

Consumer Perception of Cigarette Yields: Is the Message Relevant?

GIO B. GORI

Health Policy Center, 6704 Barr Road, Bethesda, Maryland 20816

Received March 15, 1990

Over 1200 randomly selected subjects from the U.S. and key European countries were interviewed by telephone, to establish how consumers perceive the meaning and relative value scale of tar yields of commercial cigarettes. Some 50% of respondents interpreted numerical tar yields as being precise quantitative predictors of intake related to health effects. A less precise quantitative intuition is shown by 20-30% of respondents. The remaining respondents had little or no interest in, or understanding of, tar yield meaning. Despite local differences, the aggregate responses from the U.S. were analogous to European responses and were not significantly affected by age, sex, or socioeconomic status. The results show that consumers expect a cigarette grading message predictive of actual intake from different brands. The current message based on standard analytical yields does not meet this requirement and needs modification. Cigarette ratings based on the tar-to-nicotine ratio of standard yields could offer the basis for an acceptable message. © 1990 Academic Press, Inc.

INTRODUCTION

Over the years it has become axiomatic that officially published cigarette yields should be perceived in a quantitative context. This is what advertisers and lay media suggest when using terms such as "low" and "ultralow tar," following what public health officials have implied in numerous anti-smoking campaigns. In fact, a quantitative relationship of yield and intake is presumed in most issues regarding cigarettes, without being explicitly acknowledged. If smokers' perceptions are as presumed, this should be substantiated, and the public message should guarantee information that conforms to consumer expectations.

In order to gain insight into these expectations, pilot telephone surveys were conducted in the U.S. and selected European countries. Since tar values play a prominent role in cigarette advertising, the surveys were restricted to investigating whether smokers are aware of and how they interpret published tar values.

METHODS

Approximately 500 smokers and exsmokers were queried in the U.S. and 150 each in France, Italy, Switzerland, Germany, and Norway. Telephone calls were placed randomly, and interviews were based on a standard questionnaire.

TABLE 1
 RESPONSES OF U.S. SUBJECTS TO THE QUESTION, "What, in your
 opinion, is the meaning of the tar value of cigarettes?"

	Men			Women			Men and women		
	Current smoker (%)	Exsmoker (%)	Total (%)	Current smoker (%)	Exsmoker (%)	Total (%)	Current smoker (%)	Exsmoker (%)	Total (%)
1. Health									
1a. Measure of health risk	16	12	15	22	46	25	19	25	20
1b. Related to specific disease	19	27	20	22	14	22	21	22	21
2. Amount of tar in cigarettes	20	16	19	11	14	12	15	16	15
3. Amount of nicotine in cigarettes	3	2	3	3	—	3	3	1	3
4. Junk/gook/etc.	7	10	8	5	7	5	6	9	6
5. Taste/flavor	10	6	9	7	4	7	8	5	8
6. Don't know	24	22	24	27	14	26	26	19	25
7. Other	1	4	2	2	—	2	2	3	2
Total number of respondents	177	49	226	223	28	251	400	77	477

Significant questions were designed to elicit only open-ended responses, in order to minimize the bias of the interview itself. Interviewers recorded responses as given, without comment or probing or suggesting any directions or responses whatsoever. Ambiguous responses were recorded without requesting clarification, all this to avoid stimulating respondents into forming fresh opinions about tar values during the interview.

All respondents were asked to describe the meaning of tar values. The question of whether a 10-mg tar cigarette is more relevant than a 5-mg tar cigarette was deliberately given at the end of the questionnaire to avoid leading of respondents. U.S. and European questionnaires were slightly different in format but addressed essentially identical questions.

RESULTS—UNITED STATES

Open-ended responses to the question of what is the meaning of tar values of cigarettes were partitioned into seven categories. A summary of U.S. results, by gender and smoking status, is presented in Table 1. Approximately 40% of U.S. respondents described tar as related to health. Between 10 and 20% of the respondents described tar as the amount of tar in the cigarette. Since interviewers were directed not to seek clarification of responses, it might be conjectured that these respondents had an imperfect concept of tar. Between 5 and 10% of the respondents defined tar with even vaguer descriptors; a slightly higher percentage related tar to taste and flavor. Between

TABLE 2
 RESPONSES OF U.S. SUBJECTS TO THE QUESTION, "Is a 10-mg tar cigarette more relevant to health than a 5-mg one and, if so, how much more?"

Dose-response category	Men			Women			Men & women		
	Current smokers (%)	Exsmokers (%)	Total (%)	Current smokers (%)	Exsmokers (%)	Total (%)	Current smokers (%)	Exsmokers (%)	Total (%)
1. No difference	8	6	8	9	4	8	8	5	8
2. Slightly more	5	4	4	10	21	12	8	10	8
3. Less than 50% more	5	—	4	1	—	1	3	—	3
4. 50% more	11	6	10	10	11	10	11	8	10
5. Between 50% and 100% more	2	—	1	1	—	1	1	—	1
6. 100% more	48	53	49	49	36	47	49	47	48
7. Greater than 100% more	1	1	1	1	4	1	1	3	1
8. Don't know	19	27	20	17	21	17	18	25	19
9. Other	2	1	2	3	4	3	3	3	3
Total number of respondents	177	49	226	223	28	251	400	77	477

19% and 27% did not know how to describe tar. Data did not infer significant differences in responses as a function of age, sex, or smoking status.

After responding to the question of whether a 10-mg tar cigarette is more relevant than a 5-mg one, those who answered "Yes" were then asked "How much more?" Responses were categorized as shown in Table 2. Sixteen percent of the respondents believed that a 10-mg tar cigarette had either no more impact or only slightly more impact than a 5-mg one. Slightly less than 50% believed that it had twice the impact. Between 17% and 27% stated that the 10-mg tar cigarette had more impact on health, but could not quantify how much more.

Data on formal education and occupation were available on 342 of the respondents, who were classified into three education-weighted categories. The stratification failed to uncover significant differences of response.

TABLE 3
 RESPONSES OF EUROPEAN SUBJECTS TO THE QUESTION, "What, in your opinion, is the meaning of the tar value of cigarettes?"

	Total (%)	Germany (%)	France (%)	Italy (%)	Norway (%)	Switzerland (%)
1. Bad for health	25	35	25	23	25	22
2. Lung damage	13	11	8	6	18	10
3. Lung deposition	10	14	12	8	6	12
4. Tar amount	9	14	14	0	0	14
5. Means nothing	7	6	10	4	16	8
6. Don't know	36	20	31	59	35	34

TABLE 4
 RESPONSES OF EUROPEAN SUBJECTS TO THE QUESTION, "Is a 15-mg
 tar cigarette more relevant to health than a 5-mg one?"

	Total (%)	Germany (%)	France (%)	Italy (%)	Norway (%)	Switzerland (%)
1. Yes	75	78	70	82	77	72
2. Maybe	5	5	14	3	1	4
3. No	5	3	3	5	3	10
4. Don't know	12	12	10	9	16	10
5. Other answers	3	2	3	1	3	4

RESULTS—EUROPEAN COUNTRIES

Open-ended responses to the question of what is the meaning of tar were partitioned in six categories as given in Table 3. The degree of awareness varied in different countries, with 20–40% of respondents indicating awareness of a health relationship.

Tables 4 and 5 give responses to the questions of whether a 15-mg tar cigarette has more significance than a 5-mg cigarette and, if so, by how much. Here the responses by country were more homogeneous, and over 70% of answers were qualitatively affirmative. Quantitative responses were more fragmented, but indicate that a majority of the respondents had an accurate quantitative perception or an intuitive equivalent.

DISCUSSION

Despite a relatively small sample size and local differences, this survey indicates that U.S. and European respondents have similar perceptions of standard tar yields. Responding to decades of anti-smoking campaigns, the majority interpreted such yields as indicating a quantitative dose–response relationship to health issues. The survey confirms fundamental consumer beliefs that currently published cigarette yields are explicit quantitative predictors of smoke intake. Yet this belief is unwarranted.

Issued by the U.S. Federal Trade Commission, the original charter of the cigarette testing methodology still used today contained clear warnings of the inability of standard smoking machines to provide information of direct relevance to human experi-

TABLE 5
 RESPONSES OF EUROPEAN SUBJECTS WHO THOUGHT A 15-mg TAR CIGARETTE WAS MORE RELEVANT
 TO HEALTH THAN A 5-mg ONE AND WERE THEN ASKED THE QUESTION, "How much more?"

Answer	<3×	3×	>2×	2×	Much more	More	Little more	Depends	Don't know
% of respondents	2.5	29.4	6.8	1.2	8.5	15.4	6.7	6.8	22.6

ence (FTC, 1967), essentially because standard analytical yields represent only one set of the many possible yields of cigarettes when smoked under different conditions. The puffing behavior of smokers is obviously nonstandard. They also inhale, a function not covered by smoking machines and show a substantial interindividual variation in behavior and smoke intake. These observations are reinforced by the demonstrated absence of a meaningful relationship between published standard nicotine and carbon monoxide yields and their actual bioavailability. This is because smokers obtain whatever nicotine they momentarily demand from any cigarette, regardless of standard nicotine yields, with each smoker managing to attain cumulative daily intakes at personal levels that are virtually constant from day to day. This makes standard yields quite unsuitable as intake predictors. However, since nicotine is the intake-limiting factor, tar intake relative to nicotine intake would be predicted by the tar-to-nicotine ratios that are characteristic of each brand's smoke and would give useful discriminant information to the consumer (Russell *et al.*, 1980; Gori and Lynch, 1985).

It is apparent that wide individual variation of intake bars the possibility of any universal message quantitatively predictive of individual intake. On the other hand, a message of relative intake based on tar-to-nicotine ratios is rationally defensible and its adoption should be seriously considered (Gori, 1990).

ACKNOWLEDGMENT

Recognition is gratefully given to the staffs of Elrick & Lavidge, Inc., of Atlanta, Georgia, and Interview, Inc., of Amsterdam, The Netherlands, who conducted the surveys.

REFERENCES

- Federal Trade Commission (FTC) (1967). Cigarettes: Testing for tar and nicotine content—Statements of considerations. *Fed. Regist.* **32**, 11,178. The document reads:
- . . . No two human smokers smoke in the same way. No individual smoker always smokes in the same fashion. The speed at which one smokes varies both among smokers, and usually also varies with the same individual under different circumstances even within the same day. Some take long puffs (or draws); some take short puffs. That variation affects the PM (PM = particulate matter) quantity in the smoke generated. . . . The . . . method does not and cannot measure these many variations in human smoking habits. It does not measure PM or nicotine in the smoke generated while the cigarette is not being puffed. It does not measure all of the PM or nicotine in any cigarette, but only that in the smoke drawn in the standardized machine smoking according to the prescribed method. . . .
- RUSSELL, M. A. H., *et al.* (1980). Relation of nicotine yield of cigarettes to blood nicotine concentration in smokers. *Brit. Med. J.* **280**, 972–976.
- GORI, G. B., AND LYNCH, C. J. (1985). Analytical cigarette yields as predictors of smoke bioavailability. *Regul. Toxicol. Pharmacol.* **5**, 314–326.
- GORI, G. B. (1990) Time for cigarette reclassification? *Nature* **344**, 821.