overall Population		Overall Exclusion	
		Frequency	%	Frequency	%
Albuquerque, NM	1	100	1.0	6	16.7
Atlanta, GA	0	101	0.0	17	0.0
Boston, MA	1	100	1.0	4	25.0
Charleston, WV	2	100	2.0	17	11.8
North Riverside, IL	0	100	0.0	8	0.0
Cleveland, OH	0	101	0.0	4	0.0
Aurora, CO	1	101	1.0	10	10.0
West Des Moines, IA	1	100	1.0	1	100.0
Boynton Beach, FL	0	100	0.0	1	0.0
Ft. Smith, AR	1	109	0.9	4	25.0
Houston, TX	1	98	1.0	4	25.0
Indianapolis, IN	1	100	1.0	4	25.0
Jackson, MS	0	103	0.0	3	0.0
Downey, CA	1	100	1.0	1	100.0
Memphis, TN	0	102	0.0	1	0.0
Minnetonka, MN	2	102	2.0	3	66.7
NYC, NY	1	101	1.0	3	33.3
Nashua, NH	1	100	1.0	4	25.0
Vancouver, WA	2	100	2.0	2	100.0
Wayne, NJ	0	100	0.0	0	0.0
Total	16	2018	0.8	97	16.5

Table 3.1.2
Records Excluded Due to Protocol Violations – Detailed Reasons
(N = 16)

Panelist Initials	Respondent ID Number	Combination Number	Panelist Number	Location Number	Reasons for Exclusion
FM	0120	07	022	01	Did not mention beach activity (required for coastal market – MA)
CW	0300	03	001	02	Participated in a survey within the past 6 months
RL	0556	12	006	04	Works for advertising, marketing, healthcare or cosmetic firm
CH	1380	24	079	07	Participated in a survey within the past 6 months
AB	1508	01	007	08	Works for advertising, marketing, healthcare or cosmetic firm
ES	1604	12	102	08	Did not mention sunscreen use
ML	1762	13	043	09	Works for advertising, marketing, healthcare or cosmetic firm
MW	2308	06	031	12	Participated in a survey within the past 6 months
IW	2432	01	007	12	Works for advertising, marketing, healthcare or cosmetic firm
JJ	2927	04	030	15	Did not mention beach activity (required for coastal market - TX)
AH	3205	10	105	16	Participated in a survey within the past 6 months
DM	3338	08	046	17	Did not mention sunscreen use
JT	3504	20	002	18	Participated in a survey within the past 6 months
RM	3754	24	059	19	Works for advertising, marketing, healthcare or cosmetic firm; participated in a survey within the past 6 months
FJ	3945	13	043	20	Works for advertising, marketing, healthcare or cosmetic firm
HM	3985	04	080	20	Participated in a survey within the past 6 months

Table 3.2.1
Records Excluded Due to Panelists Not Understanding the Questionnaire

Gender	Frequency	Overall Population		Overall Exclusion	
		Frequency	%	Frequency	%
Male	41	903	4.5	46	89.1
Female	40	1115	3.6	51	78.4
Total	81	2018	4.0	97	83.5

Age	Frequency	Overall Population		Overall Exclusion	
		Frequency	%	Frequency	%
18-24	7	341	2.1	10	70.0
25-34	24	433	5.5	25	96.0
35-44	19	460	4.1	22	86.4
45-54	12	324	3.7	15	80.0
55-64	6	193	3.1	8	75.0
65+	13	267	4.9	17	76.5
Total	81	2018	4.0	97	83.5

Education	Frequency	Overall Population		Overall Exclusion	
		Frequency	%	Frequency	%
Completed High School or Less	37	681	5.4	45	82.2
Some College	18	565	3.2	23	78.3
Completed College	19	563	3.4	21	90.5
Graduate School	7	204	3.4	8	87.5
Omitted	0	5	0.0	0	
Total	81	2018	4.0	97	83.5

Ethnicity	Frequency	Overall Population		Overall Exclusion	
		Frequency	%	Frequency	%
White/Caucasian	51	1559	3.3	62	82.3
Black/African American	23	231	10.0	27	85.2
Hispanic	4	166	2.4	5	80.0
Other (Asian/American Indian)	2	61	3.3	2	100.0
Omitted	1	1	100.0	1	100.0
Total	81	2018	4.0	97	83.5

Table 3.2.1
Records Excluded Due to Panelists Not Understanding the Questionnaire (cont.)

Sites	Frequency	Overall Population		Overall Exclusion	
		Frequency	%	Frequency	%
Albuquerque, NM	5	100	5.0	6	83.3
Atlanta, GA	17	101	16.8	17	100.0
Boston, MA	3	100	3.0	4	75.0
Charleston, WV	15	100	15.0	17	88.2
North Riverside, IL	8	100	8.0	8	100.0
Cleveland, OH	4	101	4.0	4	100.0
Aurora, CO	9	101	8.9	10	90.0
West Des Moines, IA	0	100	0.0	1	0.0
Boynton Beach, FL	1	100	1.0	1	100.0
Ft. Smith, AR	3	109	2.8	4	75.0
Houston, TX	3	98	3.1	4	75.0
Indianapolis, IN	3	100	3.0	4	75.0
Jackson, MS	3	103	2.9	3	100.0
Downey, CA	0	100	0.0	1	0.0
Memphis, TN	1	102	1.0	1	100.0
Minnetonka, MN	1	102	1.0	3	33.3
NYC, NY	2	101	2.0	3	66.7
Nashua, NH	3	100	3.0	4	75.0
Vancouver, WA	0	100	0.0	2	0.0
Wayne, NJ	0	100	0.0	0	
Total	81	2018	4.0	97	83.5

Table 3.2.2
Records Excluded Due to Panelists Not Understanding the Questionnaire
Detailed Reasons
(N = 81)

Panelist Initials	Respondent ID Number	Combination Number	Panelist Number	Location Number	Reason for Exclusion*
TF	126	4	28	1	5
KR	127	6	29	1	2
SM	187	5	89	1	2
JP	335	13	35	2	2
MVD	348	5	48	2	1
CB	376	20	77	2	1
MS	527	18	15	4	4
FF	584	13	70	4	4
EB	930	6	51	5	2
SF	962	15	55	5	2
MS	965	8	98	5	1
EH	969	19	72	5	4
CR	970	9	67	5	1
JC	990	1	76	5	2
KB	1001	5	89	5	1
DS	1009	20	94	5	4
KF	1136	18	37	6	4
AO	1158	21	60	6	3
KM	1169	13	70	6	2
PS	1171	19	72	6	2
MM	1331	19	32	7	2
AE	1341	17	42	7	4
DP	1382	12	81	7	2
JL	1524	11	27	8	1
JB	1901	3	1	10	2
AF	1903	19	3	10	2
KS	1910	19	10	10	2
MJ	1911	15	11	10	2
EW	1924	11	24	10	2
CJ	1925	14	25	10	2
WS	1933	14	33	10	4
AMH	1942	17	42	10	2

Table 3.2.2
Records Excluded Due to Panelists Not Understanding the Questionnaire
Detailed Reasons (cont.)
(N = 81)

Panelist Initials	Respondent ID Number	Combination Number	Panelist Number	Location Number	Reason for Exclusion*
MM	1948	5	48	10	4
AJJ	1949	9	49	10	4
MM	1950	9	50	10	4
EM	1952	10	52	10	4
AC	1954	7	54	10	4
AS	1966	21	66	10	4
CJ	1967	9	67	10	4
GT	1972	19	72	10	2
DM	1993	22	93	10	4
HS	2147	18	37	11	2
GC	2313	2	18	12	2
RM	2314	18	37	12	1
LL	2315	9	49	12	1
KK	2316	13	41	12	2
FR	2323	8	46	12	2
NR	2349	21	100	12	2
HS	2370	17	83	12	2
BN	2371	4	80	12	2
RB	2372	7	82	12	2
GH	2388	22	47	12	1
AM	2420	7	68	12	1
SGK	2431	4	28	12	1
RS	2445	7	22	12	1
RS	2447	8	34	12	1
DJ	2448	11	27	12	1
LR	2545	13	43	13	1
NB	2706	1	7	14	2
LF	2742	5	39	14	3
DC	2813	2	101	14	4
KC	2900	19	3	15	4
RG	2918	3	23	15	3
JB	2951	15	53	15	4

Table 3.2.2
Records Excluded Due to Panelists Not Understanding the Questionnaire
Detailed Reasons (cont.)
(N = 81)

Panelist Initials	Respondent ID Number	Combination Number	Panelist Number	Location Number	Reason for Exclusion*
JW	3111	20	12	16	2
LM	3128	6	29	16	4
SP	3167	9	67	16	2
EM	3325	4	30	17	1
ELM	3326	6	29	17	1
DB	3327	4	28	17	1
DV	3332	5	48	17	2
TC	3352	1	75	17	2
JH	3353	20	77	17	4
KS	3364	21	44	17	1
KC	3369	6	85	17	1
TG	3370	24	86	17	2
JPS	3529	11	27	18	1
PJ	3531	4	28	18	1
JS	3583	16	92	18	2
JH	3584	16	69	18	2
AF	3586	2	71	18	2

***Reason for Exclusion**

1. Panelists were requested to rank their second through fourth choice of sunscreen label in Question 4, to provide their reason for their second choice in Question 5, and to provide their reason for their fourth choice in Question 6. The panelists with deficient records did not rank their choices in Question 4, but gave a response to Question 5 and/or Question 6.
2. Panelist gave conflicting responses by ranking the same sunscreen label twice.
3. Panelist gave inappropriate responses to Question 4. Panelists were instructed to rank the "letter" of their choice for sunscreen label, but entered numbers or gave a letter that was not a choice.
4. Panelist gave more than one (1) answer to a question that required only one (1) answer.
5. Panelist received an incomplete questionnaire due to clerical error.

4) Evaluation of Panelists' Preferences:

The panelists' preferences were ranked using the ANOVA and the Student-Newman-Keuls statistical tests. The Descriptors labeling system was ranked first with a mean score of 1.97 (± 1.05). The Numbers labeling system was ranked second with a mean score of 2.21 (± 0.92). The Symbols labeling system was ranked third with a mean score of 2.68 (± 0.96). The Pass/Fail labeling system was ranked fourth (last) with a mean score of 3.14 (± 1.15). The differences in the ranking scores among the four labeling systems were statistically significant. See Table 4 below.

Table 4
Ranking of Panelists' Preferences
(N = 1921)

Label	Mean (\pm Std Dev)	Median (Range: Min – Max)	p-Value
Descriptors	1.97 (± 1.05)	2 (1 – 4)	0.001 Descriptors< Numbers< Symbols< Pass/Fail
Numbers	2.21 (± 0.92)	2 (1 – 4)	
Symbols	2.68 (± 0.96)	3 (1 – 4)	
Pass/Fail	3.14 (± 1.15)	4 (1 – 4)	

* One (1) panelist did not complete the ranking.

The panelists' choices (first, second, third, and fourth choice) were tabulated by frequency. The frequencies were compared for the "most preferred" to the "least preferred" choice using the Chi-square test. The Descriptors labeling system was selected as the first choice, and the Numbers labeling system was selected as the second choice by the highest number of panelists. See Table 5.

The Descriptors labeling system was selected as the first choice by 874 panelists (45.5%), the second choice by 440 panelists (22.9%), the third choice by 389 panelists (20.2%), and the last choice by 218 panelists (11.3%). The differences in the frequencies of selection among the four (4) choices were statistically significant ($p < 0.05$).

The Numbers labeling system was selected as the first choice by 454 panelists (23.6%), the second choice by 816 panelists (42.5%), the third choice by 445 panelists (23.2%), and the last choice by 206 panelists (10.7%). The differences in the frequencies of selection among the four (4) choices were statistically significant ($p < 0.05$).

The Symbols labeling system was selected as the first choice by 288 panelists (15%), the second choice by 427 panelists (22.2%), the third choice by 816 panelists (42.5%), and the last choice by 389 panelists (20.3%). The differences in the frequencies of selection among the four (4) choices were statistically significant ($p < 0.05$).

The Pass/Fail labeling system was selected as the first choice by 305 panelists (15.9%), the second choice by 238 panelists (12.4%), the third choice by 270 panelists (14.1%), and the last choice by 1107 panelists (57.7%). The differences in the frequencies of selection among the four (4) choices were statistically significant ($p < 0.05$).

Table 5
Comparison of Panelists' Preferences
(N = 1921)
Frequency (%)

Label	First Choice	Second Choice	Third Choice	Last Choice	p-Value
Descriptors	874 (45.5)	440 (22.9)	389 (20.2)	218 (11.3)	0.001
Numbers	454 (23.6)	816 (42.5)	445 (23.2)	206 (10.7)	0.001
Symbols	288 (15.0)	427 (22.2)	816 (42.5)	389 (20.3)	0.001
Pass/Fail	305 (15.9)	238 (12.4)	270 (14.1)	1107 (57.7)	0.001
p-Value	0.001	0.001	0.001	0.001	

* One (1) panelist elected not to complete the ranking.

When panelists were asked for the main reason for selecting their first choice, the majority (52.3%) chose the answer "clearer/more specific/easier to understand". Three hundred thirty (330) panelists or 17.2% chose "easier to read or see". Three hundred twenty-eight (328) panelists or 17.1% chose "easy to compare products against each other" and two hundred fifty-eight (258) panelists or 13.4% chose "easy to increase rating scale, like SPF". The data indicated that the clarity, the specificity, and the ease of comprehension of a label were most important to panelists. The differences in frequency of selection among the answers were statistically significant ($p < 0.05$). See Table 6.

Of the 872 panelists who selected the Descriptors labeling system as their first choice, 559 panelists (64.1%) cited the answer "clearer/more specific/easier to understand" as their main reason. One hundred thirty-seven (137) panelists or 15.7% selected the answer "easier to read or see" as the main reason. One hundred two (102) panelists or 11.7% selected the answer "easy to compare products against each other" and 74 panelists (8.5%) selected the answer "easy to increase rating scale, like SPF". See Table 6.

Of the 454 panelists who selected the Numbers labeling system as their first choice, 196 panelists (43.2%) chose the answer "clearer/more specific/easier to understand". Ninety-three (93) panelists or 20.5% chose "easy to compare products against each other", 90 panelists (19.8%) chose "easy to increase rating scale, like SPF", and 75 panelists (16.5%) chose "easier to read or see". See Table 6.

Of the 288 panelists who selected the Symbols labeling system as their first choice, 107 panelists (37.2%) chose the answer "clearer/more specific/easier to understand". Sixty-eight (68) panelists or 23.6% chose "easier to read or see", 60 panelists (20.8%) chose "easy to compare

products against each other", and 53 panelists (18.4%) chose "easy to increase rating scale, like SPF". See Table 6.

Of the 305 panelists who selected the Pass/Fail labeling system as their first choice, 141 panelists (46.2%) chose the answer "clearer/more specific/easier to understand". Seventy-three (73) panelists or 23.9% chose "easy to compare products against each other", 50 panelists (16.4%) chose "easier to read or see", and 41 panelists (13.4%) chose "easy to increase rating scale, like SPF". See Table 6.

Table 6
Comparison of Reasons for First Choice - Main Reason
(N = 1919)
Frequency (%)

Label	N	Clearer/ More Specific/ Easier to Understand	Easier to Read or See	Easy to Compare Products Against Each Other	Easy to Increase Rating Scale, Like SPF	p-Value
(Total)	1919	1003 (52.3)	330 (17.2)	328 (17.1)	258 (13.4)	0.001
Descriptors	872	559 (64.1)	137 (15.7)	102 (11.7)	74 (8.5)	0.001
Numbers	454	196 (43.2)	75 (16.5)	93 (20.5)	90 (19.8)	0.001
Pass/Fail	305	141 (46.2)	50 (16.4)	73 (23.9)	41 (13.4)	0.001
Symbols	288	107 (37.2)	68 (23.6)	60 (20.8)	53 (18.4)	0.001

* Two (2) panelists did not answer this question.

When panelists were asked about "other reasons" for selecting the labeling of their first choice, giving them the option of selecting more than one answer, the pattern of panelists' answers was similar to that of the "main reason". The clarity, the specificity, and the ease of comprehension were important to the panelists. In addition, the answer "shows you what you need to know", the adequacy of information, was selected with a high frequency. See Table 7.

Table 7

**Comparison of All Reasons for First Choice - Multiple Reasons
(N = 1920)
Frequency (%)**

Label	N	Clearer/ More Specific/ Easier to Understand	Shows You What You Need to Know	Easy to Compare Products Against Each Other	Easier to Read or See	Easier to Increase Rating Scale, Like SPF	p-Value
(Total)	1920	1441 (75.1)	945 (49.2)	876 (45.6)	863 (44.9)	586 (30.5)	< 0.001
Descriptors	873	715 (81.9)	505 (57.8)	372 (42.6)	424 (48.6)	194 (22.2)	< 0.001
Numbers	454	337 (74.2)	183 (40.3)	238 (52.4)	197 (43.4)	188 (41.4)	< 0.001
Symbols	288	190 (66.0)	114 (39.6)	146 (50.7)	130 (45.1)	111 (38.5)	< 0.001
Pass/Fail	305	199 (65.2)	143 (46.9)	120 (39.3)	112 (36.7)	93 (30.5)	< 0.001

* One (1) panelist did not answer this question.

When panelists were asked to rank their choices (among the three [3] remaining labeling systems) and to select reasons for their second choice and last choice, panelists selected their second choice, again, primarily based on the reason "Clearer/More Specific/Easier to Understand". See Table 8.

Table 8
Comparison of All Reasons for Second Choice - Multiple Reasons
(N = 1920)
Frequency (%)

Label	N	Clearer/ More Specific/ Easier to Understand	Easier to Read or See	Easy to Compare Products Against Each Other	Easier to Increase Rating Scale, Like SPF	p-Value
(Total)	1920	820 (42.7)	779 (40.6)	727 (37.9)	371 (19.3)	<0.001
Numbers	816	353 (43.3)	341 (41.8)	327 (40.1)	187 (22.9)	<0.001
Descriptors	440	208 (47.3)	178 (40.5)	154 (35.0)	66 (15.0)	< 0.001
Symbols	427	169 (39.6)	181 (42.4)	165 (38.6)	84 (19.7)	< 0.001
Pass/Fail	237	90 (38.0)	79 (33.3)	81 (34.2)	34 (14.3)	< 0.001

* One panelist did not answer this question.

When panelists were asked the reason(s) for selecting their fourth (last) choice, an overwhelming number of responses (2,017) was recorded for the Pass/Fail labeling system. The reasons that the panelists selected for their dislike of this system were "not as clear/not as specific/not as easy to understand", "is not easy to compare against other products" and "does not show you what you need to know". See Table 9.

Table 9

**Comparison of All Reasons for Fourth (Last) Choice - Multiple Reasons
(N = 1917)
Frequency (%)**

Label	N	Not as Clear/ Not as Specific/ Not as Easy to Understand	Not Easy to Compare Against Other Products	Does Not Show You What You Need to Know	Cannot Increase Rating Scale, Not Like SPF	Not Easy to Read or See	p-Value
(Total)	1917	1129 (58.9)	672 (35.1)	561 (29.3)	401 (20.9)	372 (19.4)	<0.001
Pass/Fail	1105	752 (68.1)	429 (38.8)	357 (32.3)	252 (22.8)	227 (20.5)	<0.001
Symbols	388	203 (52.3)	112 (28.9)	110 (28.4)	60 (15.5)	87 (22.4)	< 0.001
Descriptors	218	98 (45.0)	65 (29.8)	44 (20.2)	54 (24.8)	32 (14.7)	< 0.001
Numbers	206	76 (36.9)	66 (32.0)	50 (24.3)	35 (17.0)	26 (12.6)	< 0.001

* Four (4) panelists did not answer this question.

When the data were analyzed by educational background, the pattern of panelists' preferences among the groups with different educational backgrounds paralleled that of the nationwide panel. The results suggest that, regardless of the level of education, panelists selected Descriptors and Numbers as their top two choices, and Pass/Fail as their least preferred choice. See Table 10 and Figures 1-4.

Table 10
Panelists' Preferences – By Education
(N = 1916)
Frequency (%)

Label	First Choice	Second Choice	Third Choice	Last Choice	p-Value
Completed High School or Less (N = 636)					
Descriptors	268 (42.1)	154 (24.2)	129 (20.3)	85 (13.4)	0.001
Numbers	143 (22.5)	254 (39.9)	154 (24.2)	85 (13.4)	0.001
Symbols	107 (16.8)	135 (21.2)	262 (41.2)	132 (20.8)	0.001
Pass/Fail	118 (18.6)	93 (14.6)	91 (14.3)	334 (52.5)	0.001
Some College (N = 542)					
Descriptors	256 (47.2)	109 (20.1)	123 (22.7)	54 (10.0)	0.001
Numbers	125 (23.1)	236 (43.5)	123 (22.7)	58 (10.7)	0.001
Symbols	73 (13.5)	123 (22.7)	211 (38.9)	135 (24.9)	0.001
Pass/Fail	88 (16.2)	74 (13.7)	85 (15.7)	295 (54.4)	0.001
Completed College (N = 542)					
Descriptors	247 (45.6)	134 (24.7)	99 (18.3)	62 (11.4)	0.001
Numbers	150 (27.7)	230 (42.4)	116 (21.4)	46 (8.5)	0.001
Symbols	77 (14.2)	120 (22.1)	254 (46.9)	91 (16.8)	0.001
Pass/Fail	68 (12.5)	58 (10.7)	73 (13.5)	343 (63.3)	0.001
Graduate School (N = 196)					
Descriptors	102 (52.0)	42 (21.4)	36 (18.4)	16 (8.2)	0.001
Numbers	35 (17.9)	95 (48.5)	49 (25.0)	17 (8.7)	0.001
Symbols	30 (15.4)	47 (24.1)	89 (45.6)	29 (14.9)	0.001
Pass/Fail	29 (14.9)	12 (6.2)	21 (10.8)	133 (68.2)	0.001

* Five (5) panelists did not disclose their educational background.

* One (1) panelist did not complete the ranking.

DESCRIPTORS

(PREFERENCES BY EDUCATION)

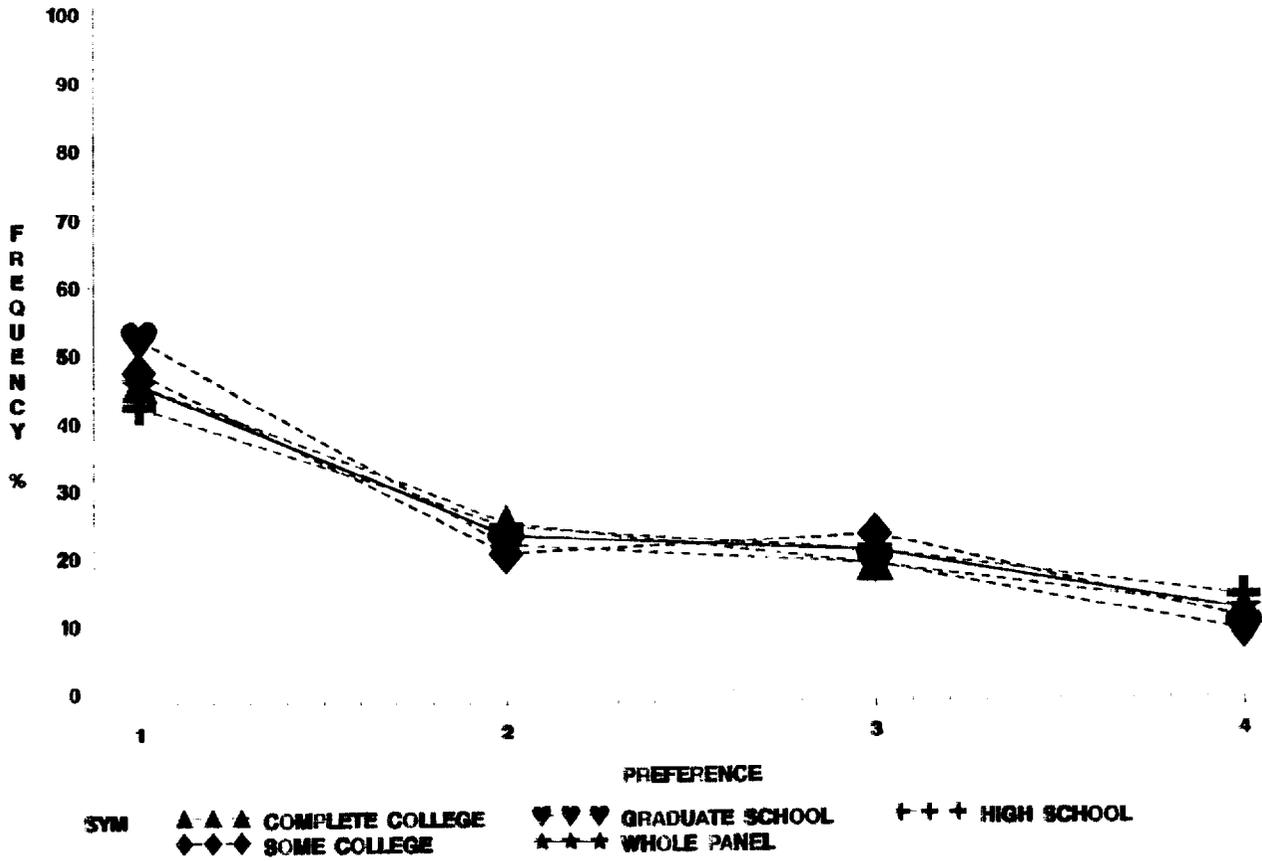


Figure 1

NUMBERS

(PREFERENCES BY EDUCATION)

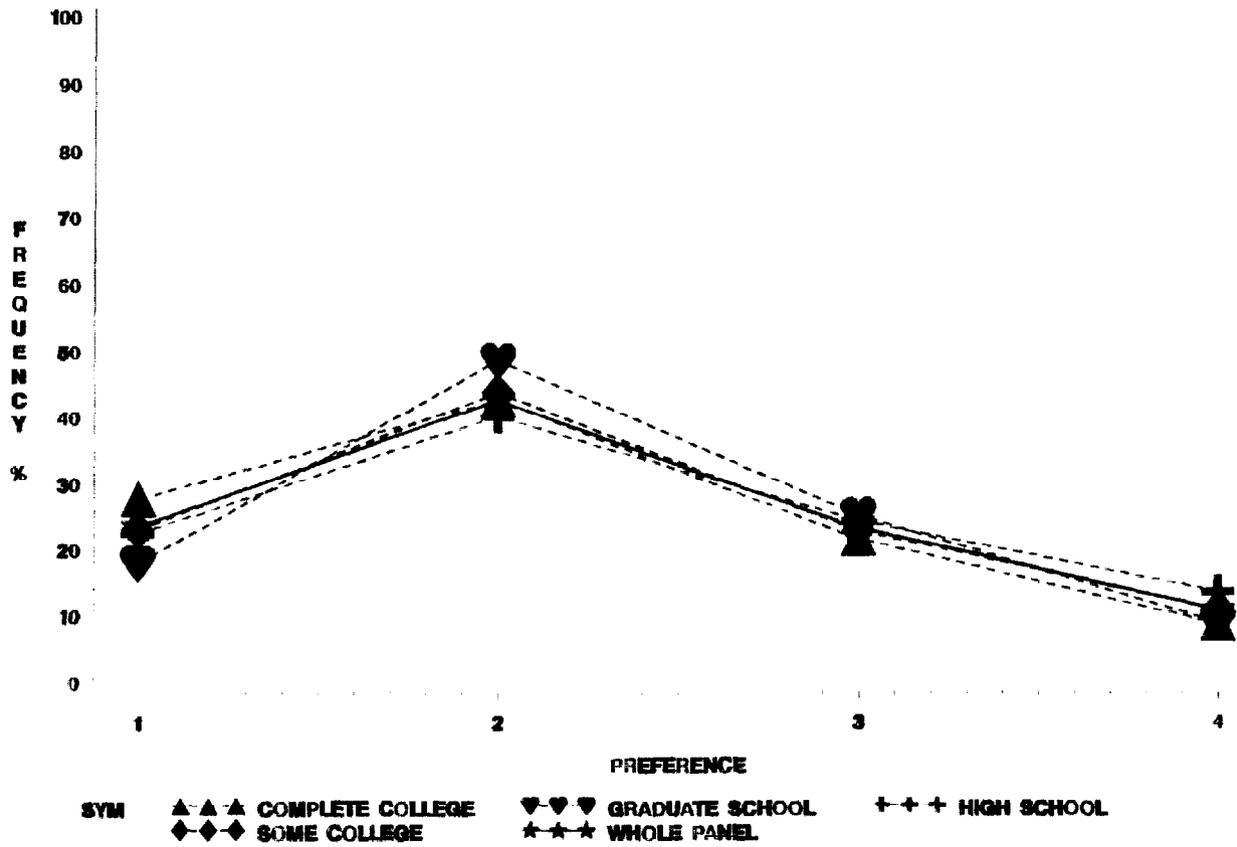


Figure 2

SYMBOLS

(PREFERENCES BY EDUCATION)

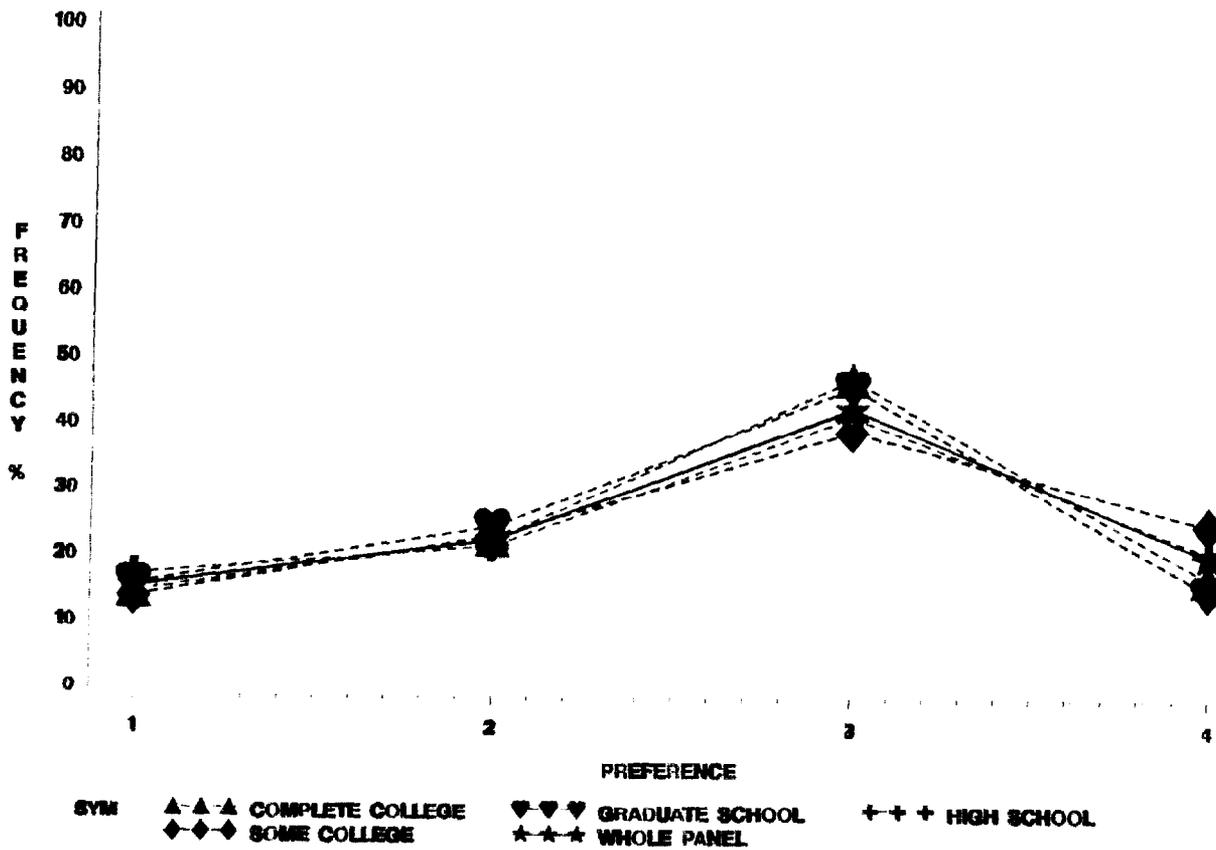


Figure 3

PASS/FAIL
(PREFERENCES BY EDUCATION)

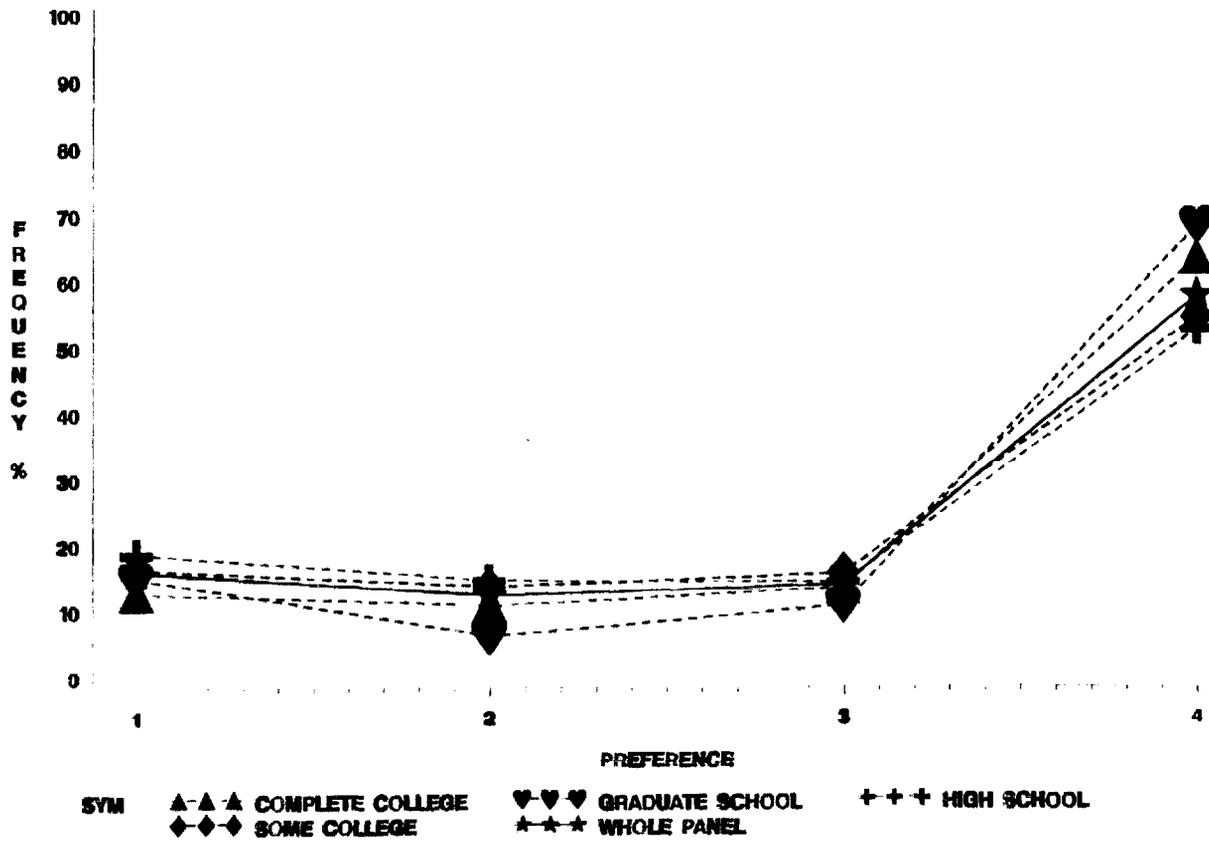


Figure 4

When the data were analyzed by gender, the pattern of preference in both female and male panelists mirrored that of the nationwide panel. In both genders, the first two choices were Descriptors and Numbers, and the last two choices were Symbols and Pass/Fail. See Table 11 and Figures 5-8.

Table 11
Panelists' Preferences – By Gender
(N = 1921)
Frequency (%)

Label	First Choice	Second Choice	Third Choice	Last Choice	p-Value
Female (N = 1064)					
Descriptors	509 (47.8)	230 (21.6)	220 (20.7)	105 (9.9)	0.001
Numbers	241 (22.7)	473 (44.5)	237 (22.3)	113 (10.6)	0.001
Symbols	157 (14.8)	233 (21.9)	465 (43.7)	208 (19.6)	0.001
Pass/Fail	157 (14.8)	128 (12.0)	141 (13.3)	637 (59.9)	0.001
Male (N = 857)					
Descriptors	365 (42.6)	210 (24.5)	169 (19.7)	113 (13.2)	0.001
Numbers	213 (24.9)	343 (40.0)	208 (24.3)	93 (10.9)	0.001
Symbols	131 (15.3)	194 (22.6)	351 (41.0)	181 (21.1)	0.001
Pass/Fail	148 (17.3)	110 (12.8)	129 (15.1)	470 (54.8)	0.001

* One (1) panelist did not complete the ranking.

DESCRIPTORS

(PREFERENCES BY GENDER)

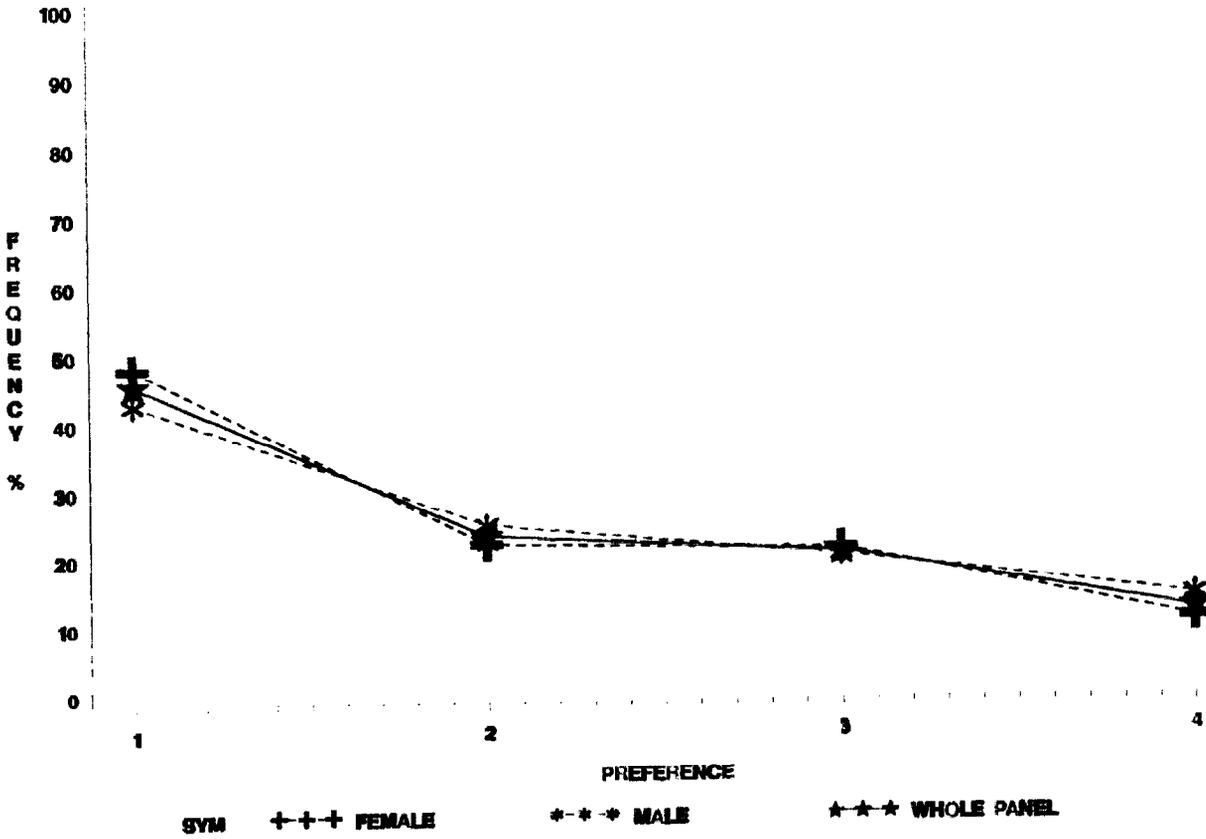


Figure 5

NUMBERS

(PREFERENCES BY GENDER)

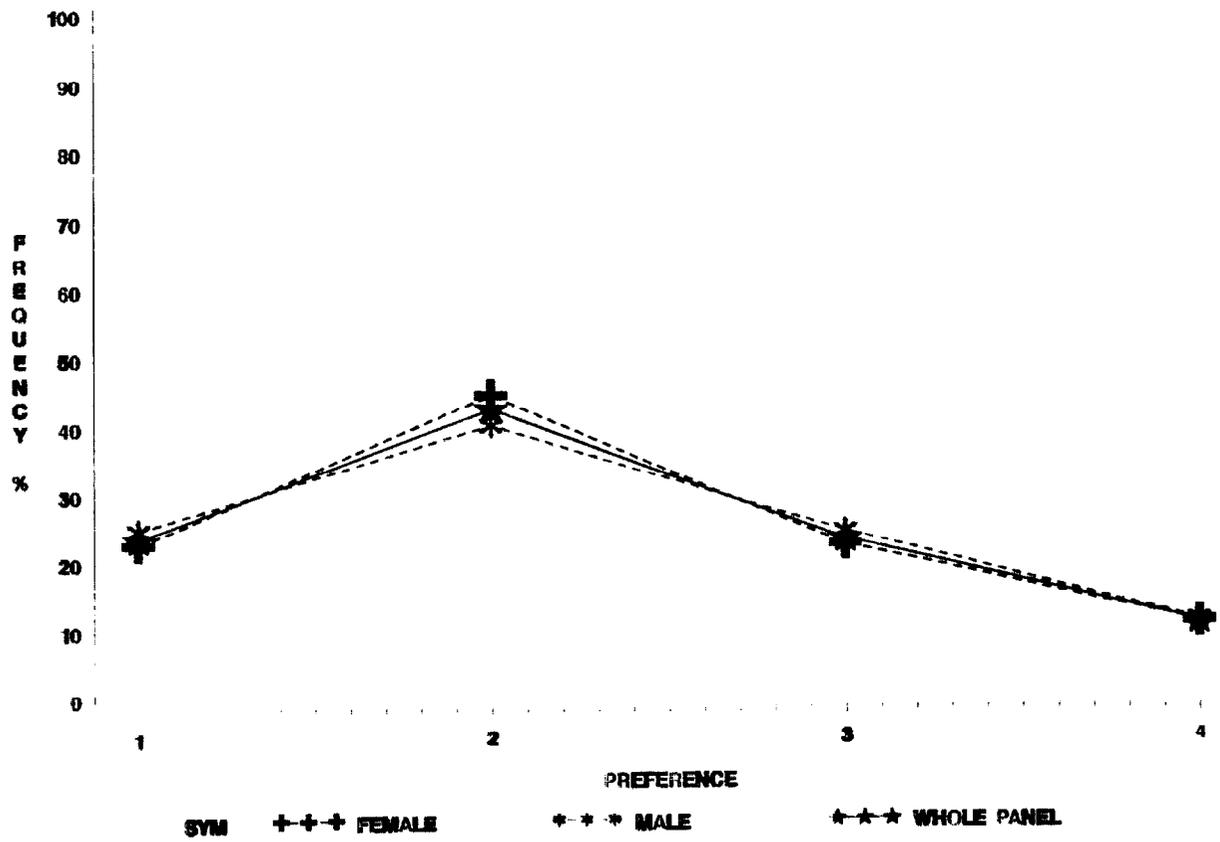


Figure 6

SYMBOLS

(PREFERENCES BY GENDER)

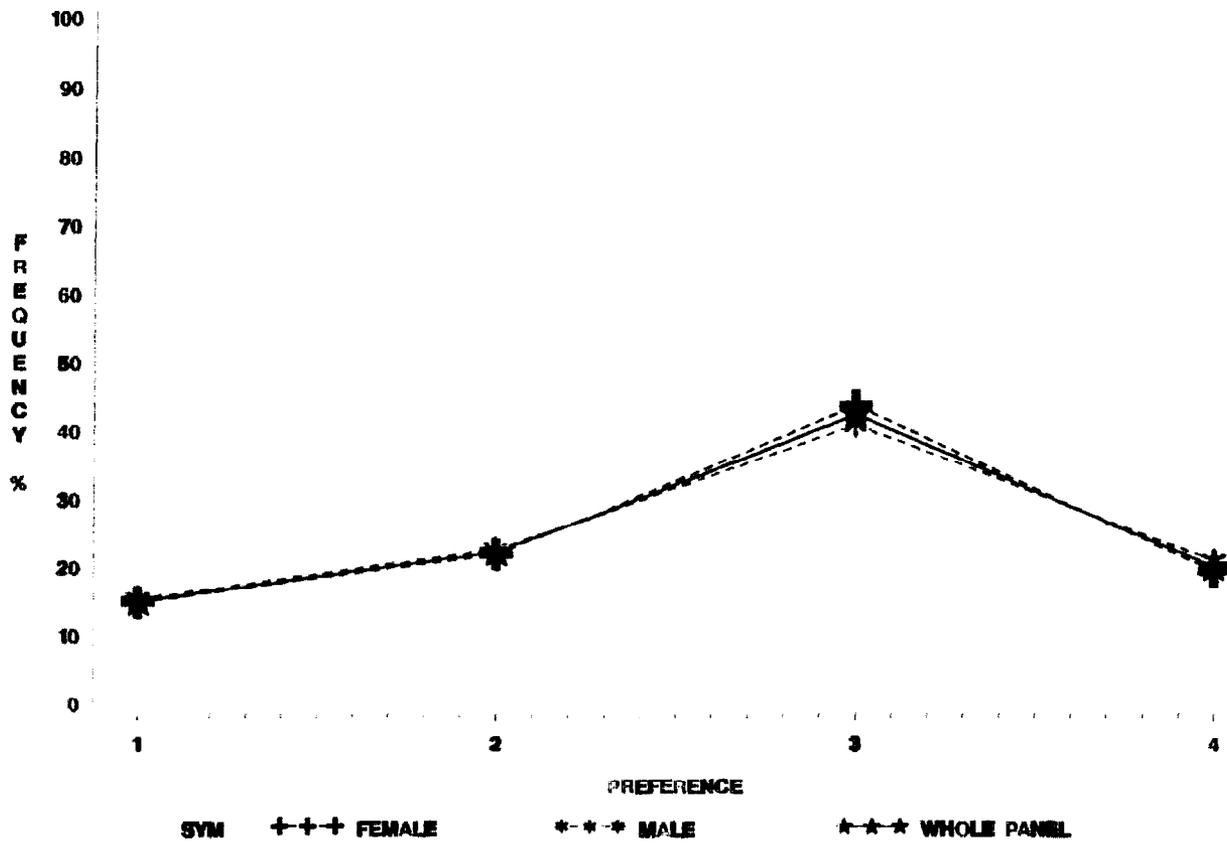


Figure 7

PASS/FAIL (PREFERENCES BY GENDER)

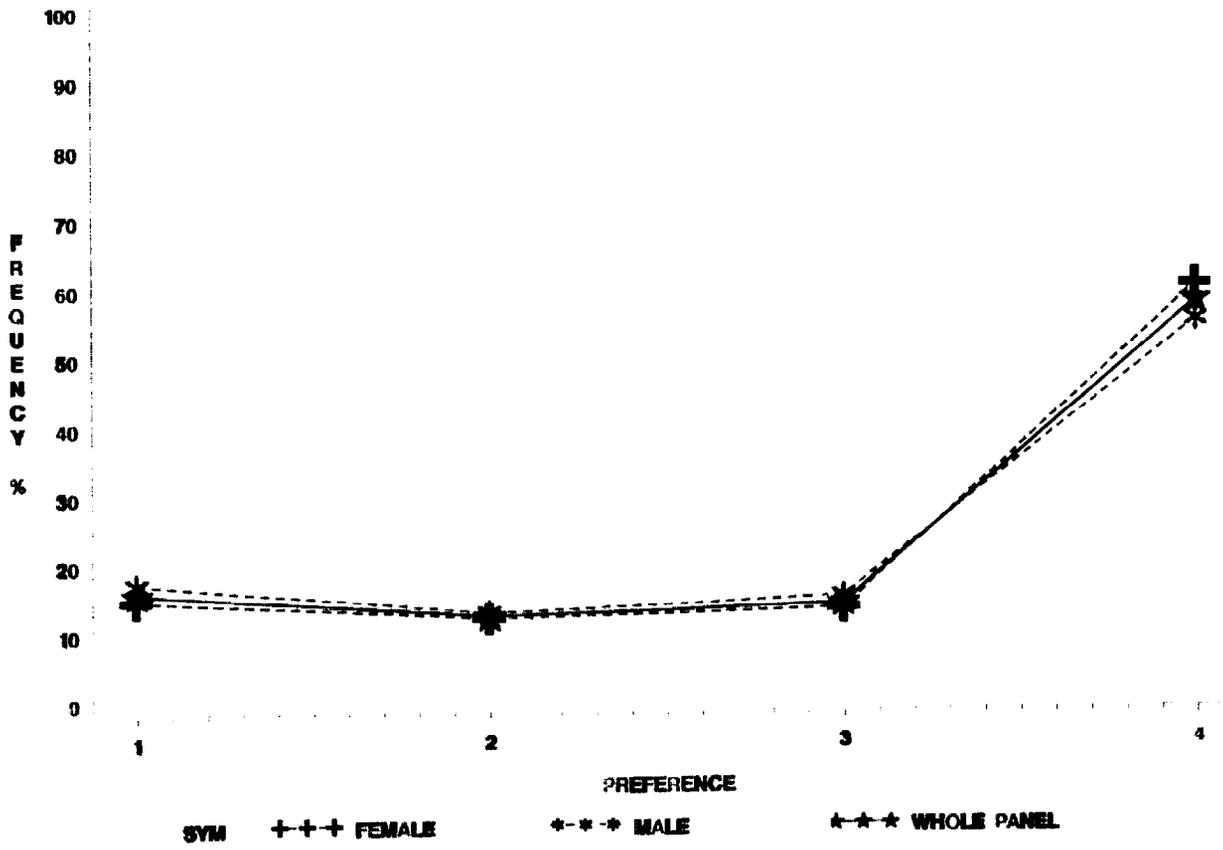


Figure 8

When the data were analyzed by ethnic background, the pattern of preference in all ethnic groups - Caucasian, Black, Hispanic, and other minorities - was comparable to that of the nationwide panel. Regardless of ethnic background, the panel chose Descriptors and Numbers, (both were four- [4] level systems), as their top two choices. See Table 12 and Figures 9-12.

Table 12

**Panelists' Preferences – By Ethnic Background
(N = 1921)
Frequency (%)**

Label	First Choice	Second Choice	Third Choice	Last Choice	p-Value
Caucasian (N = 1497)					
Descriptors	710 (47.4)	325 (21.7)	306 (20.4)	156 (10.4)	0.001
Numbers	349 (23.3)	676 (45.2)	338 (22.6)	134 (9.0)	0.001
Symbols	212 (14.2)	337 (22.5)	650 (43.4)	297 (19.9)	0.001
Pass/Fail	226 (15.1)	159 (10.6)	202 (13.5)	909 (60.8)	0.001
Black (African American) (N = 204)					
Descriptors	79 (38.7)	56 (27.5)	42 (20.6)	27 (13.2)	0.001
Numbers	49 (24.0)	73 (35.8)	50 (24.5)	32 (15.7)	0.001
Symbols	38 (18.6)	37 (18.1)	85 (41.7)	44 (21.6)	0.001
Pass/Fail	38 (18.6)	38 (18.6)	27 (13.2)	101 (49.5)	0.001
Hispanic (N = 161)					
Descriptors	60 (37.3)	44 (27.3)	32 (19.9)	25 (15.5)	0.001
Numbers	44 (27.3)	47 (29.2)	41 (25.5)	29 (18.0)	0.200
Symbols	30 (18.6)	41 (25.5)	55 (34.2)	35 (21.7)	0.033
Pass/Fail	27 (16.8)	29 (18.0)	33 (20.5)	72 (44.7)	0.001
Other (Asian/American Indian) (N = 59)					
Descriptors	25 (42.4)	15 (25.4)	9 (15.3)	10 (16.9)	0.012
Numbers	12 (20.3)	20 (33.9)	16 (27.1)	11 (18.6)	0.329
Symbols	8 (13.6)	12 (20.3)	26 (44.1)	13 (22.0)	0.006
Pass/Fail	14 (23.7)	12 (20.3)	8 (13.6)	25 (42.4)	0.013

* One (1) panelist did not complete the ranking.

DESCRIPTORS

(PREFERENCES BY ETHNIC BACKGROUND)

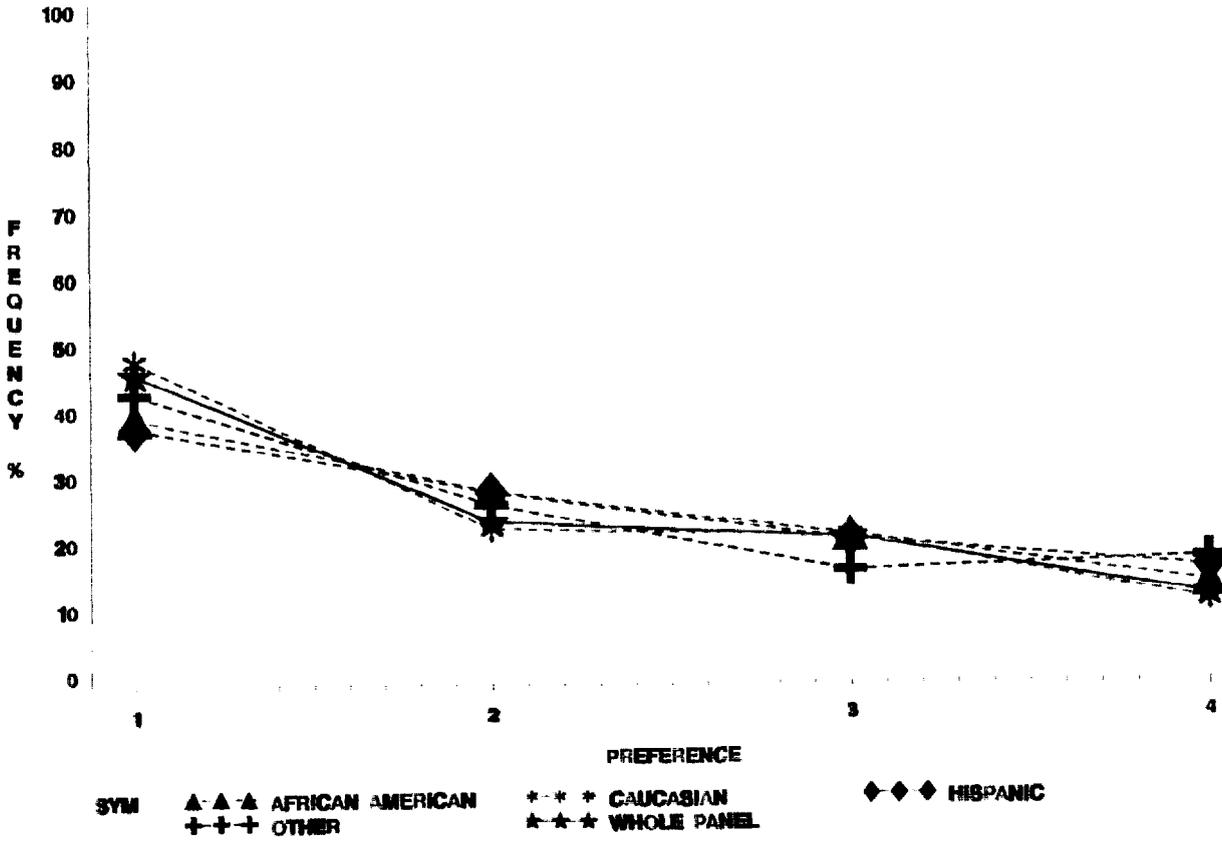


Figure 9

NUMBERS

(PREFERENCES BY ETHNIC BACKGROUND)

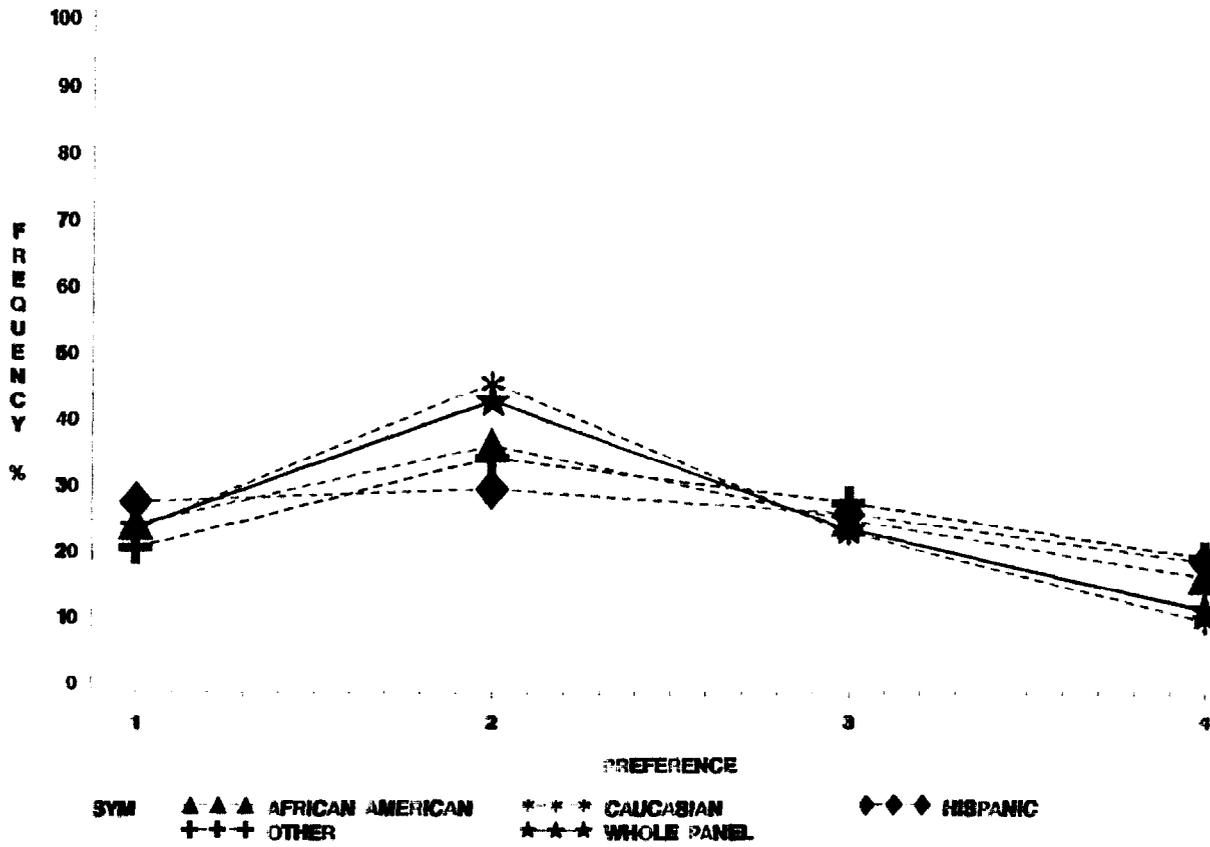


Figure 10

SYMBOLS

(PREFERENCES BY ETHNIC BACKGROUND)

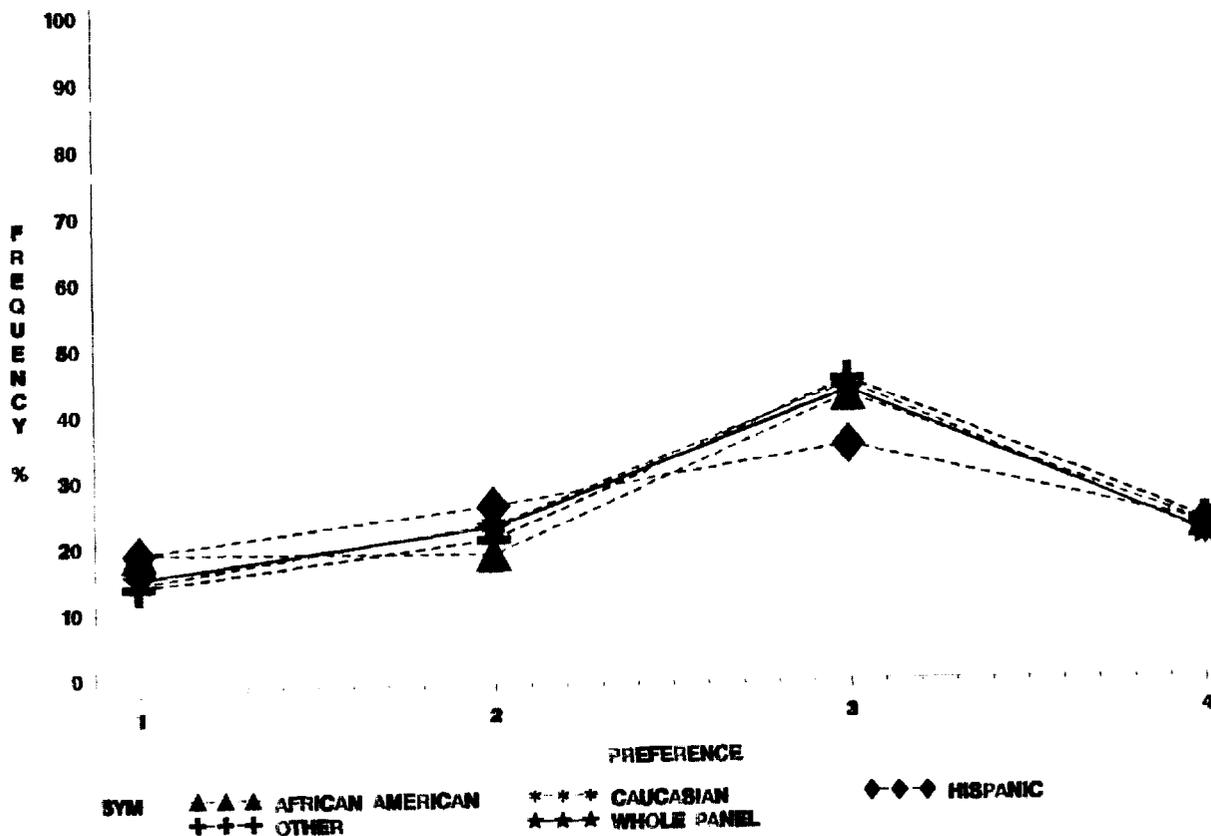


Figure 11

PASS/FAIL

(PREFERENCES BY ETHNIC BACKGROUND)

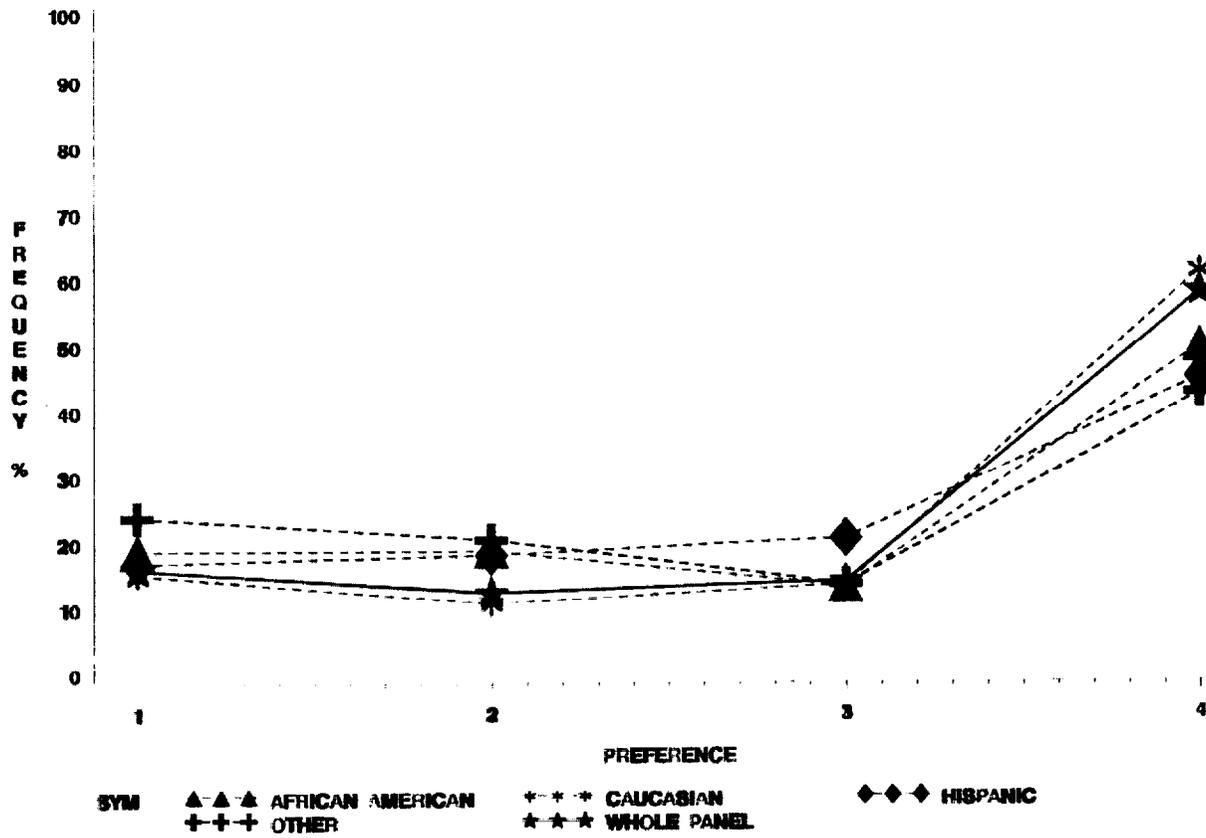


Figure 12

When the data were analyzed by age groups, the pattern of preference in all age groups paralleled that of the nationwide panel. Regardless of their age, the panel chose Descriptors and Numbers (both were four- [4] level systems) as their top two choices, and Symbols and Pass/Fail as their last two choices. See Table 13 and Figures 13-16 below.

Table 13
Panelists Preferences – By Age Groups
(N = 1921)
Frequency (%)

Label	First Choice	Second Choice	Third Choice	Last Choice	p-Value
18 – 24 Years (N = 331)					
Descriptors	132 (39.9)	79 (23.9)	77 (23.3)	43 (13.0)	0.001
Numbers	88 (26.6)	117 (35.3)	90 (27.2)	36 (10.9)	0.001
Symbols	43 (13.0)	94 (28.4)	125 (37.8)	69 (20.8)	0.001
Pass/Fail	68 (20.5)	41 (12.4)	39 (11.8)	183 (55.3)	0.001
25 – 34 Years (N = 408)					
Descriptors	162 (39.7)	103 (25.2)	95 (23.3)	48 (11.8)	0.001
Numbers	114 (27.9)	165 (40.4)	86 (21.1)	43 (10.5)	0.001
Symbols	67 (16.4)	98 (24.0)	164 (40.2)	79 (19.4)	0.001
Pass/Fail	65 (15.9)	42 (10.3)	63 (15.4)	238 (58.3)	0.001
35 – 44 Years (N = 438)					
Descriptors	219 (50.0)	100 (22.8)	77 (17.6)	42 (9.6)	0.001
Numbers	106 (24.2)	188 (42.9)	103 (23.5)	41 (9.4)	0.001
Symbols	54 (12.3)	91 (20.8)	205 (46.8)	88 (20.1)	0.001
Pass/Fail	59 (13.5)	59 (13.5)	53 (12.1)	267 (61.0)	0.001
45 – 54 Years (N = 309)					
Descriptors	161 (52.1)	63 (20.4)	53 (17.2)	32 (10.4)	0.001
Numbers	64 (20.7)	152 (49.2)	68 (22.0)	25 (8.1)	0.001
Symbols	42 (13.6)	58 (18.8)	147 (47.6)	62 (20.1)	0.001
Pass/Fail	42 (13.6)	36 (11.7)	41 (13.3)	190 (61.5)	0.001
55 – 64 Years (N = 185)					
Descriptors	94 (50.8)	40 (21.6)	38 (20.5)	13 (7.0)	0.001
Numbers	32 (17.3)	81 (43.8)	43 (23.2)	29 (15.7)	0.001
Symbols	32 (17.3)	37 (20.0)	76 (41.1)	40 (21.6)	0.001
Pass/Fail	27 (14.6)	27 (14.6)	28 (15.1)	103 (55.7)	0.001
65+ Years (N = 250)					
Descriptors	106 (42.4)	55 (22.0)	49 (19.6)	40 (16.0)	0.001
Numbers	50 (20.0)	113 (45.2)	55 (22.0)	32 (12.8)	0.001
Symbols	50 (20.1)	49 (19.7)	99 (39.8)	51 (20.5)	0.001
Pass/Fail	44 (17.7)	33 (13.3)	46 (18.5)	126 (50.6)	0.001

* One (1) panelist did not complete the ranking.

DESCRIPTORS

(PREFERENCES BY AGE GROUPS)

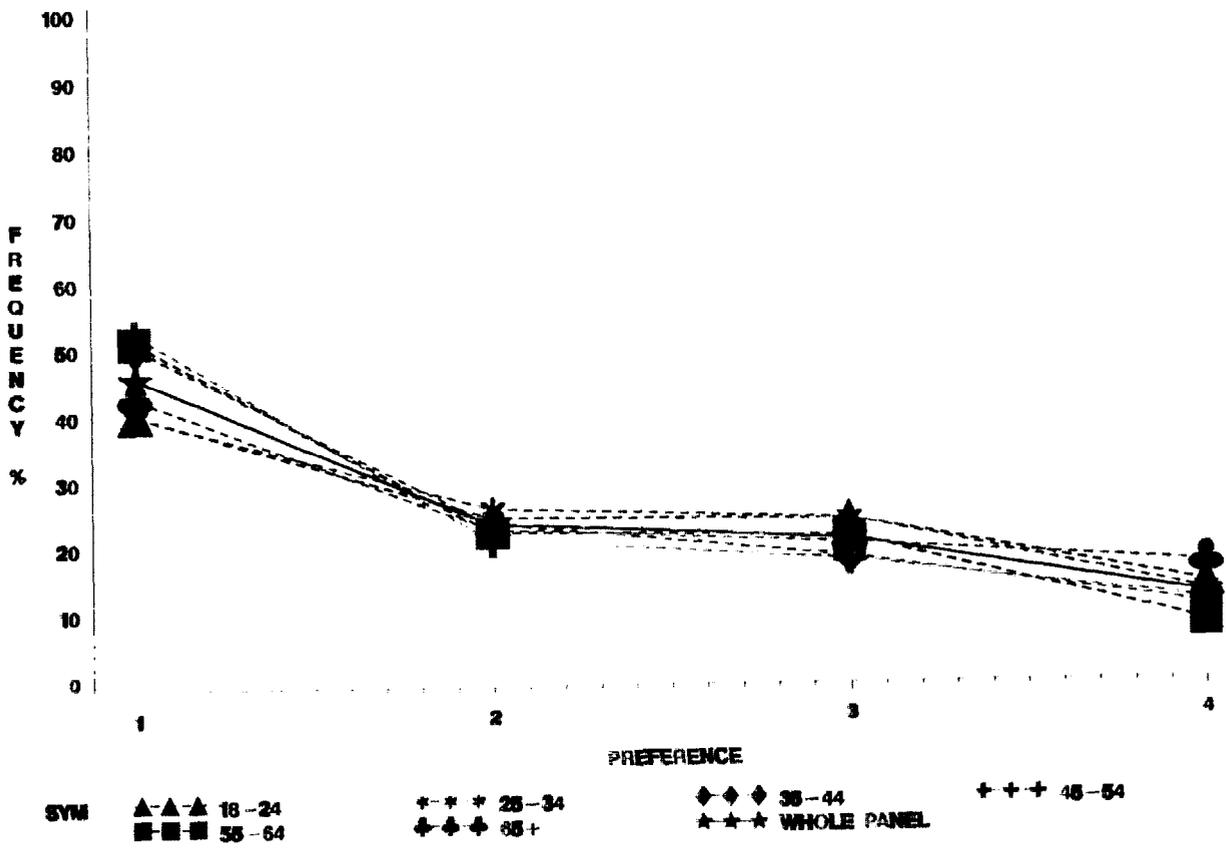


Figure 13

NUMBERS

(PREFERENCES BY AGE GROUPS)

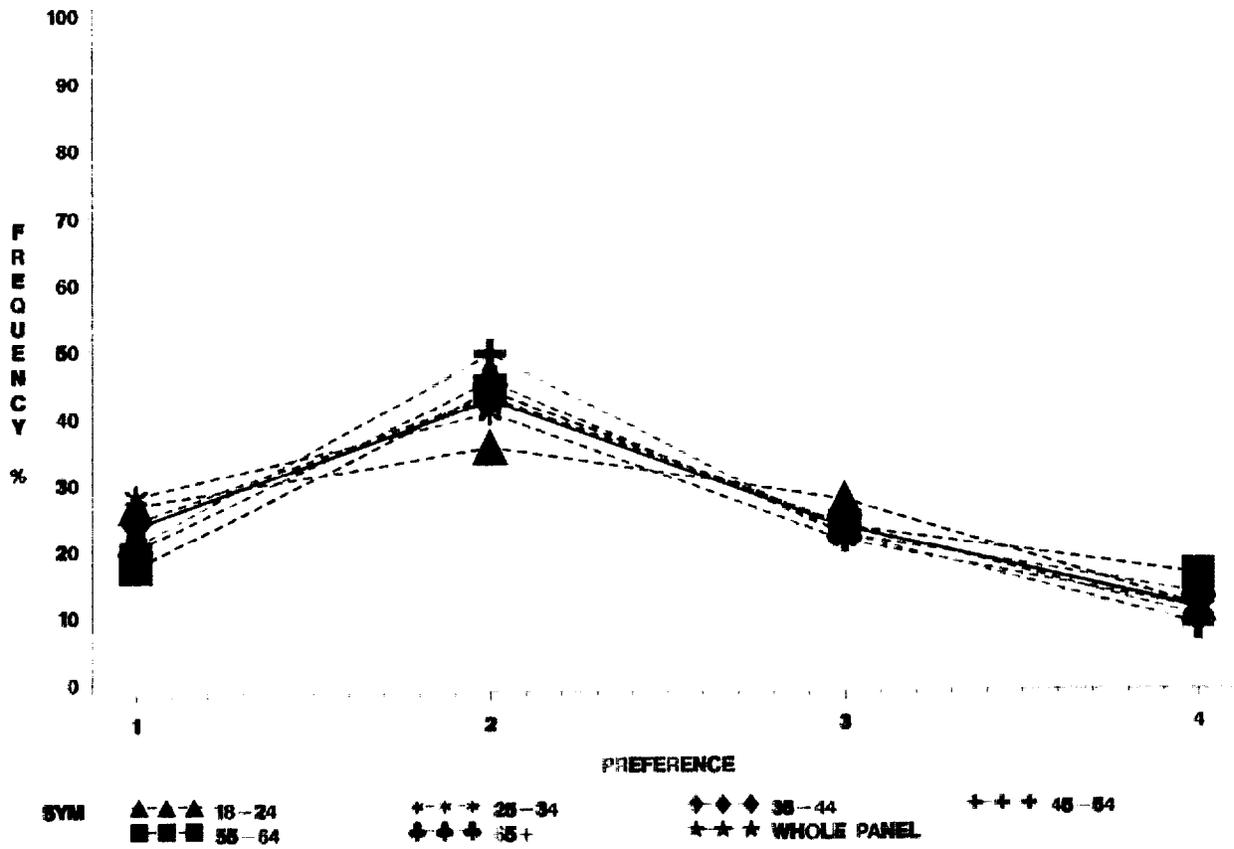


Figure 14

SYMBOLS

(PREFERENCES BY AGE GROUPS)

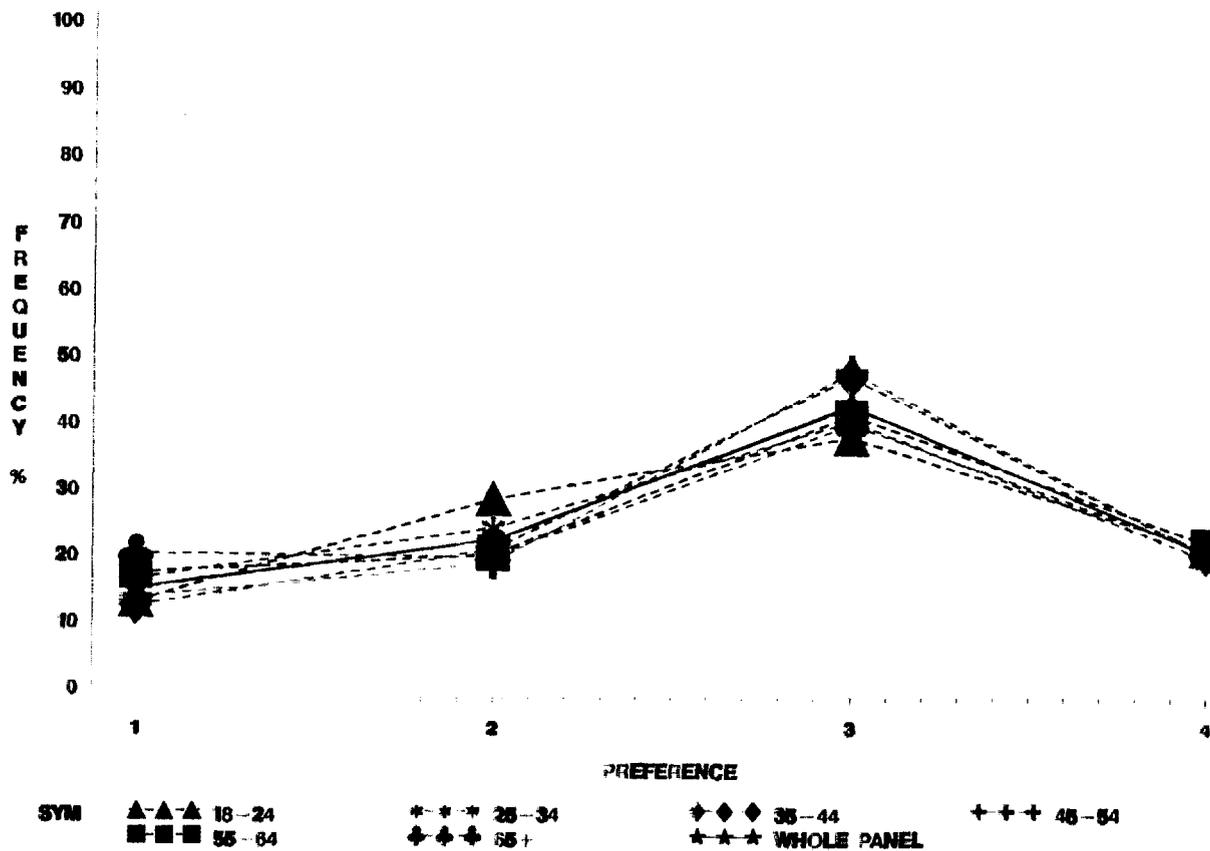


Figure 15

PASS/FAIL

(PREFERENCES BY AGE GROUPS)

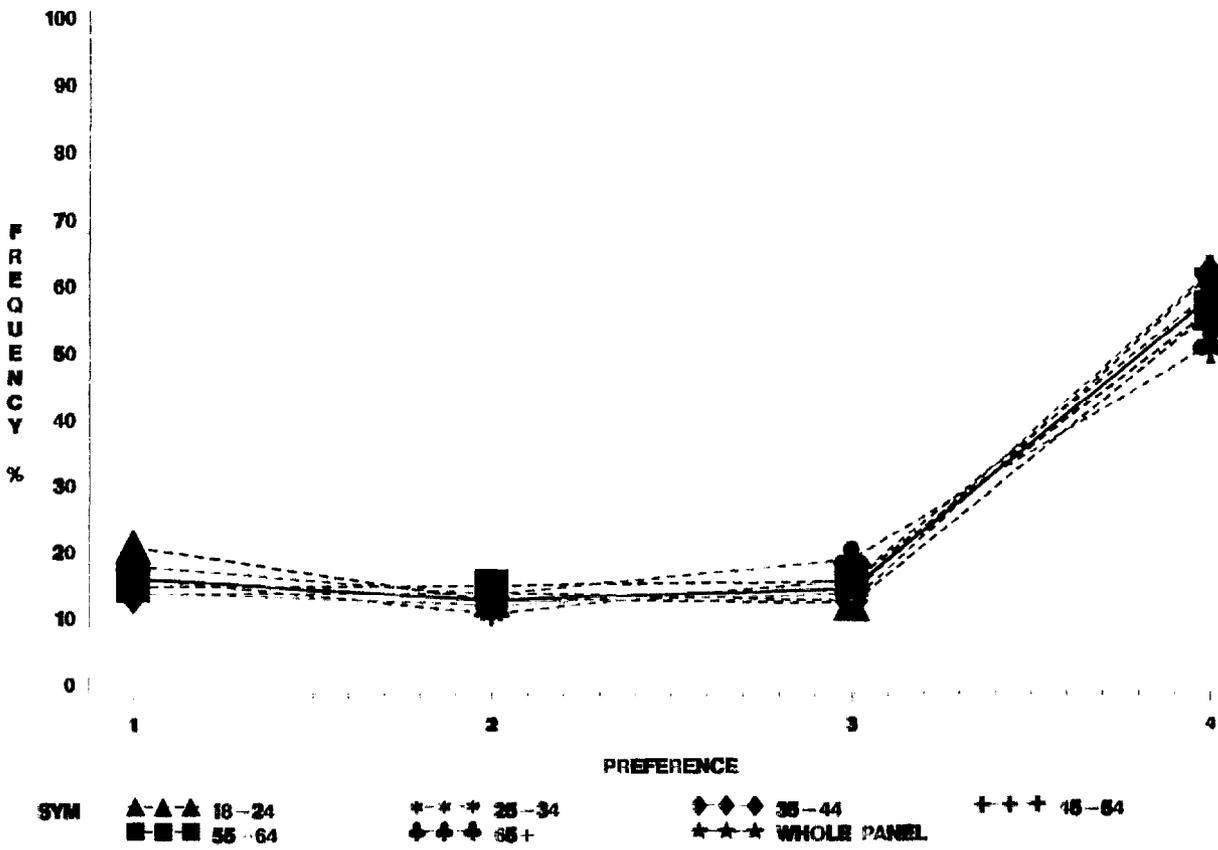


Figure 16

When the data were analyzed by geographic region, the pattern of preference in panelists in all geographic regions paralleled that of the nationwide panel. Regardless of their locality, the panel chose Descriptors and Numbers (both were four- [4] level systems) as their top two choices, and Symbols and Pass/Fail as their last two choices. See Table 14 and Figures 17-20.

Table 14
Panelists' Preferences – By Geographic Region
(N = 1921)
Frequency (%)

Label	First Choice	Second Choice	Third Choice	Last Choice	p-Value
Midwest (N = 483)					
Descriptors	228 (47.2)	118 (24.4)	87 (18.0)	50 (10.4)	0.001
Numbers	111 (23.0)	211 (43.7)	108 (22.4)	53 (11.0)	0.001
Symbols	65 (13.5)	102 (21.1)	217 (44.9)	99 (20.5)	0.001
Pass/Fail	79 (16.4)	52 (10.8)	71 (14.7)	281 (58.2)	0.001
Northeast (N = 473)					
Descriptors	234 (49.5)	109 (23.0)	90 (19.0)	40 (8.5)	0.001
Numbers	122 (25.8)	226 (47.8)	102 (21.6)	23 (4.9)	0.001
Symbols	63 (13.3)	95 (20.1)	229 (48.5)	85 (18.0)	0.001
Pass/Fail	54 (11.4)	43 (9.1)	51 (10.8)	324 (68.6)	0.001
South (N = 489)					
Descriptors	184 (37.6)	122 (24.9)	109 (22.3)	74 (15.1)	0.001
Numbers	122 (24.9)	189 (38.7)	122 (24.9)	56 (11.5)	0.001
Symbols	93 (19.0)	108 (22.1)	194 (39.7)	94 (19.2)	0.001
Pass/Fail	90 (18.4)	70 (14.3)	64 (13.1)	265 (54.2)	0.001
West (N = 476)					
Descriptors	228 (47.9)	91 (19.1)	103 (21.6)	54 (11.3)	0.001
Numbers	99 (20.8)	190 (39.9)	113 (23.7)	74 (15.5)	0.001
Symbols	67 (14.1)	122 (25.6)	176 (37.0)	111 (23.3)	0.001
Pass/Fail	82 (17.2)	73 (15.3)	84 (17.6)	237 (49.8)	0.001

* One (1) panelist did not complete the ranking.

DESCRIPTORS

(PREFERENCES BY GEOGRAPHIC REGION)

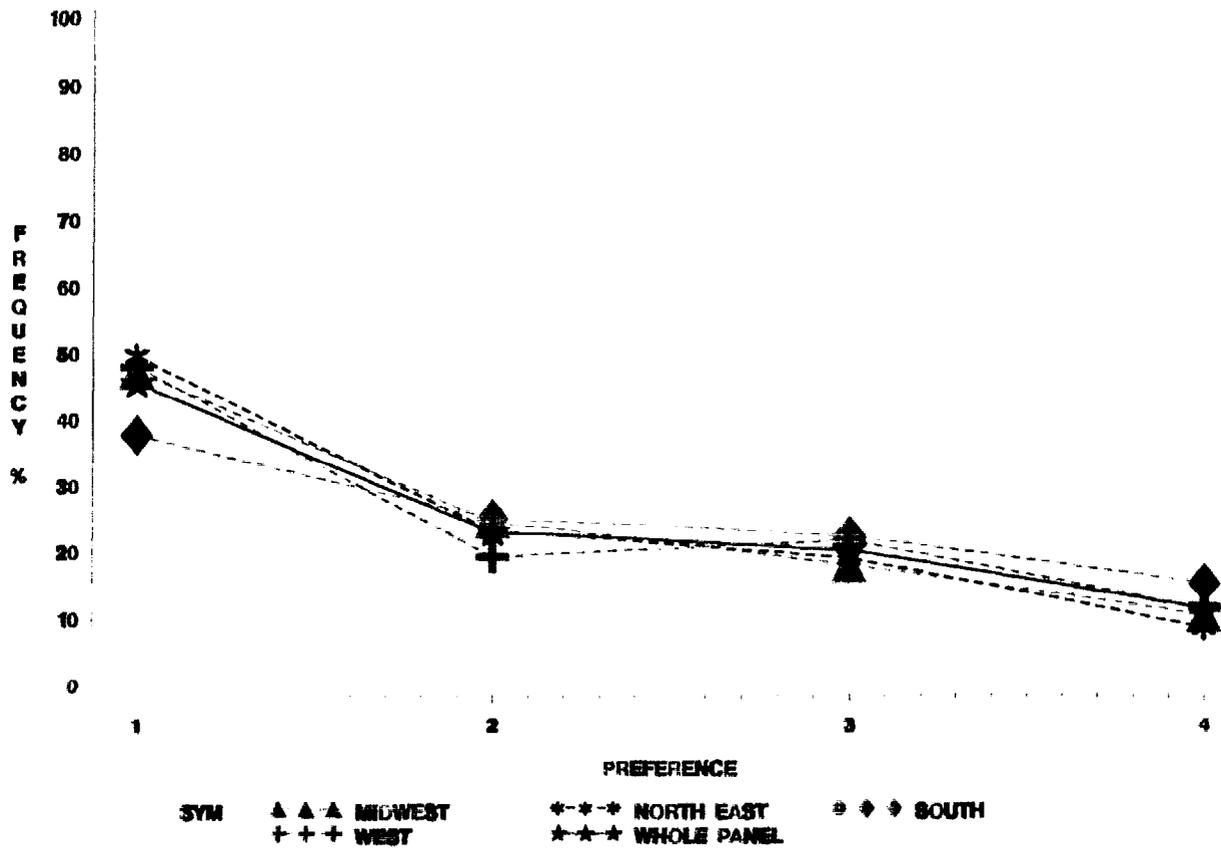


Figure 17

NUMBERS

(PREFERENCES BY GEOGRAPHIC REGION)

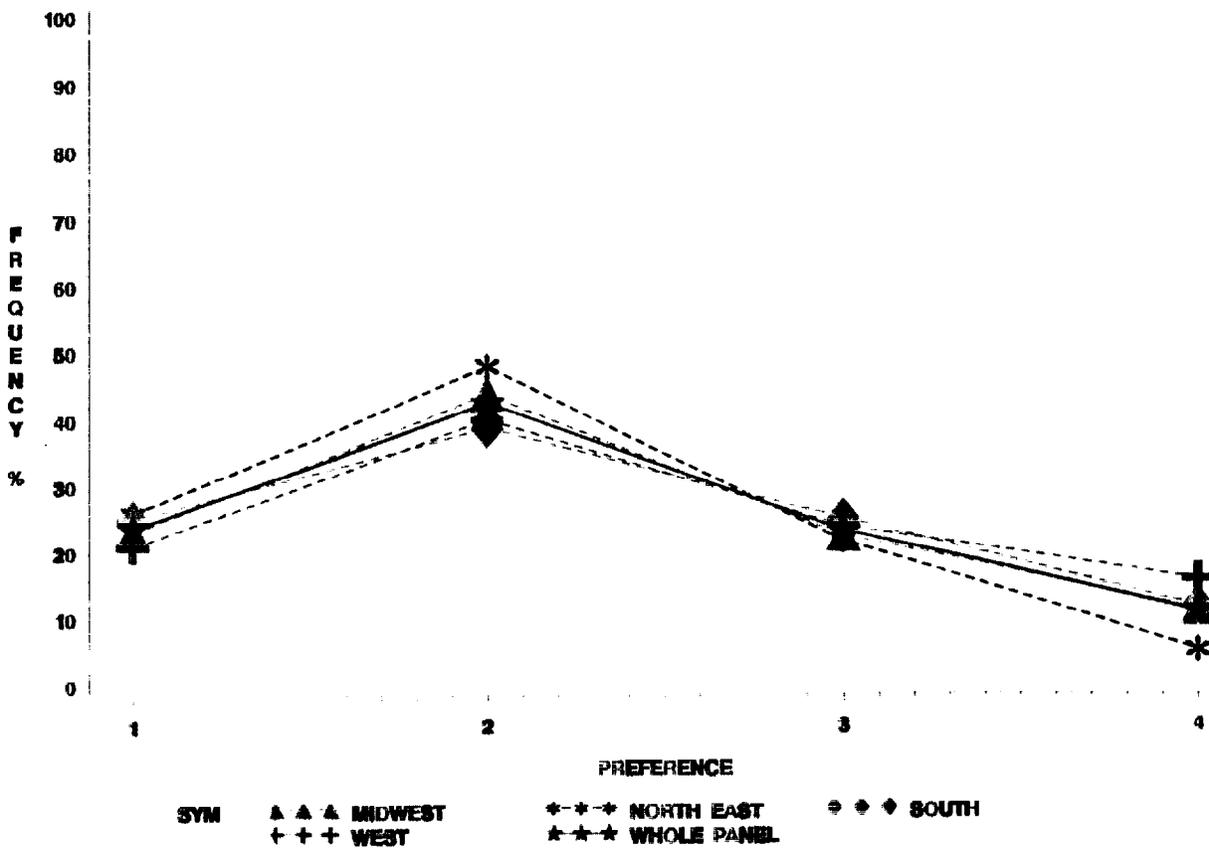


Figure 18

SYMBOLS

(PREFERENCES BY GEOGRAPHIC REGION)

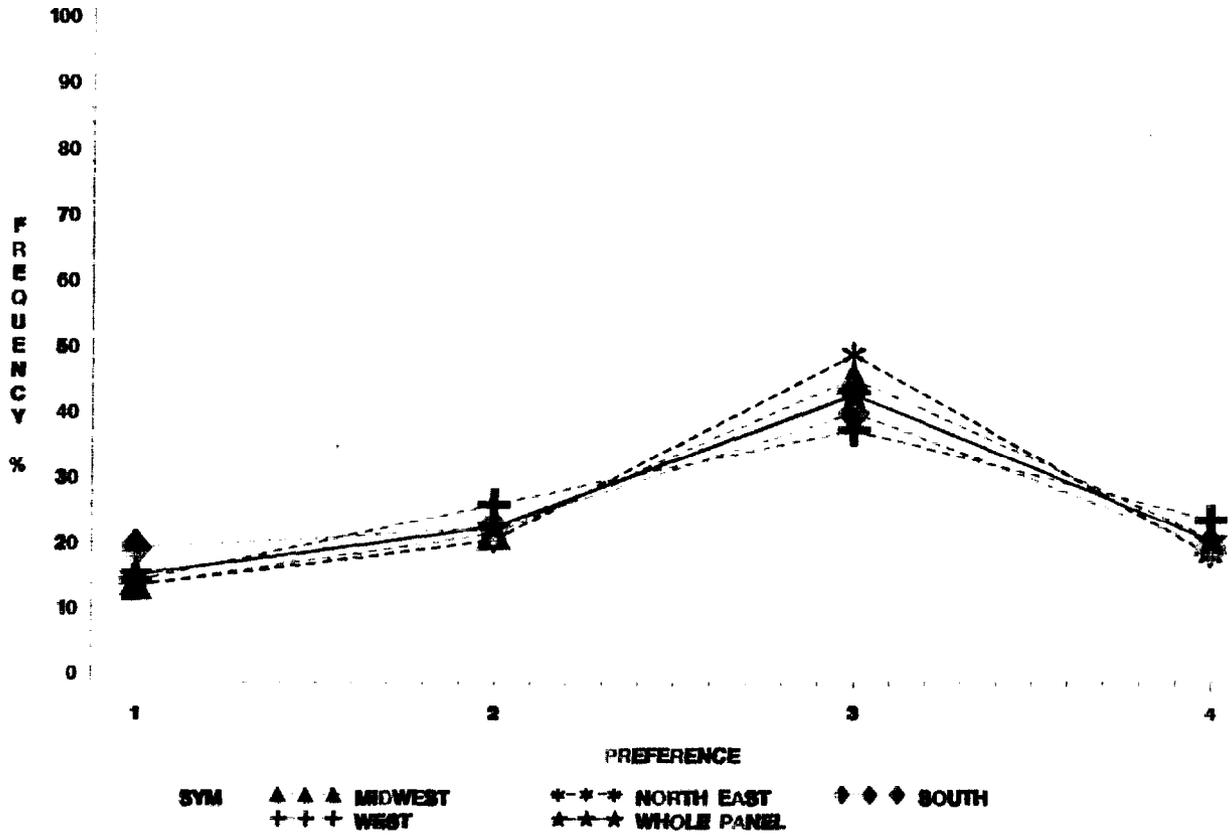


Figure 19

PASS/FAIL

(PREFERENCES BY GEOGRAPHIC REGION)

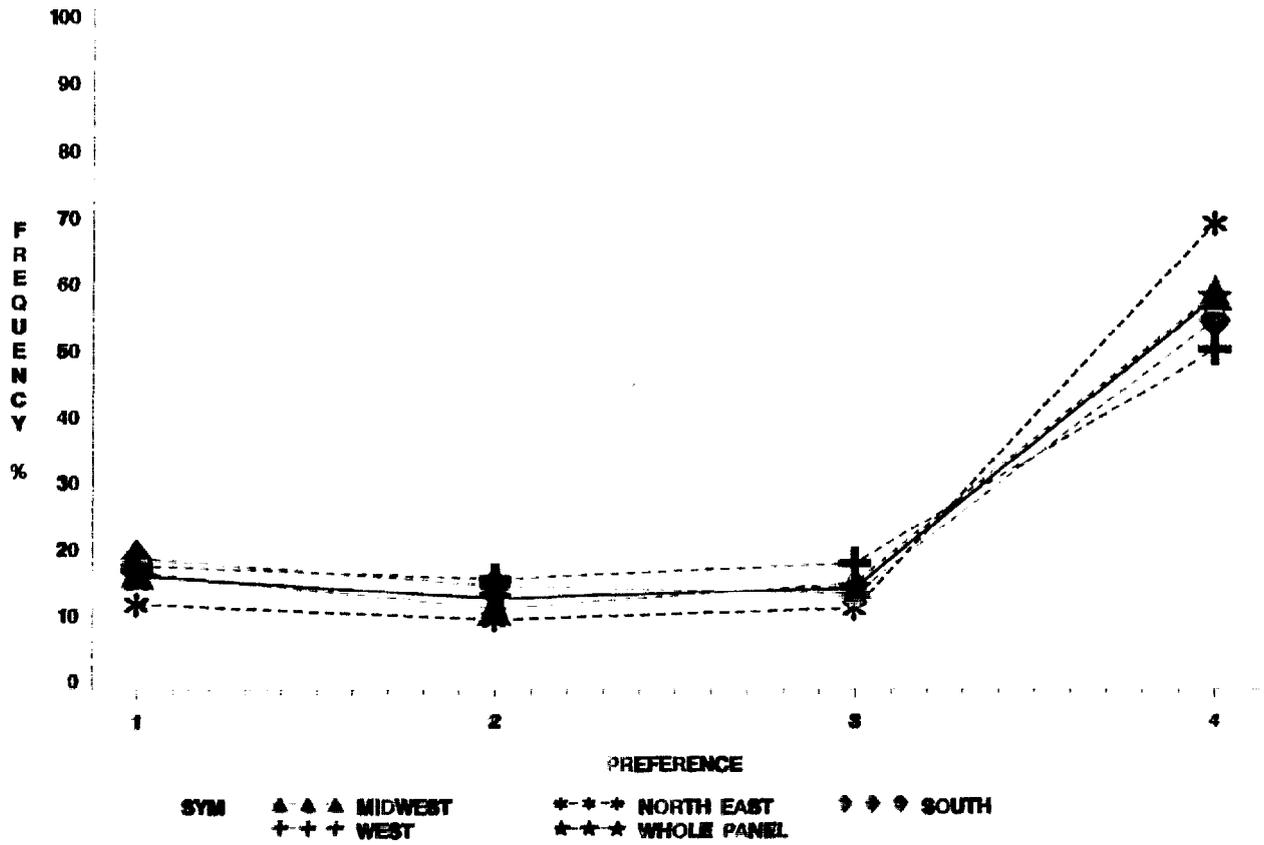


Figure 20

A detailed statistical analysis is included in Appendix II. Raw Data are included in Appendix III, in SAS format, available upon request by electronic file.

Conclusion:

Panelists across the United States preferred a four- (4) level labeling system using descriptive words or numbers. The reason for their choice was based on the label's clarity, specificity, and ease of comprehension. The Pass/Fail system was judged by our panel to be unclear, non-specific, and lacking in sufficient information for comparison to other products. The Pass/Fail system was also the fourth choice, the last choice, among the labeling systems presented.

The results of this study support the CTFA's study conclusion that American consumers preferred descriptive words as a means to express UVA protection. However, this panel also selected Numbers as one of the top two choices because it was "clearer/more specific/easier to understand". This finding did not support the CTFA's study conclusion that a second number or symbols confused consumers. Furthermore, the data sharply contrasted the Procter & Gamble study conclusion that the "pass/fail label was significantly superior to the other labels with respect to ease of product selection." Indeed, in this study, American consumers found the Pass/Fail labeling system inferior to other labeling systems in term of clarity, specificity, and adequacy of information.