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Risk perception and precautionary intent for common consumer products

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ABSTRACT

This study attempted to determine if accident scenario analysis reduces accident frequency misestimations and leads to heightened precautionary intent for products. Subjects generated or were provided with scenarios and made estimates. Other subjects made estimates at varying paces without analysis. These and an additional group then rated their precautionary intent for the products. Subjects also gave ratings for confidence in their estimations reported injury experience related to the products. No differences were found among the group correlations. Analyses showed that the Scenario groups performed no better and sometimes worse than the other groups. The Hurried subjects reported lower precautionary intent ratings than other groups. Subjects with injury experience reported higher precautionary intent than subjects without such experience. No relationship was found between precautionary intent and frequency estimates. It is concluded that personal knowledge of accidents rather than general knowledge of accidents or frequencies may be a better predictor of intended behavior.

RISK PERCEPTION AND PRECAUTIONARY INTENT FOR COMMON CONSUMER PRODUCTS

By

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TABLE OF CONTENTS

		Page
1.	INTRODUCTION	1
2.	FACTORS AFFECTIONG PERCEPTIONS OF HAZARDOUSNESS	1
3.	HEURISTICS AND RISK MISPERCEPTION	2
4.	FAULT TREES	4
5.	PRECAUTIONARY INTENT	11
6.	PRODUCT PERCEPTION STUDY	11
7.	METHOD	11
8.	RESULTS	18
9.	RESPONSE TIMES	18
10.	TESTING BETWEEN CORRELATIONS	18
11.	ANALYSES OF VARIANCE FOR CORRELATIONS	19
12.	DIFFERENCES BETWEEN ESTIMATES AND NEISS FREQUENCIES	21
13.	PRODUCTS AS A RANDOM VARIABLE	24
14.	PRECAUTIONARY INTENT	29
15.	CONFIDENCE	32
16.	INJURY EXPERIENCE	32
17.	ANALYSES FROM PRODUCT PERCEPTION STUDY	35
18.	DISCUSSION	38
19.	REFERENCES	48
20.	APPENDIX A: FAULT TREES USED BY SCENARIO PROVIDED GROUP	50
21.	APPENDIX B: MATERIALS AND INSTRUCTIONS	69
22.	APPENDIX C: DATA AND ANALYSES FOR RESPONSE TIMES	87
23.	APPENDIX D: GROUP ESTIMATES AND CORRELATIONS	92

24. APPENDIX E: INDIVIDUAL CORRELATIONS 111

25. APPENDIX F: ESTIMATE DIFFERENCES FROM NEISS FREQUENCIES 123

26. APPENDIX G: PRODUCTS AS A RANDOM VARIABLE 130

27. APPENDIX H: DATA AND ANALYSES FOR PRECAUTIONARY INTENT 147

28. APPENDIX I: ANALYSES FOR INJURY EXPERIENCE 159

29. APPENDIX J: ANALYSES FROM PRODUCT PERCEPTION STUDY 170

LIST OF TABLES

	Page
Table 1. Products, Frequency Category, and NEISS Accident Frequencies	13
Table 2. Product Category Means for Individual Correlations	20
Table 3. Group and Product Category Means for Logarithms of Individual Correlations	22
Table 4. Mean Differences of Estimates from NEISS Frequencies by Product Frequency Category and Group	25
Table 5. Group and Product Category Means for Logarithms of Estimate Differences	26
Table 6. Product Category Means for Absolute Differences of Estimates from NEISS Frequencies	27
Table 7. Group and Product Category Means for Estimate Differences from NEISS Frequencies Using Products as a Random Variable	28
Table 8. Group and Product Category Means for Estimate Logarithms from NEISS Frequencies Using Products as a Random Variable	30
Table 9. Means for Analysis of Variance for Precautionary Intent by Group and Product Category	31
Table 10. Precautionary Intent Correlated with NEISS Frequencies	33
Table 11. Estimate Means for Products Based on Injury Esperience	34
Table 12. Precautionary Intent Ratings for Products Based on Injury Experience	36

Table 13. Correlations for Questions From Product Perception Study 37

Risk Perception and Precautionary Intent for Common Consumer Products

The perception of risk is an important component in determining action and in preventing injury. Determining how individuals perceive risk, make judgments, and use available information is crucial for persons who must develop the design and display of warnings. If individuals misperceive the hazards or risks they may fail to read or heed vital safety information and serious consequences may result. Recent research has investigated the methods by which individuals make decisions regarding hazard information.

Until recently there has been little research on consumer product risk perception. Several important variables have emerged in the existing research. Familiarity with a product, severity of injury, willingness to read warnings, and precautionary intent for product use have been examined.

Factors Affecting Perceptions of Hazardousness

Godfrey, Allender, Laughery, and Smith (1983) had subjects rate consumer products along several dimensions including hazardousness and familiarity with a product. The results showed that the more familiar a person is with a product, the less hazardous he or she perceives that product to be. Godfrey and Laughery (1984) and Wogalter, Desaulniers, and Brelsford (1986) also found that higher familiarity is associated with lower perceptions of hazardousness. Hence, familiarity may lead to misperceptions of product hazardousness.

Severity of injury is also associated with perceptions of product hazardousness. Wogalter, Desaulniers, and Brelsford (1987) had subjects generate accident scenarios for 18 consumer products. Subjects were then asked to rate the hazardousness, likelihood of injury, and severity of injury for each. Overall product hazardousness was positively correlated with severity of injury of generated scenarios ($r = .90$, $p < .0001$). Familiarity (frequency and time of contact) and judged likelihood of injury added little variance to the prediction of hazardousness beyond that accounted for by the severity variable. Hence, with regard to perceptions of hazardousness, severity is more important than familiarity.

Research also shows that hazardousness and severity have been positively correlated with looking for a product warning (Godfrey et al., 1983), willingness to read product warnings (Wogalter et al., 1986), and the level of precautionary intent that individuals report they will take when using a product (Wogalter et al. 1987). A negative relationship has been found between familiarity and these variables. These findings suggest that in order for a consumer to read and take precautionary measures regarding a product, he or she must be relatively unfamiliar with a product and perceive that the product will produce severe injury.

It is important to understand how individuals determine their perceptions of hazardousness, and if the decisions they make are accurate. Errors can lead to failure to gain important information about products, and this may lead to improper usage resulting in injury or death. People may be less likely to engage in precautionary behavior for products judged less hazardous then they actually might be.

Heuristics and Risk Misperception

Tversky and Kahneman (1973) suggested that people sometimes use heuristics, rules of thumb, for decision making and judgment. Generally, these rules of thumb are useful and accurate in the decision making process; however, their use can also lead to errors.

One type of heuristic that is used in frequency estimation tasks and probability tasks is the "availability heuristic". The premise of this rule of thumb is that individuals often determine the probability or frequency of an event by the ease with which similar events can be retrieved or by the number of such events that can be remembered. For the most part, this is a fairly accurate way of making a decision; however, in some circumstances availability is affected by factors other than actual frequency. The salience or vividness, the amount of media coverage, or the number of people affected can all contribute to ease of availability. Thus, ease of retrieval of information can be misinterpreted as evidence that an event happens frequently.

In order to determine the effects of the availability heuristic on risk perception, Lichtenstein, Slovic, Fischoff, Layman, and Combs (1978) examined individuals' frequency estimations for causes of deaths. College students and members of the League of Women voters were presented with pairs of causes of death and asked to choose which was the more likely cause of death. They were also asked to estimate the ratio by which the more frequent cause occurred. The findings showed that subjects were more likely to select accidents as a cause of death over disease when in fact the reverse is true. Subjects overestimated infrequent causes of death and underestimated the more frequent causes of death as compiled by the National Center for Health Statistics. Lichtenstein et al. argued that the more unusual or infrequently occurring types of death may be more available to people since they are more likely to be printed in the newspapers or given television and radio air time than other kinds of deaths. Silent killers such as heart disease and cancer kill more people each year but these individual deaths are not considered to be as newsworthy as tornadoes and plane crashes. Lichtenstein et al. argued that the large scale catastrophic events remain vivid in peoples' minds.

Lichtenstein et al. attempted to remove this estimation bias by informing the subjects of the types of errors that are made due to the availability and salience of certain types of death. Despite this information, there was no evidence of debiasing; subjects continued to make severe and consistent errors in judging the frequency of lethal events. Lichtenstein et al. hypothesized that this bias might be removed through other means such as the use of fault tree construction.

Fault trees

One approach to problem solving and decision making is representing the problem in an organized manner. This can be accomplished by the use of fault trees. Fault trees are often used in industrial settings to determine where and how errors in a system may occur. A fault tree organizes possible sources of trouble or alternative solutions into a branching structure. The top of the fault tree hierarchy presents the problem. The level below it describes major sources of trouble or alternatives, and the level below that branches out further for the listing of specific items. Because fault tree construction is dependent on the recall or generation of multiple alternative scenarios, items not readily available and therefore not generated by an individual may cause errors in analysis.

Fischoff, Slovic, and Lichtenstein (1978) examined how leaving out sections of a fault tree could alter perceptions about how system failure could occur. For example, subjects were presented with fault trees listing possible causes for a car that fails to start. Some subjects received trees that contained eight branches including one entitled "all other causes". Other subjects received fault trees that lacked several branches such as "battery failure" but always included the "all other causes" category. All subjects were asked to estimate the percentage of failures to start the car that should be attributed to each branch. Those subjects who had fault trees with branches missing should have attributed higher percentages to the "all other causes" category than the subjects with eight branches. This did not occur. Instead, subjects who were missing branches simply attributed higher percentages to the causes that were present. This underestimation of the "all other causes" category demonstrates a failure to properly estimate probabilities and supports the notion that availability can affect frequency estimates. Because perception of risk or hazard is dependent upon people recognizing the ways in which injury may occur, the failure to generate all the scenarios in which they may be harmed may lead to incorrect perceptions of the hazards associated with each product.

Another means of debiasing subjects was attempted by Brems (1986, 1987). Three experiments were conducted in order to investigate the nature of risk perception and more specifically, to determine if careful analysis of products and accident scenarios would lead to more accurate perceptions of risk. Because of the importance of Brems' research in the present context, it will be discussed in detail.

Brems (1986) attempted to investigate subjects' ability to recall and generate accident scenarios based on accident frequencies provided by the National Electronic Injury Surveillance System (NEISS) which is maintained by the Consumer Products Safety Commission (CPSC). Subjects completed the following tasks:

Task 1: Subjects rank ordered the products according to estimated annual emergency room visits.

Task 2: Given an anchor point (the number of annual emergency room visits associated with swimming pools and accessories) subjects estimated the number of annual emergency room visits associated with each product.

Task 3: Subjects generated accident scenarios for each product.

Task 4: Subjects assigned percentages of accidents associated with each of the scenarios.

Task 5: Subjects reported how they knew of each scenario.

Task 6: Subjects were given the opportunity to reorder their original rankings.

The rank ordering and the correlation between emergency room visits and frequency estimates was quite reasonable before the scenario task ($\underline{r} = .60$, $n = 13$, $\underline{p} < .05$). The recalling and ratings of the accident scenarios did not change the rank ordering of the products. Subjects then reported the knowledge source for each scenario (i.e., happened to them, news media, product warnings). The total number of times each knowledge source was mentioned was correlated with the NEISS accident frequencies for that product. Scenarios that an individual reported as having actually experienced were better predictors of true accident frequency than scenarios generated from other sources of knowledge including warnings and the news media. Unless other variables were operating, the results of this study suggest that a person may have to experience product related injury in order to perceive a product's risks accurately. Clearly, a better method of risk perception is desired.

A second experiment by Brems addressed several related issues. Did subjects automatically generate scenarios when they engaged in the rank order and estimation tasks? Was the failure to generate all possible accident scenarios in the first experiment due to a memory failure or a lack of awareness of the scenario?

The tasks in the second experiment were as follows:

Task 1: Subjects gave a quick estimation of accident frequencies.

Task 2: Subjects gave an unhurried estimation of accident frequencies.

Task 3: Subjects generated accident scenarios.

Task 4: Subjects estimated the percentage of accidents associated with each scenario.

Task 5: Subjects were presented with a list of all possible scenarios (a compilation of all the scenarios generated by subjects in the first experiment) and asked if they were unaware of the scenarios or had just failed to recall them.

Task 6: Subjects estimated the percentage of accidents associated with each scenario from the list of all possible scenarios.

Task 7: Subjects estimated the number of emergency room visits associated with each product as they did in Task 2.

The pattern of results were similar to those found by Lichtenstein et al.: Infrequent events were overestimated and more frequently occurring events were underestimated. Responses made very quickly, that is without time to generate a scenario, were just as accurate as those made at a less hurried pace. The correlations were .78, .72, and .66 for hurried estimates, unhurried estimates, and estimates made after scenarios were generated. The mean response time for Task 1 was less than 2 seconds; the response time for Task 2 was 3.5 seconds, suggesting that the subjects must not have generated many scenarios during their estimations. Both of these types of estimates were as accurate as those made after 1/2 hour of recalling and rating the accident scenarios. Subjects reported more often that failure to produce a scenario was due to failure to recall rather than lack of awareness of the scenario. From these results it appears that scenario generation has little effect on perception of accident frequencies.

Why consideration of the accident scenarios was not helpful is not clear. One possibility is that subjects did not generate a sufficient percentage of scenarios to be helpful. While subjects reported that they had accounted for 80% of the possible scenarios, they had only accounted for 40%. An explanation posited by Brems was that subjects were unable to organize and refer to the scenarios during the final estimation task and therefore did not benefit from them.

A third experiment by Brems (1987) was designed to determine if organization of scenarios through the implementation of fault trees would improve accident frequency estimations.

Task 1: Subjects gave a quick estimation of frequencies followed by confidence ratings for their estimated frequencies.

Task 2: Subjects gave an unhurried estimation of frequencies followed by confidence ratings.

Task 3: Subjects created fault trees for each product category.

Task 4: Subjects estimated injury frequencies using the fault trees they had created. Subjects again gave confidence ratings.

Frequency estimates were correlated with true accident frequencies and as in the two previous experiments, subjects tended to overestimate the less frequently occurring accidents and underestimate the more frequently occurring ones. The correlations between NEISS logs and the logs of mean frequency estimates were .75, .70, and .64 for Tasks 1, 2, and 4, respectively. The differences between these correlations were not statistically significant, $p > .05$. Estimates for Task 2 were significantly larger than estimates on Task 1, $t(29) = 2.91$, $p < .01$; however, there were no differences between estimates in Task 2 and Task 4, $t(29) = 0.73$, $p > .10$. There were no significant differences in correlations between estimates and accident frequencies among Tasks 1, 2, or 4. Thus, the fault trees, organization of the scenario information, did not appear to aid the subjects in frequency estimation. The subjects' ratings of confidence, however, were higher in the frequency estimation task following the generation of the fault trees. While subjects did not improve upon their performance, the process of analysis gave them a false sense of confidence that they had performed better. A possible explanation is that analysis may be ineffective in frequency estimation tasks and in fact may lead to perceptual errors (i.e., overconfidence).

The findings of these experiments suggest that knowledge about accident frequencies is accessible without the use of accident scenarios. There are several possible explanations. It is possible that risks are associated with products in semantic memory and do not need to be analyzed or extracted separately. It is also possible that knowledge of scenarios does not provide sufficient information to improve estimates. Another possible explanation, however, lies within the methodology of these studies. Because of the within-subjects design, the same subjects were asked to give frequency estimates two or more times. The failure to find a difference in estimations after quick estimates, more leisurely estimates, and after fault tree analyses may be a result of the subjects' reluctance to stray too far from their original estimations. That is, the beneficial effects of these manipulations might have been hidden because of the experimental design that was used. A between-subjects design in which some subjects make hurried estimates and other subjects make use of accident scenario analysis before providing frequency estimates might show differences among the groups. This might demonstrate that scenario analyses allow individuals to make better estimates thereby eliminating overestimation of low frequency accidents and underestimation of high frequency accidents. If this occurred, not only would it tell something about the cognitive processes but it would also suggest a way to present product warnings or other methods of conveying information. Warnings might need to be designed in a way to inform people more completely of the hazards and circumstances in which they may be harmed by a product.

Precautionary Intent

While accident frequency estimation has been used in a number of studies examining risk misperceptions, it is not necessarily the best predictor of people's recognition of hazards. A more relevant and direct measure of risk perception is the person's precautionary intent; that is, how much precaution an individual reports to be willing to engage in when using a specific product. It is, after all, the individuals' behavior regarding a product that is most important, not how well he or she can estimate accident frequencies. By recognizing and considering the ways in which one may be injured, individuals may report appropriately heightened precautionary intent when using a hazardous product. Therefore, generation and use of accident scenarios was examined not only to determine if they improve accident frequency estimation but also to determine if they have an effect on precautionary intent.

Product Perception Study

Because many variables can influence perceptions of hazardousness and precautionary intent, a separate group of subjects was used to obtain additional data. These data were used to determine characteristics of the products, including familiarity and frequency of use, that may influence precautionary intent.

Method

Subjects

In the preliminary study, 24 University of Richmond undergraduates served as subjects. In the main experiment, subjects were 80 University of Richmond undergraduates, 40 males and 40 females, participating for credit in introductory psychology classes. The subjects were randomly assigned to one of five groups with each group containing an equal number of subjects. An additional group of 31 University of Richmond undergraduates participated in a follow-up ratings study.

Materials

Eighteen product categories, six in each of three groups of high, medium, or low accident frequencies, were selected, based on the range of accident frequencies in which they fell, from the 1986 National Electronic Injury Surveillance System (NEISS) data base, which is maintained by the U. S. Consumer Product Safety Commission (CPSC).

The NEISS data base is comprised of estimates of yearly national emergency room injury frequencies; these frequencies are based on a sample of 72 hospitals that have been determined to be statistically representative of emergency rooms across the United States.

Procedure

After signing consent forms, subjects were randomly assigned to one of five groups. A set of instructions was then read to each subject. The Hurried Estimation group completed the following tasks:

Task 1: Subjects were read product categories and asked to give an estimate within 2 seconds of the annual accident frequencies associated with each product. The importance of giving immediate estimates was emphasized to the subjects.

Table 1

Products, Frequency Category, and NEISS Accident Frequencies

Product Name	Frequency Category	Accident Frequency
Vacuum cleaners	Low	11,117
Fireworks	Low	12,602
Bleach	Low	15,109
Fans	Low	17,454
Gasoline	Low	17,768
Televisions	Low	25,435
Chainsaws	Medium	45,012
Hammers	Medium	48,479
Skateboards	Medium	81,066
Drinking glasses	Medium	81,606
All terrain vehicles (ATVs)	Medium	86,400
Ladders	Medium	90,019
Bathtubs and showers	High	101,866
Windows and window glass	High	128,777
Nails, screws, thumbtacks	High	214,656
Drugs and medication	High	216,246
Knives	High	333,478
Bicycles	High	546,420

Task 2: Subjects gave ratings of precautionary intent for each product. Subjects were given a scale from one to nine with the following anchors: no precaution at all (1); little precaution (3-4); moderate precaution (6-7); and extreme precaution (9).

Task 3: Subjects gave confidence ratings for the estimated frequencies. Subjects were given a scale from 1-9 with the following anchors: no relationship between estimated and actual frequencies(1); moderate relationship between estimated and actual frequencies (5); and perfect relationship between estimated and actual frequencies (9).

Task 4: For each product, subjects answered either yes (1) or no (0) if they or someone they know had experienced injury related to the product.

Subjects in the <u>Unhurried Estimation</u> group completed the following tasks:

Task 1: Subjects, after being instructed to take as much time as they needed, were asked to give estimates of the annual accident frequencies associated with each product.

Task 2: Subjects gave ratings of precautionary intent for each product.

Task 3: Subjects gave confidence ratings for the estimated frequencies.

Task 4: For each product, subjects reported if they or someone they know had experienced injury related to the product.

Subjects in the <u>Scenario Generate</u> group completed the following tasks:

Task 1: Subjects constructed fault trees, attempting to identify all reasonable accident scenarios for each product.

Task 2: Using the fault trees for reference, subjects made an estimation of the annual accident frequencies associated with each product.

Task 3: Subjects gave ratings of precautionary intent for each product.

Task 4: Subjects gave confidence ratings for the estimated frequencies.

Task 5: For each product, subjects reported if they or someone they know had experienced injury related to the product.

Subjects in the <u>Scenario Provided</u> group completed the following tasks:

Task 1: Subjects were given a set of fault trees with all reasonable accident scenarios. (A preliminary study in which all reasonable scenarios was compiled will be described later.) Using the fault trees for reference, these subjects made an estimation of the annual accident frequencies associated with each product.

Task 2: Subjects gave ratings of precautionary intent for each product.

Task 3: Subjects gave confidence ratings for the estimated frequencies.

Task 4: For each product, subjects reported if they or someone they know had experienced injury related to the product.

Subjects in the <u>Precaution Only</u> group completed the following tasks:

Task 1: Without having given accident frequency estimates, the subjects gave ratings of precautionary intent for each product.

Task 2: For each product, subjects reported if they or someone they know had experienced injury related to the product.

The experimenter described fault trees for the Scenario Generate and Scenario Provided groups. An example of a fault tree describing accident scenarios with swimming pools and accessories was provided for these subjects. The subjects were informed that the top levels of the fault trees were for general categories and that the bottom levels should be used to list more specific accidents or scenarios.

Prior to estimating the annual frequency of emergency room injuries associated with each product, subjects were told that 88,000 emergency room injuries are associated with "swimming pools and accessories" annually. The experimenter read off one category at a time in random order, and the subject responded vocally with a frequency estimate. Each random order was given to one subject in each of the five groups for a total of 16 product orders. Answers were recorded by the experimenter and sessions with subjects were tape recorded.

A preliminary study was conducted in order to obtain a list of all reasonable accident scenarios for each product category. The subjects were given unlimited time to generate as many scenarios as possible for each product. Each subject was given six fault trees to complete out of the list of 18 products so that a total of eight fault trees per product was collected. Subject responses were pooled to form the list of all reasonable scenarios (see Appendix A). Responses that were redundant or did not fit into the context of physical injuries were eliminated.

Thirty-one additional subjects were asked a series of questions about the 18 products. Each subject received one of two product orders and answered seven questions, randomly ordered for each subject. The questions were placed on a 9 point Likert scale with endpoints of 0 and 8. Subjects rated all products for a particular question before going on to the the next question. The questions were:

1) "How frequently do you use this product?" with anchors of never (0), infrequent (2), frequent (4), very frequent (6), and extremely frequent (8);

2) "How knowledgeable are you about the product?" with anchors of not at all knowledgeable (0), slightly knowledgeable (2), knowledgeable (4), very knowledgeable (6), and extremely knowledgeable (8);

3) "How severely might you be injured with this product?" with anchors of not at all (0), slight injury (2), severe injury (4), extremely severe injury (6), and death (8);

4) "How likely (probable) are you to read a warning for this product?" with anchors of not at all (0), not likely (2), likely (4), very likely (6), and extremely likely (8);

5) "How technologically complex do you consider this product?" with anchors of not at all complex (0), slightly complex (2), complex (4), very complex (6), and extremely complex (8);

6) How likely (probable) would it be that you would be severely injured (requiring emergency room care or resulting in permanent injury) by this product in the next year?" with anchors of not at all (0), unlikely (2), somewhat unlikely (4), likely (6), and extremely unlikely (8); and

7) "How likely (probable) would it be that you would receive any sort of minor injury by this product in the next year?" with anchors of not at all (0), unlikely (2), somewhat unlikely (4), likely (6), and extremely unlikely

(8).

Subjects were told that even though only some of the scale points were associated with verbal anchors, they were free to use any integer between 0 and 8.

Results

Response Times

The mean response times for product estimation for the Hurried and Unhurried Estimation groups were 1.96 and 3.76 seconds, respectively. An analysis of variance showed that the Hurried Estimation group responded significantly faster than the Unhurried Estimation group, $F(1,30) = 15.37$, $p < .005$. An analysis of variance of group by product category (low, medium, high frequency) showed no significant interaction for either raw response times or logarithms of the scores, $F(1,30) = 1.32$, $p > .05$, and $F(1,30) = 1.37$, $p > .05$.

Testing Between Correlations

Mean product accident frequency estimates were calculated for each group. Logarithms and square roots for both the estimates and NEISS frequencies were also generated because the variance around product estimates in the high category is larger than the variance around the product estimates in the low category. Correlations with the NEISS frequencies were then calculated for the mean estimates. For the Hurried group, $r = .54$, $N = 16$, $p < .03$. For the Unhurried group, $r = .54$, $N = 16$, $p < .03$. For the Scenario Generate group, $r = .65$, $N = 16$, $p < .004$. For the Scenario Provided group, $r = .62$, $N = 16$, $p < .007$. The logarithms of the estimates were correlated with the NEISS frequency transformations. For the Hurried, Unhurried, Scenario Generate, and Scenario Provided groups, the logarithm correlations were: .64, .53, .68 and .66, respectively. Also, the estimates and the NEISS frequencies were transformed to square roots. The correlations for the Hurried, Unhurried, Scenario Generate, and Scenario Provided groups were: .63, .55, .71, and .67, respectively.

All sets of correlations were then converted to Z scores using Fisher's Z prime transformation to determine whether there were significant differences between the correlations. No differences in correlations were found among the raw score, logarithm or square root means, p's > .05.

Analyses of Variance for Correlations

Correlations of estimates with NEISS frequencies for each of the 18 products were generated for each individual subject. These correlations provided a measure of estimation accuracy by examining subjects' ordering of the frequencies. A one way analysis of variance showed no differences among the groups, $F(3,60) = 2.06$, $p > .05$. Products were then divided into three categories according to their actual frequencies (high, medium, and low) and correlation means were obtained. A three by four analysis of variance of group by product category failed to find a significant interaction, $F(3,60) = 1.11$, $p > .05$. Product category did produce a significant main effect, $F(2,61) = 12.21$, $p < .05$. These means are provided in Table 2. Tukey's Honestly Significant Difference (HSD) test showed that estimations for products in the low frequency category were less accurately ordered with the NEISS frequencies than estimates for products in the medium and high frequency categories.

Table 2

Product Category Means for Individual Correlations

Product Category	Mean
Low	-.097
Medium	.151
High	.132

A similar analysis was performed using data that were transformed into logarithms. No significant differences were found with the one way analysis of variance by group, $F(3,60) = 1.25$, $p > .05$. A significant interaction was found, however, for the three by four, group by product category analysis, $F(3,60) = 2.51$, $p < .05$. Means are provided in Table 3.

Comparisons showed that for the high frequency category, subjects in the Hurried and Scenario Generate groups made significantly better estimates than subjects in other groups. No other significant differences were found.

Differences Between Estimates and NEISS Frequencies

In order to determine how close subject estimates were to the NEISS frequencies and to determine if overestimation of low frequency products and underestimation of high frequency products occurred, analyses of variance were performed using the differences between estimates and the NEISS data. The differences between actual and estimated frequencies were obtained for each subject. Means of the differences were then obtained for each of the product frequency categories (high , medium, low) resulting in three scores for each subject.

An analysis of variance of group by product category failed to find an interaction, $F(3,60) = 1.82$, $p > .05$. Main effects of product category and group were found, $F(3,60) = 7.18$, $p < .006$, and $F(2,61) = 14.92$, $p < .0001$, respectively. Table 4 shows means for product category and group. Tukey's (HSD) showed significant differences among all three product frequency categories.

Low frequency products were overestimated and medium and high

Table 3

Group and Product Category Means for Logarithms of Individual Correlations

Group	Product Category			
	Low	Medium	High	Mean
Hurried	-.106	-.010	.287	.057
Unhurried	.015	.076	.040	.044
Generate	-.121	.179	.326	.128
Provided	.146	.184	.127	.152
Mean	-.017	.107	.195	

frequency products were underestimated. Subjects underestimated high frequency products more than medium frequency products. Overall, subjects underestimated accident frequencies. Scenario Generate and Provided subjects underestimated frequencies by a greater amount than Unhurried subjects, and Scenario Provided subjects underestimated frequencies by a greater amount than Hurried subjects.

The analyses were repeated using logarithms of the estimate differences. Main effects for group $F(3,60) = 25.16$, $p < .0001$, and product category, $F(2,61) = 15.71$, $p < .0002$, showed that the Generate Scenario and Provided Scenario groups made greater misestimations than the Hurried and Unhurried groups and that low frequency estimates were significantly different from medium and high frequency estimates. This analysis also produced a significant interaction, $F(3,60) = 2.60$, $p < .03$. Means for the interaction are presented in Table 5.

Low frequency products were overestimated by all groups except the Scenario Provided group and high frequency products were underestimated by all groups. Tukey's (HSD) test showed that for low frequency products, the Scenario Generate and Scenario Provided groups made significantly better estimates than subjects in the Hurried and Unhurried Groups. For Medium frequency products, the Unhurried group made more accurate estimates than the Hurried, Scenario Generate, and Scenario Provided groups; the Hurried Group made better estimates than the Scenario Generate and Scenario Provided groups. For high frequency products, Scenario Provided subjects made less accurate estimates than subjects in the other groups.

The analysis of variance was repeated using absolute values of the estimate differences. There was no significant interaction, $F(3,60) = 1.31$, $p > .05$. Product frequency category produced the only significant effect, $F(2,61) = 508.00$, $p < .0001$. High frequency products were misestimated by a larger amount than medium and low frequency products, and medium frequency products were misestimated by a larger amount than low frequency products. Means for product frequency category are provided in Table 6.

Products as a Random Variable

Analyses of variance using estimate differences were also performed using products as a random variable. An analysis of variance using raw estimate differences showed no significant interaction, $F(3,14) = 1.82$, $p < .05$, however, significant main effects for product category and subject group, $F(2,15) = 7.18$, $p < .006$, and $F(3,14) = 14.92$, $p < .0001$, respectively, were found. Means for groups and product category are provided in Table 7.

Tukey's (HSD) test showed that medium and high frequency products were misestimated by a greater amount than low frequency products and that the Generate and Provided Scenario underestimated accident frequencies by a larger amount than the Hurried and Unhurried subjects.

The analysis was also performed using logarithms of estimate differences from NEISS frequencies. A main effect for group, $F(3,14) = 15.71$, $p < .05$ showed that the Unhurried group made more accurate estimates than all other groups. A main effect of product category showed that low frequency estimates were significantly different from medium and

Table 4

Mean Differences of Estimates from NEISS Frequencies by Product Frequency Category and Group

Group	Product Category			
	Low	Medium	High	Mean
Hurried	24,093.50	-15,083.12	-160,093.00	-50,360.89
Unhurried	38,386.00	-2,013.33	-161,823.67	-41,817.00
Generate	12,360.50	-37,311.50	-164,314.33	-63,088.44
Provided	12,243.17	-39,908.67	-194,032.33	-73,899.28
Mean	21,770.79	-23,579.17	-170,065.84	

Table 5

Group and Product Category Means for Logarithms of Estimate Differences

Group	Product Category			
	Low	Medium	High	Mean
Hurried	.370	-.117	-.412	-.053
Unhurried	.435	-.025	-.395	.005
Generate	.188	-.330	-.428	-.190
Provided	-.212	-.357	-.575	-.240
Mean	.301	-.207	-.453	

Table 6

Product Category Means for Absolute Differences of Estimates from NEISS Frequencies

Product Frequency Category	Mean
Low	31,471.96
Medium	47,102.02
High	197,688.75

Table 7

Group and Product Category Means for Estimate Differences from NEISS Frequencies Using Products as a Random Variable

Group	Product Category			
	Low	Medium	High	Mean
Hurried	24,093.44	-15,080.00	-160,100.00	-50,360.00
Unhurried	38,385.84	-2,013.68	-161,800.00	-41,820.00
Generate	12,360.31	-37,310.00	-164,300.00	-63,088.50
Provided	12,243.13	-39,910.00	-194,000.00	-73,899.34
Mean	21,770.68	-23,580.00	-170,100.00	

high frequency estimates. A significant interaction was also found, $F(3,14) = 2.60$, $p < .03$. Subjects in the Unhurried group made significantly better estimates for the medium frequency category than subjects in all other groups. Means for group and product category are shown in Table 8.

Precautionary Intent

An analysis of variance of group by product category was used to analyze subjects' reporting of precautionary intent. This analysis included scores from the Precaution Only group in which subjects gave ratings of precautionary intent without first having made accident frequency estimations. There was no significant interaction, $F(4,75) = 1.44$, $p > .05$. There were significant main effects for group, $F(4,75) = 2.94$, $p < .03$ and product category, $F(2,77) = 107.19$, $p < .0001$. Group means are shown in Table 9.

A Tukey (HSD) test showed that the Hurried group reported significantly less precautionary intent than did subjects in the Scenario Generate, Scenario Provided, and Precaution Only groups. There were no other significant differences among the groups. Tukey's (HSD) also showed that for the product categories, subjects reported significantly higher precautionary intent for products in the medium and high frequency categories than in the low frequency product categories. Interestingly, subjects reported significantly higher precautionary intent for products in the medium frequency category than for products in the high frequency category.

The relationship between reported precautionary intent and NEISS

Table 8

Group and Product Category Means for Logarithm Differences from NEISS Frequencies Using Products as a Random Variable.

Group	Product Category			
	Low	Medium	High	Mean
Hurried	.370	-.117	-.412	-.053
Unhurried	.435	-.025	-.395	.005
Generate	.188	-.330	-.428	-.190
Provided	.212	-.357	-.575	-.240
Mean	.301	-.207	-.453	

Table 9

Means for Analysis of Variance for Precautionary Intent by Group and Product Category

Group	Product Frequency Category			
	Low	Medium	High	Mean
Hurried	3.83	5.37	5.05	4.75
Unhurried	4.40	6.19	5.48	5.35
Generate	5.02	6.18	5.88	5.69
Provided	5.03	6.07	5.88	5.66
Precaution Only	4.89	6.05	5.55	5.49
Mean	4.63	5.97	5.57	

frequencies was also examined. Table 10 provides the group correlations. There was no significant correlation of precautionary intent with the NEISS frequencies for any of the groups.

Confidence

Mean reported confidence for product frequency estimation was obtained for the Hurried, Unhurried, Scenario Generate and Scenario Provided Estimation groups. The group means were 4.31, 4.81, 3.94, and 4.44, respectively. An analysis of variance showed no significant differences among the groups, $F(3, 60) = 1.41$, $p > .05$.

Injury Experience

Analyses examined whether subjects who reported injury experience with a product estimated higher accident frequencies than did subjects without such experience. Subjects who had injury experience estimated higher accident frequencies for gasoline, $t(78) = 2.11$, $p < .05$, and all terrain vehicles, $t(78) = 1.95$, $p < .05$. Estimates are shown in Table 11.

There was a trend for subjects who reported injury experience to estimate higher accident frequencies than subjects who reported no injury experience. This trend was seen for 10 additional products: fireworks, bleach, televisions, hammers, drinking glasses, bathtubs and showers, windows and window glass, nails and screws, knives, and bicycles. A sign test conducted to examine this trend failed to find a significant difference for the expected population mean, $t(17) = 2.05$, $p > .10$.

Analyses examined whether subjects who reported injury experience gave higher levels of precautionary intent than subjects without such

Table 10

Precautionary Intent Correlated with NEISS Frequencies

Group	Correlation
Hurried Estimate	.12
Unhurried Estimate	.17
Generate Scenario	.18
Provided Scenario	.19
Precaution Only	.08

Note For all groups, N = 16. None of the correlations is significant, $p > .05$.

Table 11

Estimate Means for Products Based on Injury Experience

Product	Estimate Mean	
	Injury Yes	Injury No
Gasoline	109,761.91	41,953.49
All Terrain Vehicles	79,632.35	52,600.00

experience. Subjects with injury experience reported significantly greater precautionary intent for the following products: gasoline, $t(78) = 2.19$, $p < .04$; drinking glasses, $t(78) = 2.79$, $p < .007$; ladders, $t(78) = 2.19$, $p < .04$; windows and window glass, $t(78) = 2.66$, $p < .009$; and nails and screws, $t(78) = 1.99$, $p < .05$. Means are shown in Table 12.

There was also a trend for subjects who reported injury experience to report greater precautionary intent for 10 additional products: fireworks, bleach, fans, televisions, chainsaws, hammers, all terrain vehicles, bathtubs and showers, drugs and medication, and bicycles. A sign test showed a significant effect, $t(17) = 3.69$, $p < .01$ indicating that, in general, subjects with greater injury experience reported greater precautionary intent.

Analyses From the Product Perception Study

Analyses, using products as a random variable, were performed on the data collected from the 31 subjects who participated in the Product Perception Study in which product characteristics were examined through seven questions. Table 13 shows the correlations for the questions.

Eleven of the 21 correlations were significant. The more frequently used a product is, the less likely it is to be perceived as likely to produce a severe injury and the less likely people are to read warnings. The greater the technological complexity of a product, the less likely people are to be knowledgeable about the product. As knowledge of the product hazards increases so does the likelihood of receiving both a minor and severe injury in the next year. The greater the severity of injury, the more likely it is

Table 12

Precautionary Intent Ratings for Products Based on Injury Experience

Product	Precaution Mean	
	Injury Yes	Injury No
Gasoline	7.00	6.07
Drinking Glasses	3.74	2.58
Ladders	6.59	5.71
Windows and Window Glass	5.10	3.91
Nails, Screws and Thumbtacks	4.98	4.11

Table 13

Correlations for Questions From Product Perception Study

	Freq	Know	Sev	Read	Tech	Likely S	Likely M
Freq	1						
Know	.077	1					
Sev	-.477*	.322	1				
Read	-.472*	-.035	.772*	1			
Tech	-.183	-.591*	.300	.65*	1		
Likely S	.038	.394*	.714*	.376*	.156	1	
Likely M	.157	.706*	.296	-.084	-.435*	.539*	1

* $p < .05$

Note: freq = Frequency of Use, know = Knowledge of the Hazards, sev = Severity of Injury, read = Likelihood of Reading a Warning, tech = Technological Complexity, likely *s* = Likelihood of Receiving a Severe Injury, likely m = Likelihood of Receiving a Minor Injury that an individual will look for a warning and that an individual will be severely injured in the next year. As technological complexity increases, so does likelihood of reading a warning and likelihood of receiving a minor injury in the next year. As likelihood of receiving a minor injury in the next year increases so does likelihood of receiving a severe injury.

In order to determine if product characteristics differed among the accident frequency categories, one way analyses of variance by product frequency category were performed for each of the seven questions. No significant differences were found for any of the questions, $\underline{p} > .05$. A planned comparison examining frequency of use showed that products in the high accident frequency category are used more often than products in the medium frequency category, Fisher's (LSD) = 2.75, $p < .05$. Table 14 provides means for frequency of use by product category.

Discussion

A significant difference in response times for making frequency estimates was found between the Hurried and Unhurried groups, showing that the subjects followed the experimenter's instructions. The actual difference in these times is small, however, (less than 2 seconds) and as proposed by Brems (1986) this small amount of time suggests that not many scenarios could have been generated by the Unhurried Estimation group. If scenarios were generated at all by either group, certainly not many more scenarios could have been generated by the Unhurried group than by the Hurried group.

There were no significant differences in estimate correlations with NEISS frequencies among the groups. This result replicates Brems' (1986,

Table 14

Frequency of Use Means for Product Accident Frequency Categories

Product Accident Frequency	Mean
Low	4.30
Medium	2.56
High	5.31

1987) results in which hurried estimates were found to be as accurate as unhurried estimates and estimates made after fault tree analyses. These results suggest that his findings were not a result of the repeated measures methodology he used.

When individual correlations with NEISS frequencies were examined as a measure of accuracy in ordering of the products, significant differences were found. An analysis of variance of the individual correlations showed no significant interaction or differences among the groups. Low frequency products were ordered less accurately than medium and high frequency products. An analysis using logarithms of the correlations did reveal a significant interaction, however. The Hurried and Scenario Generate groups made more accurately ordered estimates for products in the high frequency category. In other words, the group that spent the smallest amount of time processing (less than two seconds) and the group that spent the largest amount of time processing (1/2 to 1 1/2 hours) produced the most accurately ordered results. This result is both unexpected and puzzling.

It was hoped that scenario analysis would decrease underestimation of high accident frequency products and overestimation of low frequency accident rates. In order to evaluate this component, analyses of variance were conducted using estimate differences from NEISS frequencies. The results showed that for all groups, low frequency products were overestimated and both medium and high frequency products were underestimated. Scenario Generate and Scenario Provided groups underestimated frequencies more than Unhurried group subjects and the

Scenario Provided group underestimated frequencies more than Hurried group subjects. This replicates earlier studies (Brems, 1987, and Lichtenstein et al., 1978) in which attempts to debias subjects were not successful. Subjects who were provided with all reasonable scenarios, that should have eliminated possible miscalculation involved with the availability heuristic, did not estimate accident frequencies better than subjects without such information. Additionally, being provided with all reasonable scenarios did not enable these subjects to estimate frequencies better than subjects who had to generate their own scenarios and therefore may have had much less comprehensive fault trees. Conversely, subjects who had to generate scenarios and therefore had to process the product information more actively did no better in estimating frequencies than subjects who did little or no analysis. Availability of accident information did not improve estimations.

Analysis of logarithms of the differences, however, produced different results. A significant interaction showed that for low frequency products Hurried and Unhurried group subjects overestimated frequencies more than Scenario Generate and Scenario Provided group subjects. For medium frequency products, the Unhurried group made the closest estimates to actual frequencies followed by the Hurried group. For high frequency products, the Provided group subjects underestimated frequencies more than the other groups. These inconsistent findings do not provide a clear picture of the efficacy of fault tree analysis or scenarios.

The analysis using the absolute values of the estimate and NEISS frequency differences did not provide clarification. This analysis which examined accuracy of estimates without regard to whether the errors were overestimations or underestimations showed no significant differences among the groups. This result in conjunction with the other estimate difference analyses provides evidence that organization of information through fault trees and analysis does not, in a predictable or consistent way, assist individuals in assessing product risks. In fact it may actually interfere with accurate assessment. Overall, subjects who used the scenarios underestimated accident frequencies by a larger amount than the Hurried and Unhurried group subjects.

The estimates were also analyzed using products as a random variable. Raw score estimate differences and logarithm differences were used. The raw score estimate differences showed that medium and high frequency products were misestimated more than low frequency products. They also revealed that Scenario Generate subjects made less accurate estimates than Hurried and Unhurried group subjects.

The logarithm analysis showed that the Unhurried group made the best estimates overall. For all groups, estimates for low frequency products were significantly different from medium and high frequency products. A significant interaction emerged that showed for the medium frequency category, subjects in the Unhurried groups made more accurate estimates than subjects in all other groups. No other significant differences were found.

Based on Brems results, it is not surprising that the subjects who used fault trees did no better than the other subjects. However, it was unexpected that by some measures their performance was worse. Perhaps accident frequency estimation is not a sufficiently direct measure of product risk perception and therefore scenario analysis does not aid in this task.

For this reason, precautionary intent, which logically should be a better indicator of perceived risk, was also examined. Only the Hurried group, which prior to giving precautionary intent ratings spent the least time processing, gave lower ratings than subjects in other groups. Additionally subjects who spent from 1/2 hour to 1 1/2 hours either generating or reading accident scenarios did not report higher levels of precautionary intent than did subjects in the Unhurried Estimation group which, on the average, spent less than 4 seconds evaluating each product. Because the Hurried group gave significantly lower estimates perhaps some quick processing did occur in the Unhurried subjects that an organized and complex analyses does not improve upon. The few extra seconds the Unhurried group spent may have helped while time beyond this had no effect. Thus, some processing time is needed but apparently it it is not used to evaluate scenarios. This concurs with the results of the estimation tasks in which the Scenario Generate and Scenario Provided groups did not make better estimates than the Unhurried group.

Precautionary intent was also examined by product category. Subjects in all groups reported higher precautionary intent for products in the medium accident frequency category than in the high accident frequency category. An explanation may be found in the results of the product perception study. Although the analysis of variance was not significant, paired comparisons showed a significant difference among products in the high and medium accident frequency categories. Products in the high accident frequency category are used more frequently than products in the medium frequency category. Clearly, frequency of use is related to familiarity; that is, the more frequently we use a product the more familiar it becomes. Godfrey et al. (1983); Godfrey and Laughery (1984); and Wogalter et al. (1986), reported that the more familiar an individual is with a product, the less likely that individual is to perceive that product as hazardous. This provides an explanation for subjects to report less precautionary intent for products in the high accident frequency category; these products are used more often than products in the medium accident frequency category. The fact that frequency of use factors into product perceptions may also shed some light on the inconsistent results of the estimation task. Products with high accident frequencies may not necessarily be the most dangerous or hazardous products to use. High accident frequencies may result simply because the products are more commonplace and used more often. Therefore, accident frequencies may not be the ideal source on which to base estimations of risk. This possibility may have canceled any effects that the scenario analysis may have had with regards to precautionary intent and risk perception.

Frequency estimates for all groups did correlate with the actual NEISS frequencies showing that subjects had at least a rough idea of actual frequencies. There were no significant correlations found when precautionary intent was correlated with the NEISS frequencies, however, providing evidence that knowledge of accident frequencies would have little impact on an individual's behavior regarding a product. In conjunction with the fact that Scenario subjects did not give higher ratings of precautionary intent than did subjects in the Unhurried Estimate group, these results suggest that incorporating accident scenarios or frequencies into product warnings may have little or no effect on consumer behavior. People may consider the severity of injury that may result rather than the probability that an injury could occur when evaluating product risks. The problems of familiarity, and getting consumers to read the warnings remain as well.

The use of fault trees and scenarios also had no effect on the subjects' confidence in their frequency estimates. This conflicts with Brems' results in which subjects reported higher confidence ratings after having generated fault trees than they did after they made hurried or unhurried estimates. Brems' findings, however, may have been an artifact of the within-subjects design. It is logical that subjects would give a higher confidence rating after a lengthy analysis that followed a confidence rating made after a brief analysis. It seems to be a demand characteristic of the task. In this study, however, in which subjects made frequency estimates only once, no differences among the groups were seen.

Precautionary intent, which is a primary component in risk assessment, was affected however, by a person's knowledge of injury associated with a product. Subjects who reported that they or someone they knew had an injury related to a product, reported higher levels of precautionary intent for 15 out of the 18 products. Significant differences were not found for every product but this effect may have occurred because for many of the products, the number of subjects who had injury experience was grossly unequal to the number of subjects who did not have injury experience. When examining the means, subjects with injury experience reported higher levels of precautionary intent. This was confirmed by a sign test which showed that the scores of the persons with injury experience or knowledge were larger than those with out such experience. If these analyses were repeated using an equal number of subjects in each group, perhaps the number of products for which there were significant differences would increase. It would be difficult, however, to find such subjects.

For two of the products, subjects who had injury experience gave higher frequency estimates than subjects without such experience. There was a similar trend for an additional 10 of 18 products. Brems (1986) reported that scenarios an individual had actually experienced, was a better predictor of true accident frequency than scenarios the subjects had read warnings for or heard about through the media. This further supports the idea that simply being provided with information in a warning or through accident scenarios is not sufficient to change behavior and improve consumer compliance and safety.

Unfortunately these results suggest that a person must be injured or know someone who was injured with a product in order to correctly perceive the risks related to the product or to be willing to take precaution with that product. Being provided with theoretical or possible accident scenarios is not enough. Some kinds of information may be helpful. Perhaps vivid case studies and accident accounts that personalize the risks rather than generic scenarios would provide better motivation to comply with warnings and product safety information. Obviously, injury experience, perhaps the most influential factor, is not a viable solution to preventing serious product related injuries and fatalities.

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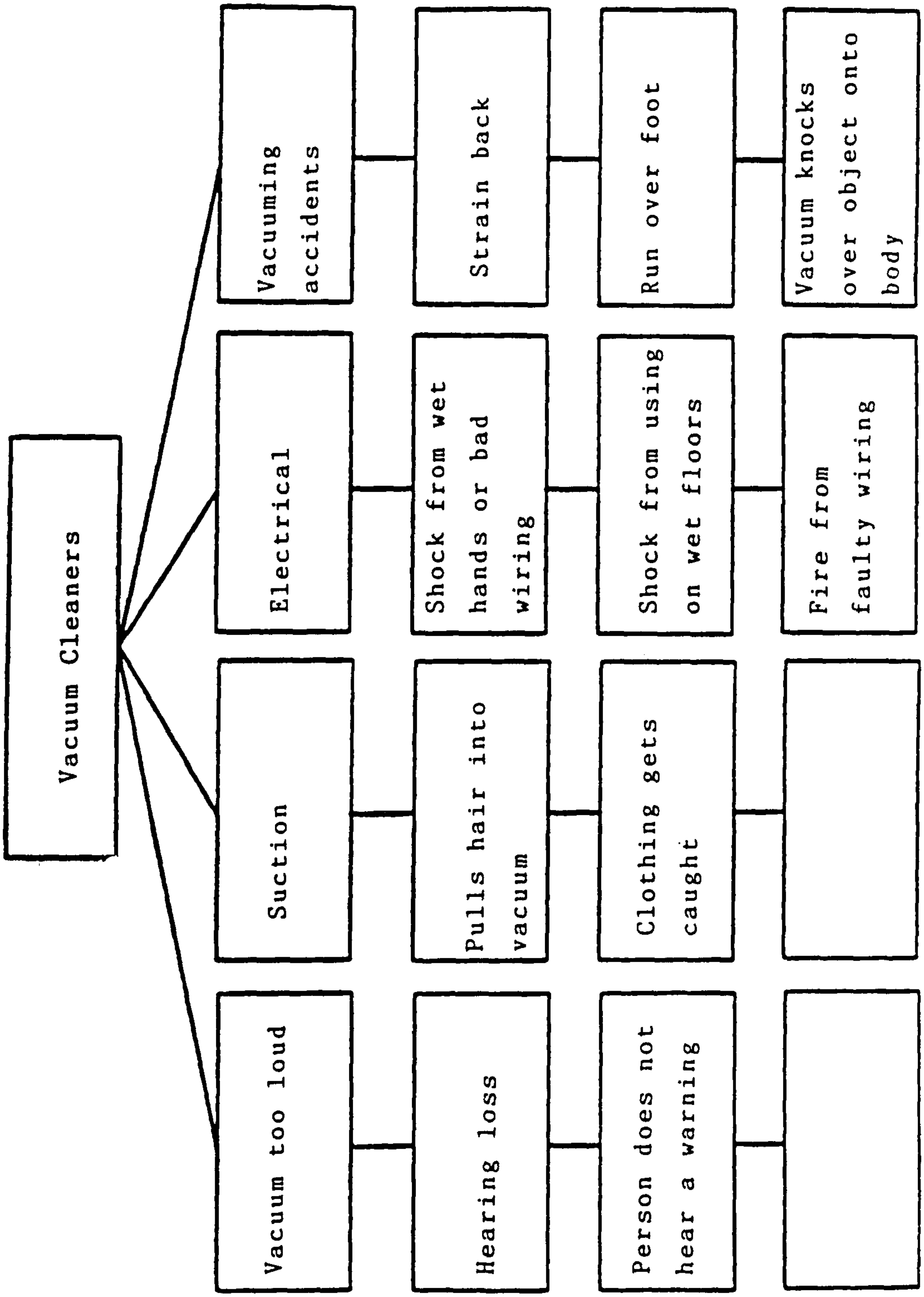
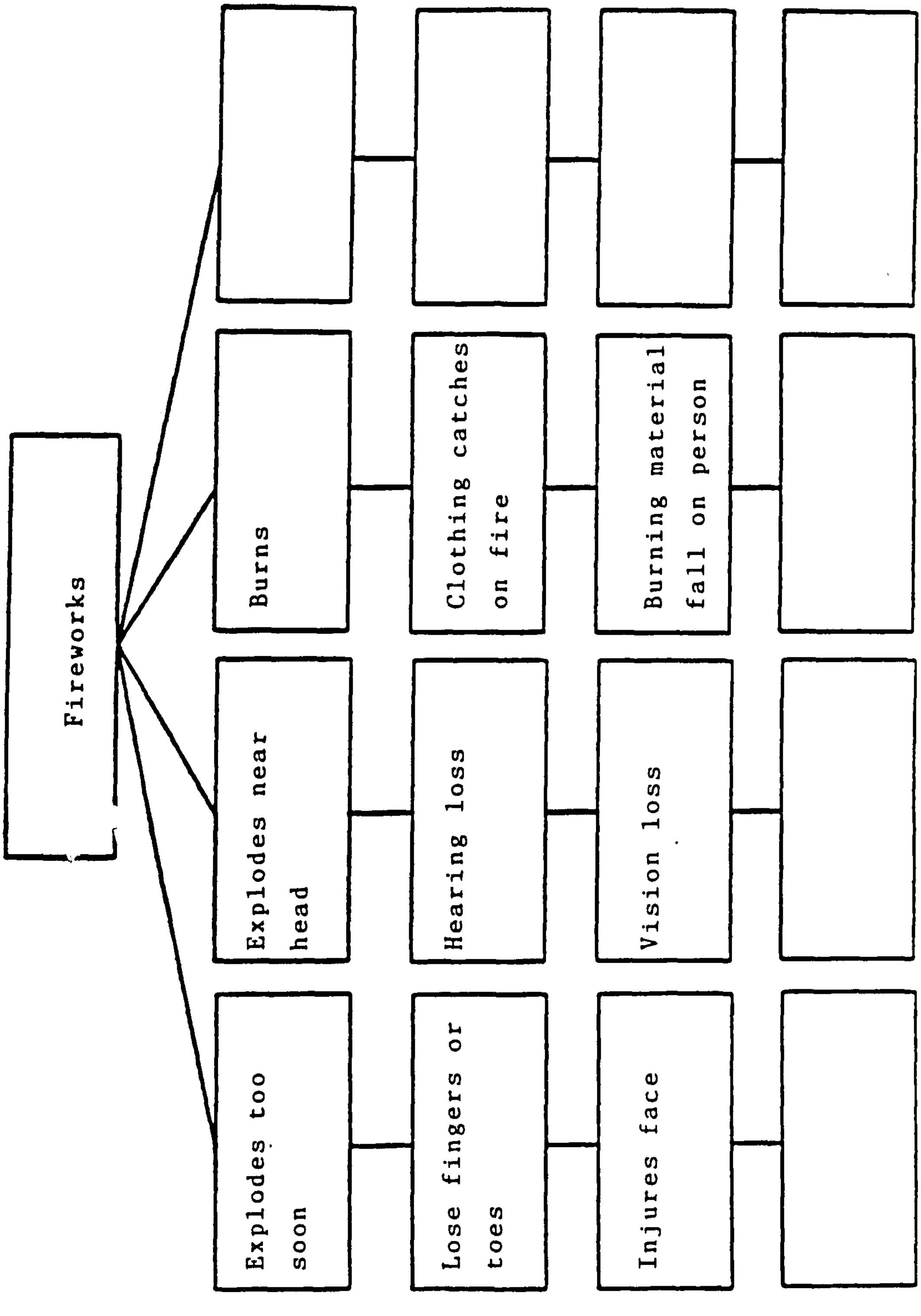
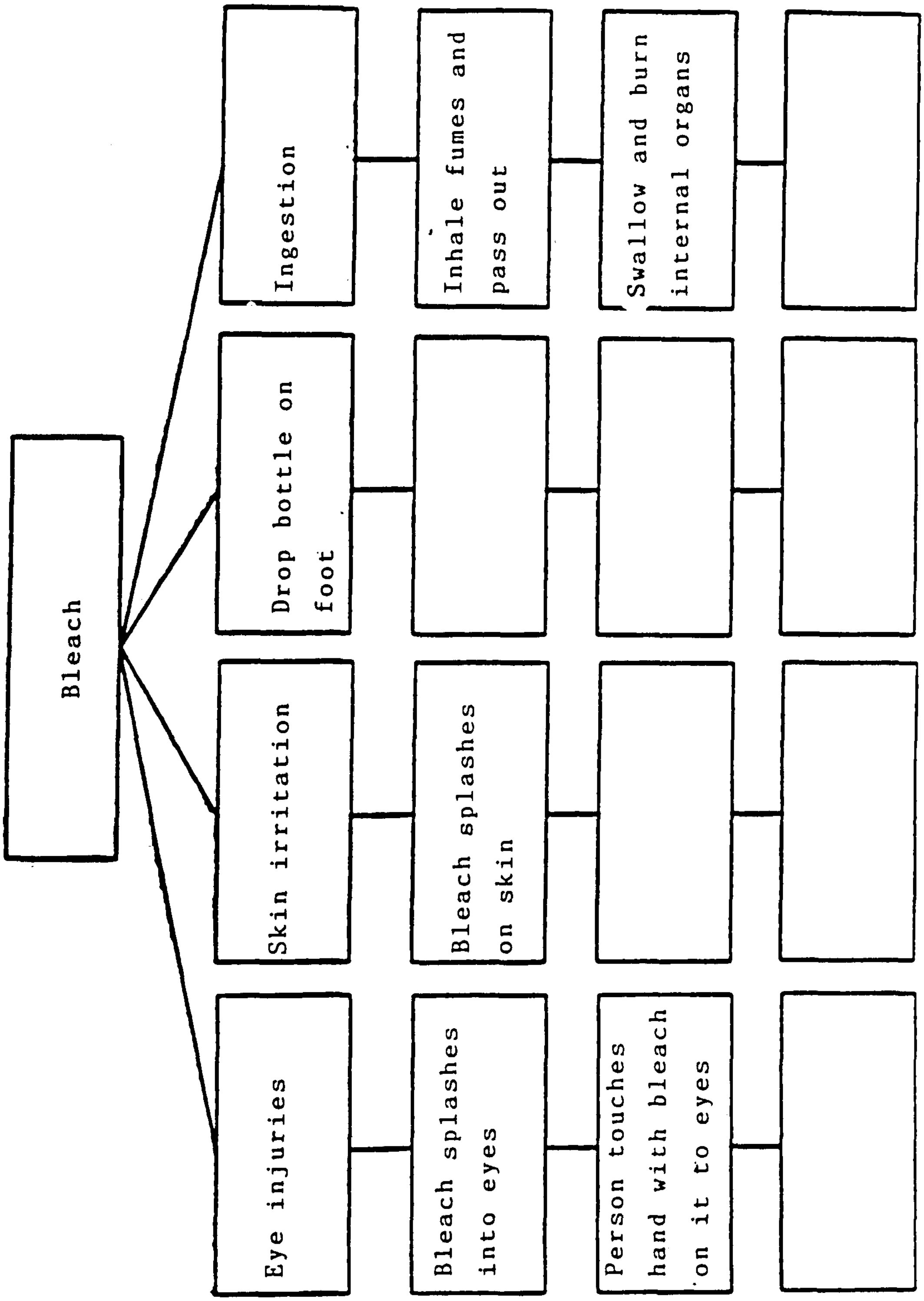
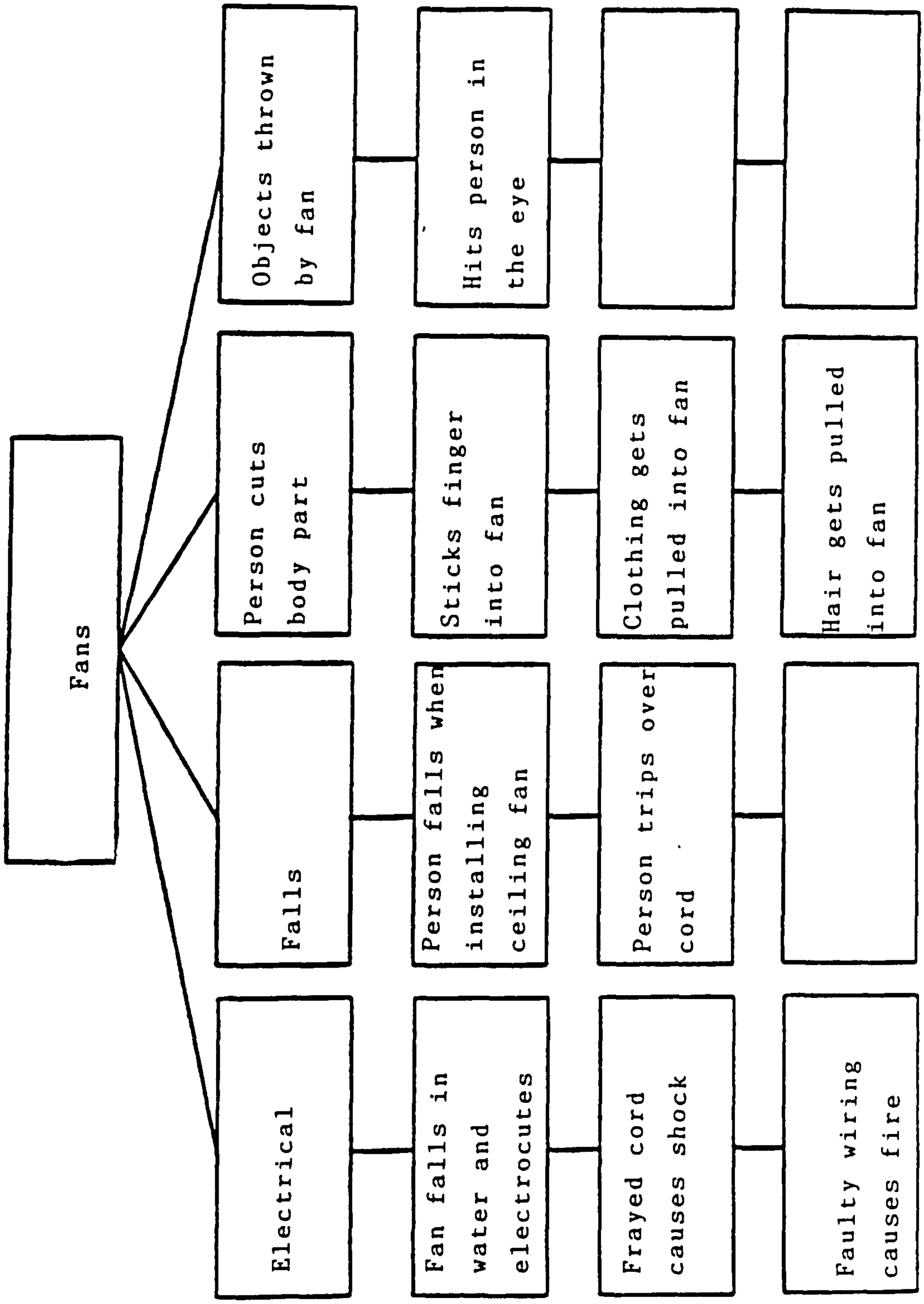
Appendix A

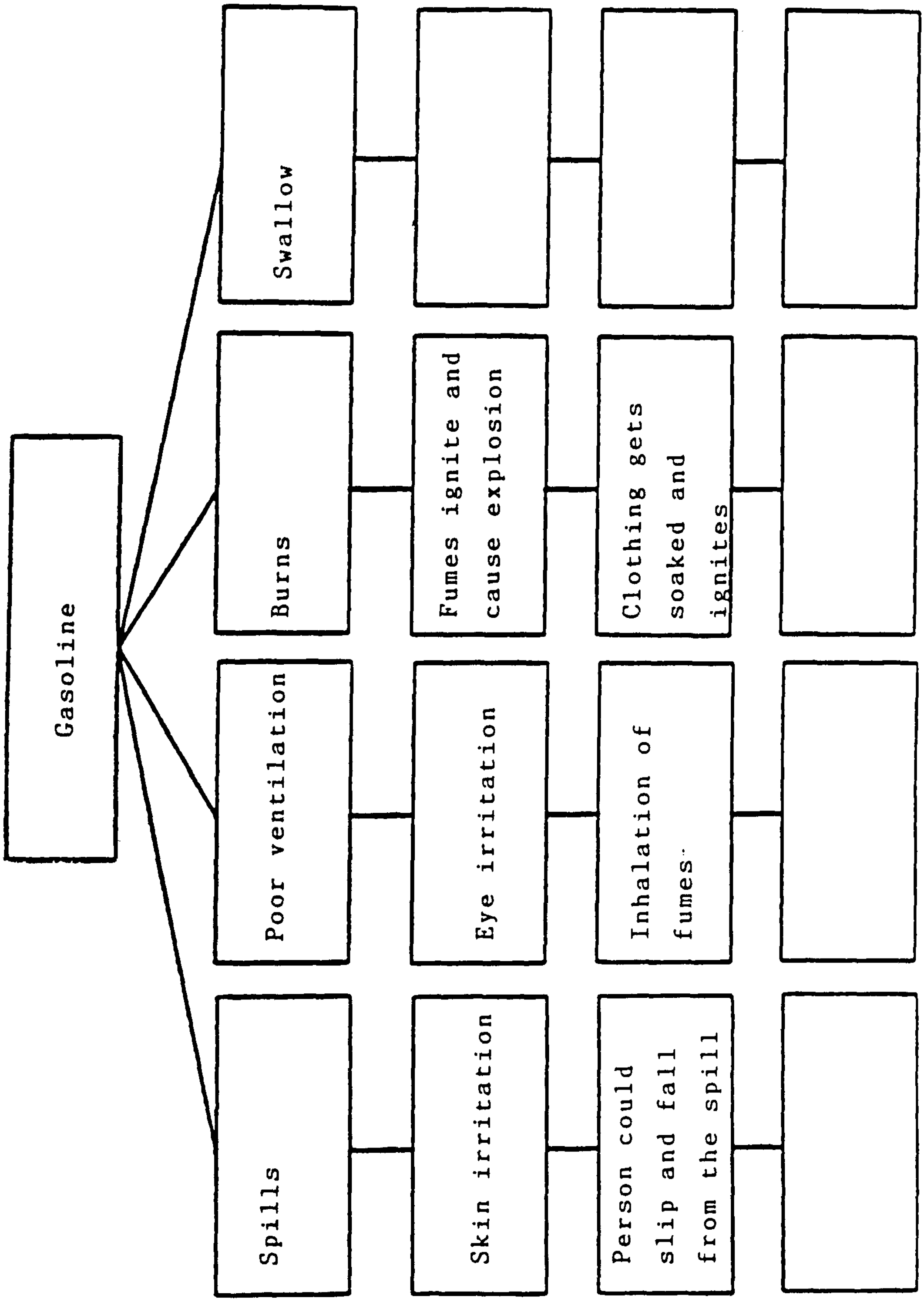
Fault Trees Used by Scenario Provided Subjects

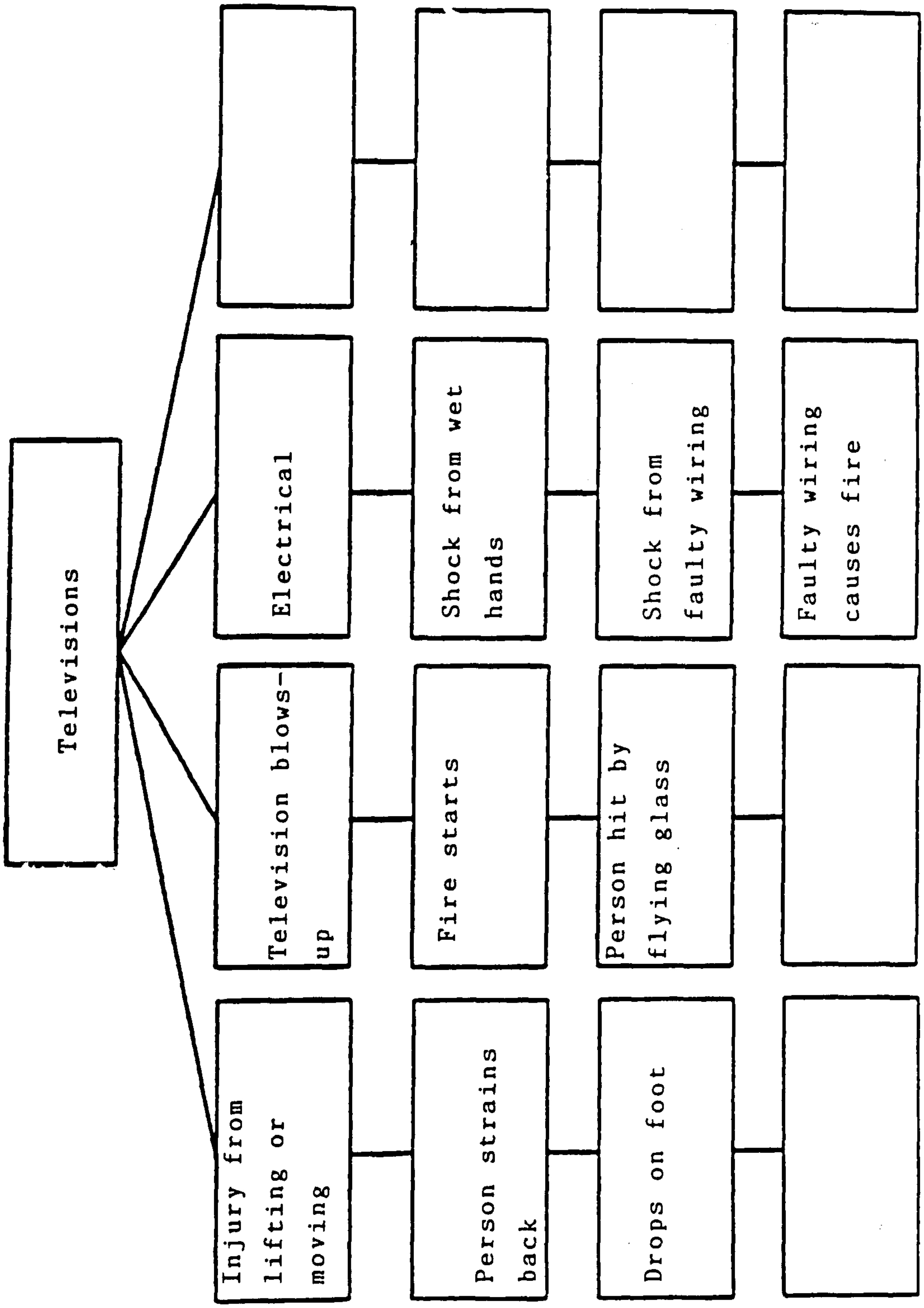

Vacuum Cleaners
Vacuum too loud
Hearing loss
Person does not hear a warning
Suction
Pulls hair into vacuum
Clothing gets caught
Electrical
Shock from wet hands or bad wiring
Shock from using on wet floors
Fire from faulty wiring
Vacuuming accidents
Strain back
Run over foot
Vacuum knocks over object onto body

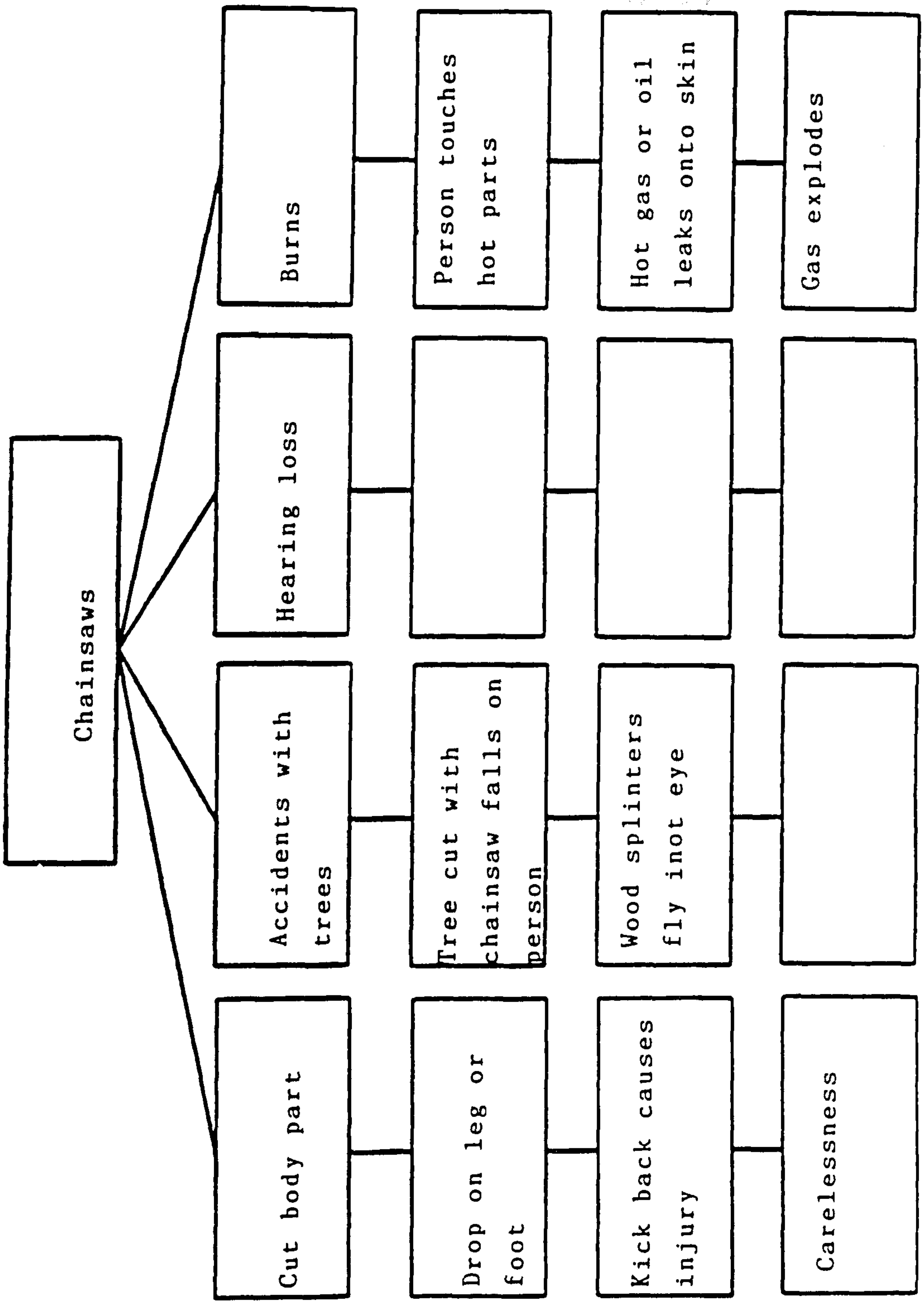

Fireworks
Explodes too soon
Explodes near head
Burns
Lose fingers or toes
Hearing loss
Clothing catches on fire
Injures face
Vision loss
Burning material fall on person

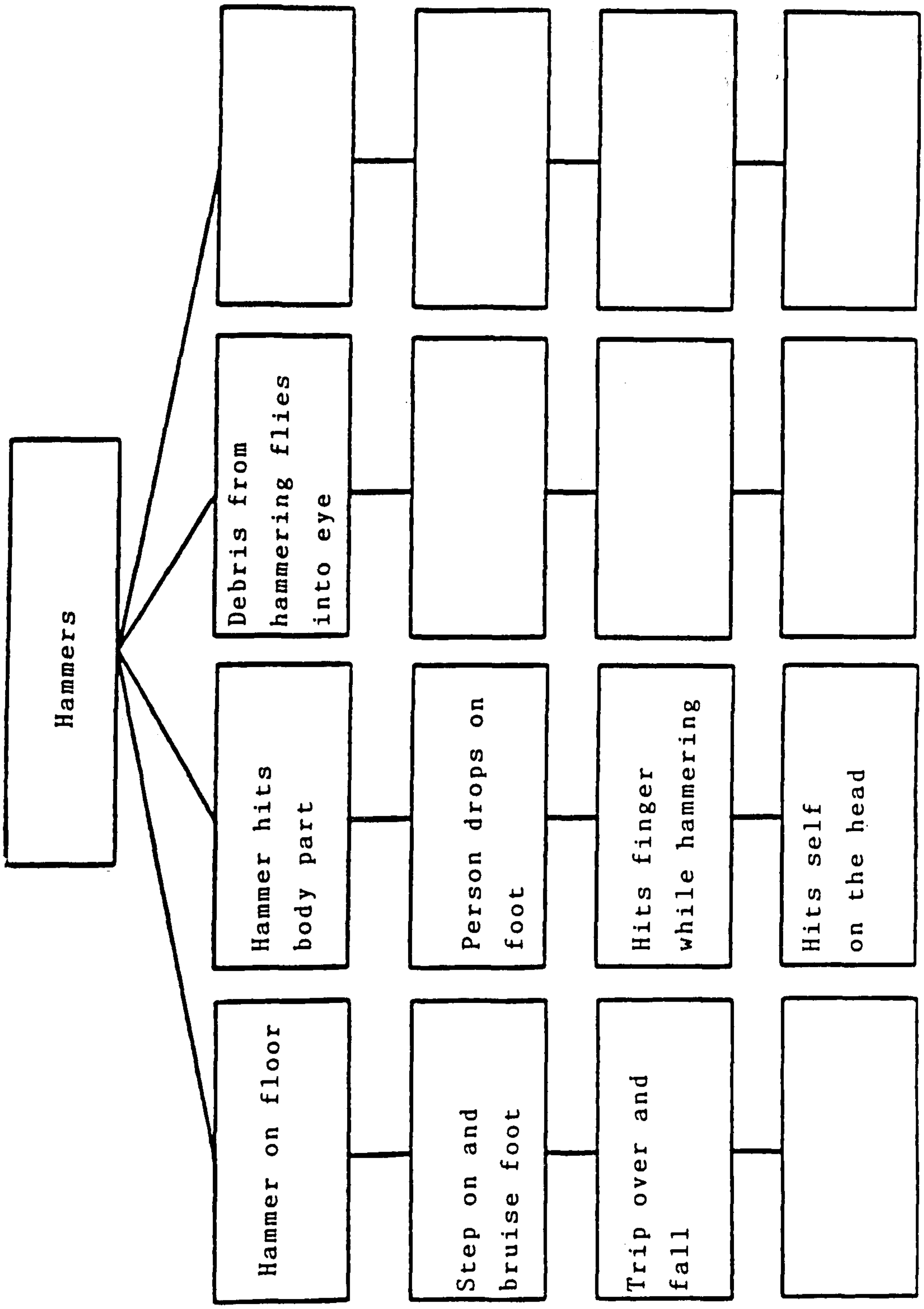

Bleach
Eye injuries
Bleach splashes into eyes
Person touches hand with bleach on it to eyes
Skin irritation
Bleach splashes on skin
Drop bottle on foot
Ingestion
Inhale fumes and pass out
Swallow and burn internal organs

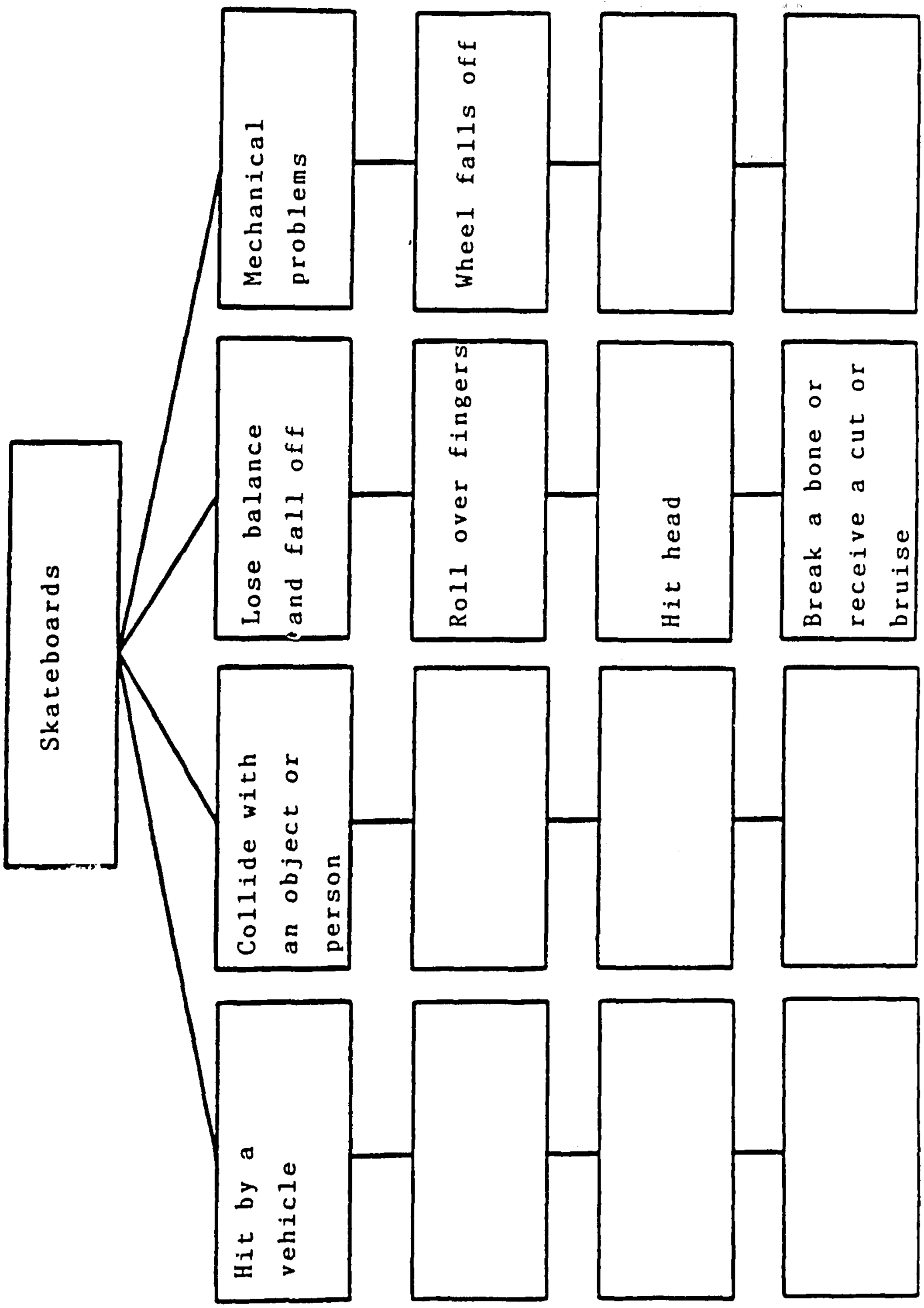

Fans
Objects thrown by fan
Hits person in the eye
Person cuts body part
Sticks finger into fan
Clothing gets pulled into fan
Hair gets pulled into fan
Falls
Person falls when installing ceiling fan
Person trips over cord
Electrical
Fan falls in water and electrocutes
Frayed cord causes shock
Faulty wiring causes fire

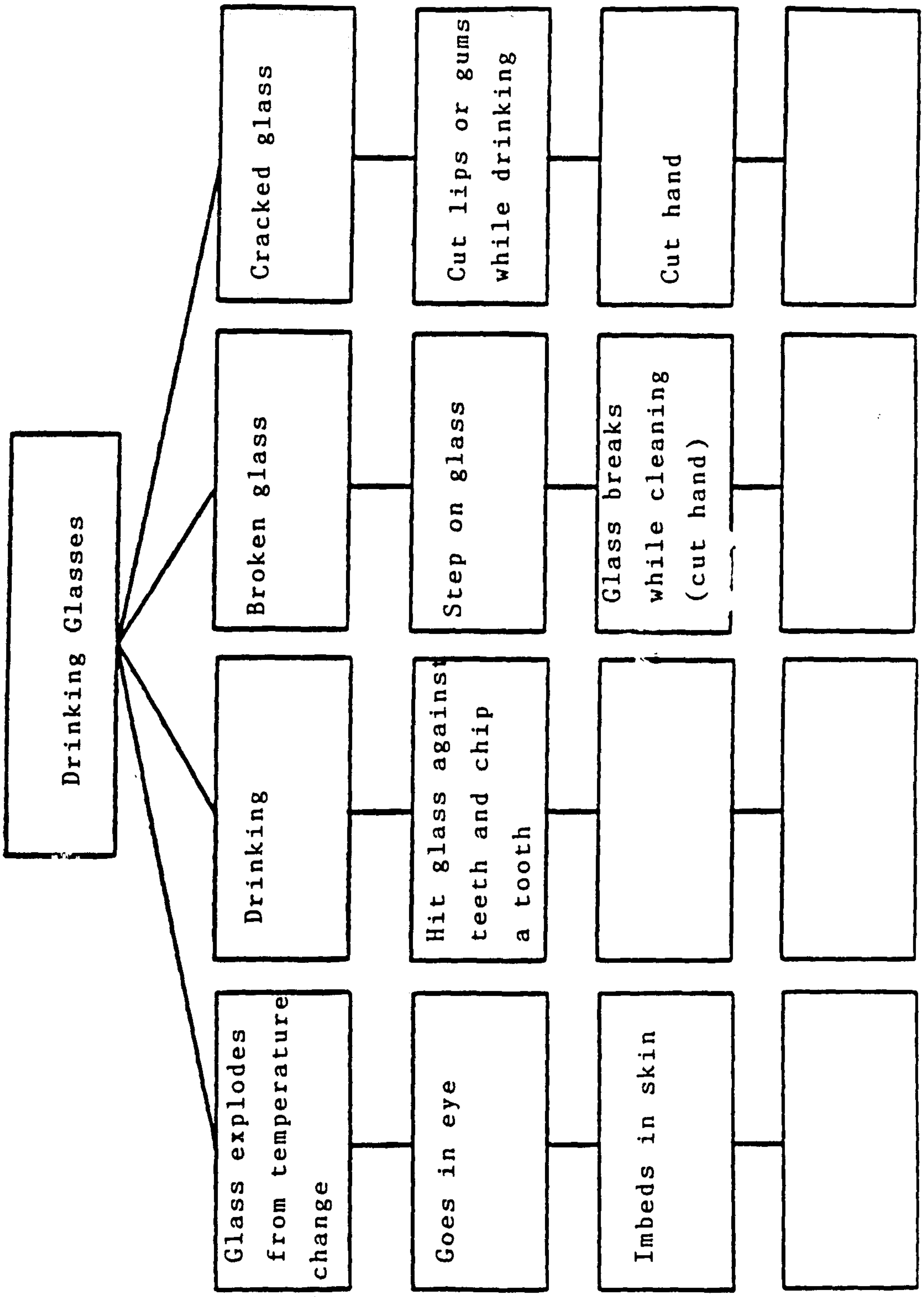

Gasoline
Spills
Poor ventilation
Burns
Swallow
Skin irritation
Eye irritation
Fumes ignite and cause explosion
Person could slip and fall from the spill
Inhalation of fumes
Clothing gets soaked and ignites

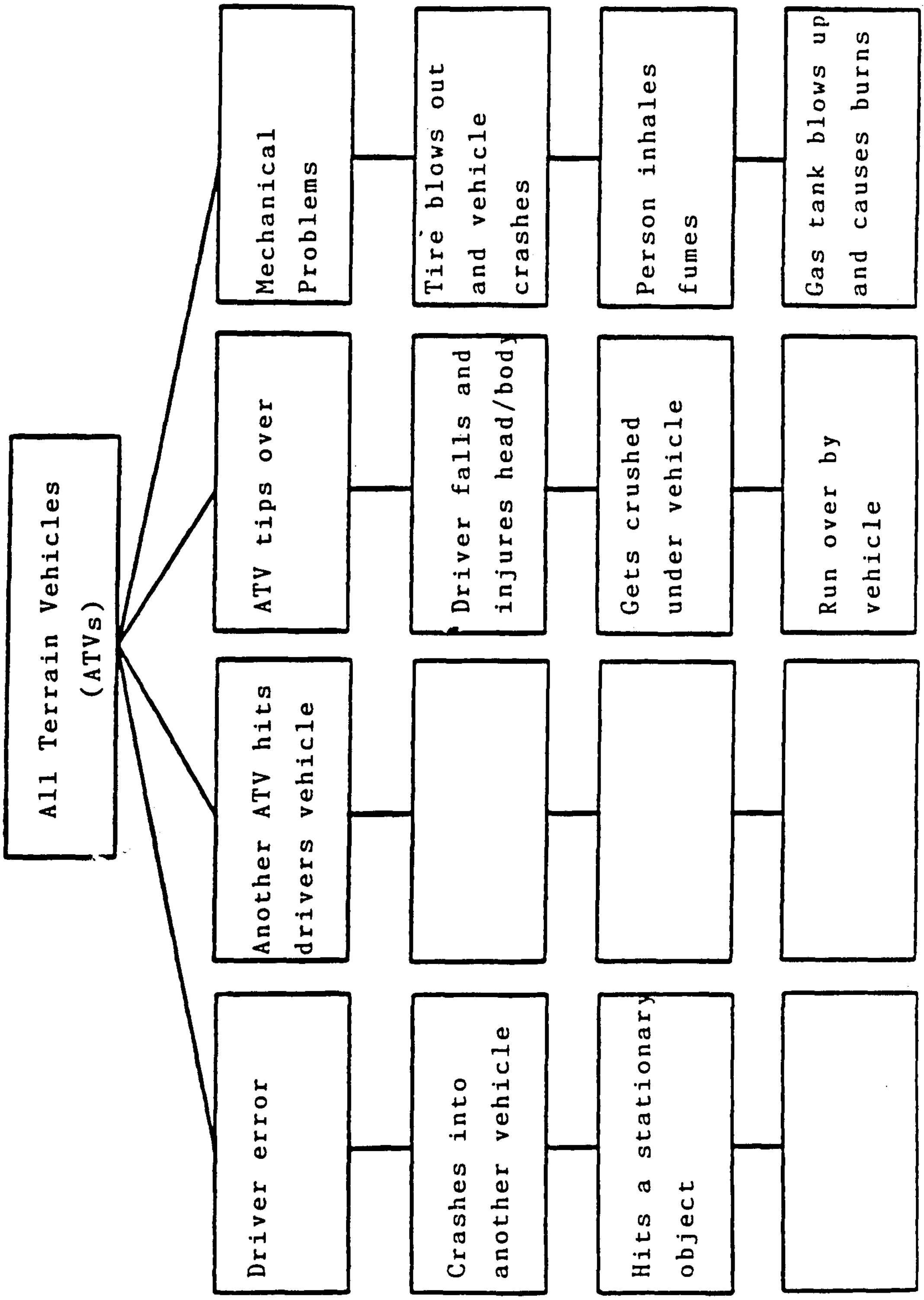

Televisions
Injury from lifting or moving
Person strains back
Drops on foot
Television blows-up
Fire starts
Person hit by flying glass
Electrical
Shock from wet hands
Shock from faulty wiring
Faulty wiring causes fire

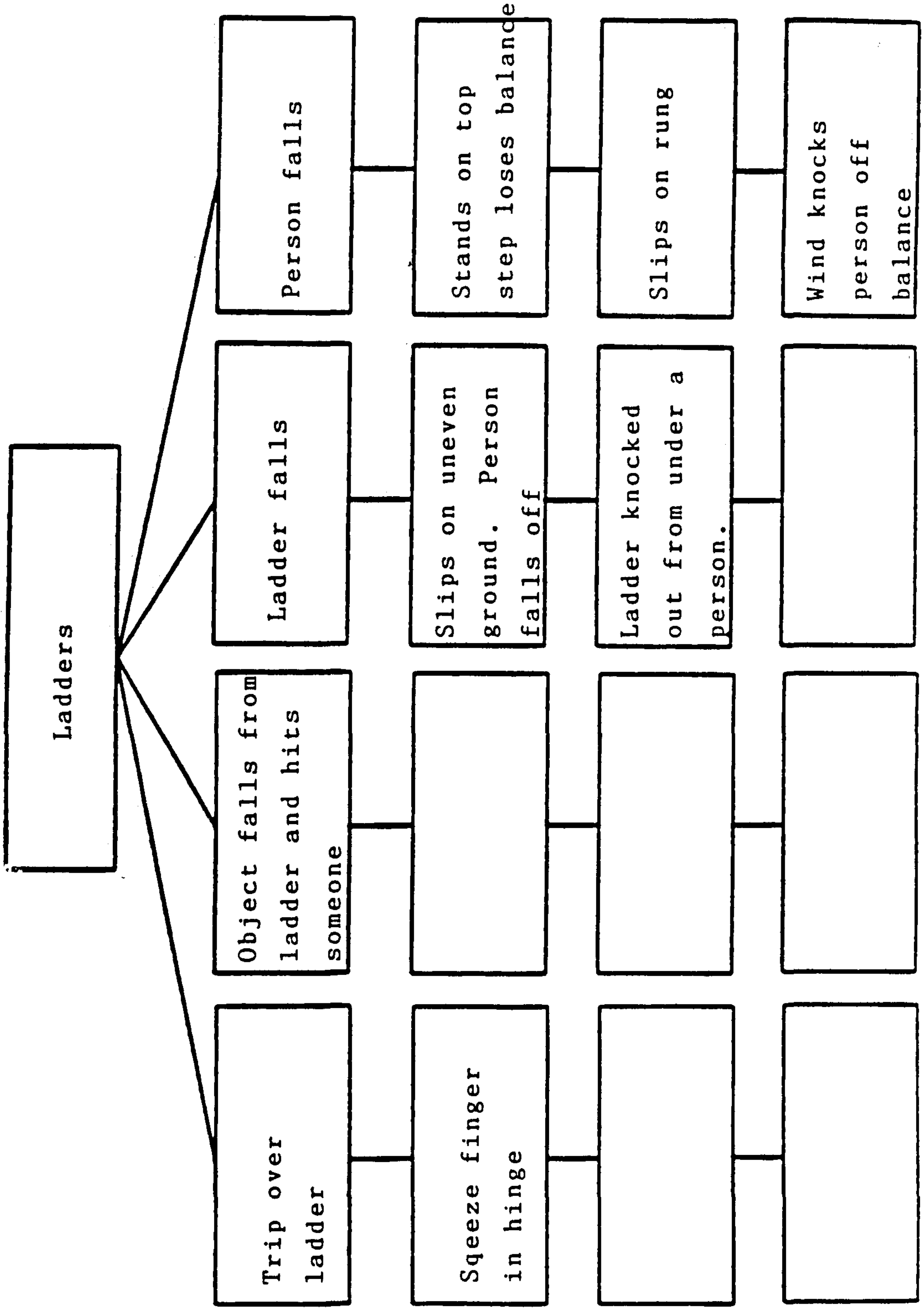

Chainsaws
Burns
Person touches hot parts
Hot gas or oil leaks onto skin
Gas explodes
Hearing loss
Accidents with trees
Tree cut with chainsaw falls on person
Wood splinters fly inot eye
Cut body part
Drop on leg or foot
Kick back causes injury
Carelessness

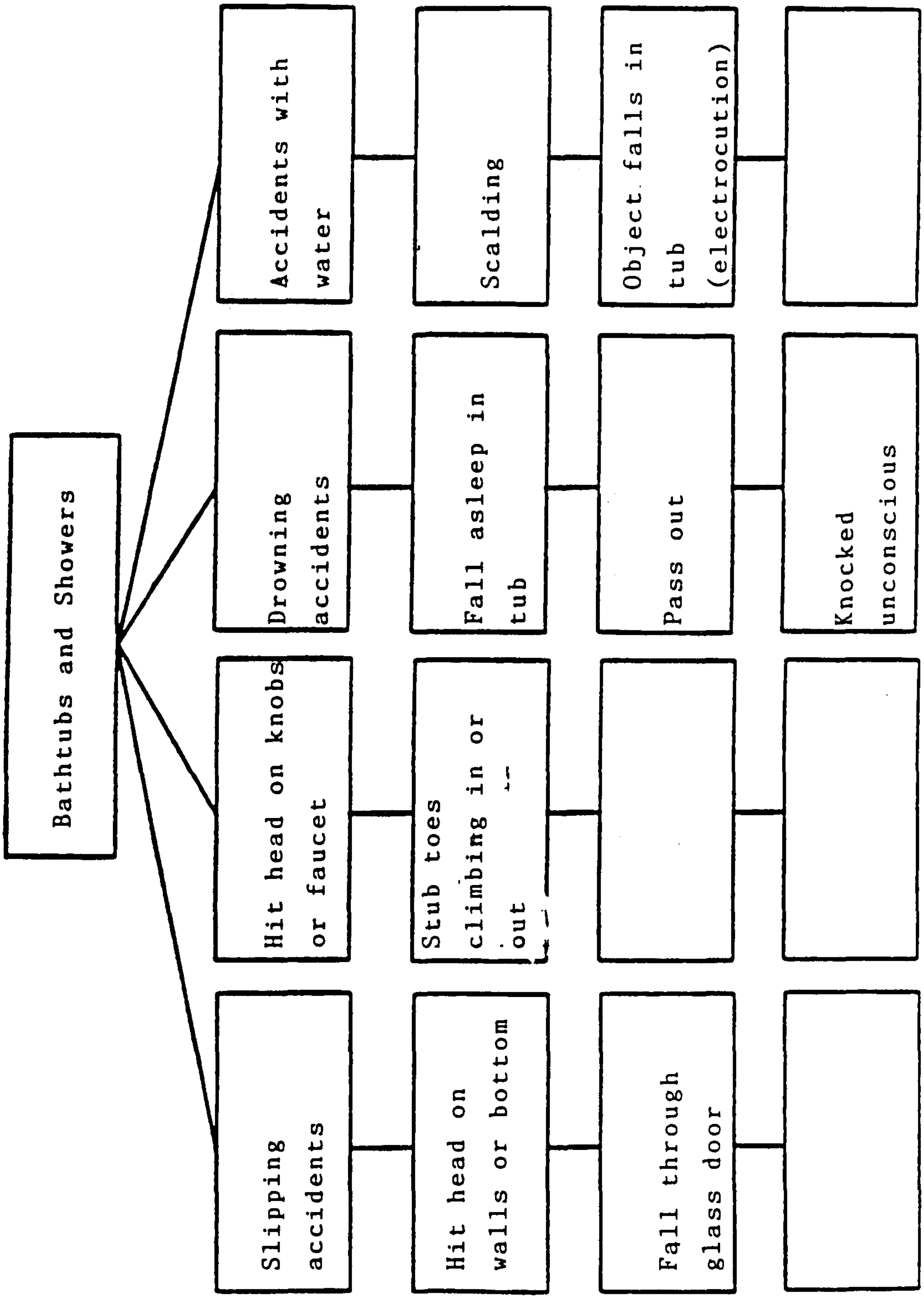

Hammers
Hammer on floor
Hammer hits body part
Debris from hammering flies into eye
Step on and bruise foot
Person drops on foot
Trip over and fall
Hits finger while hammering
Hits self on the head

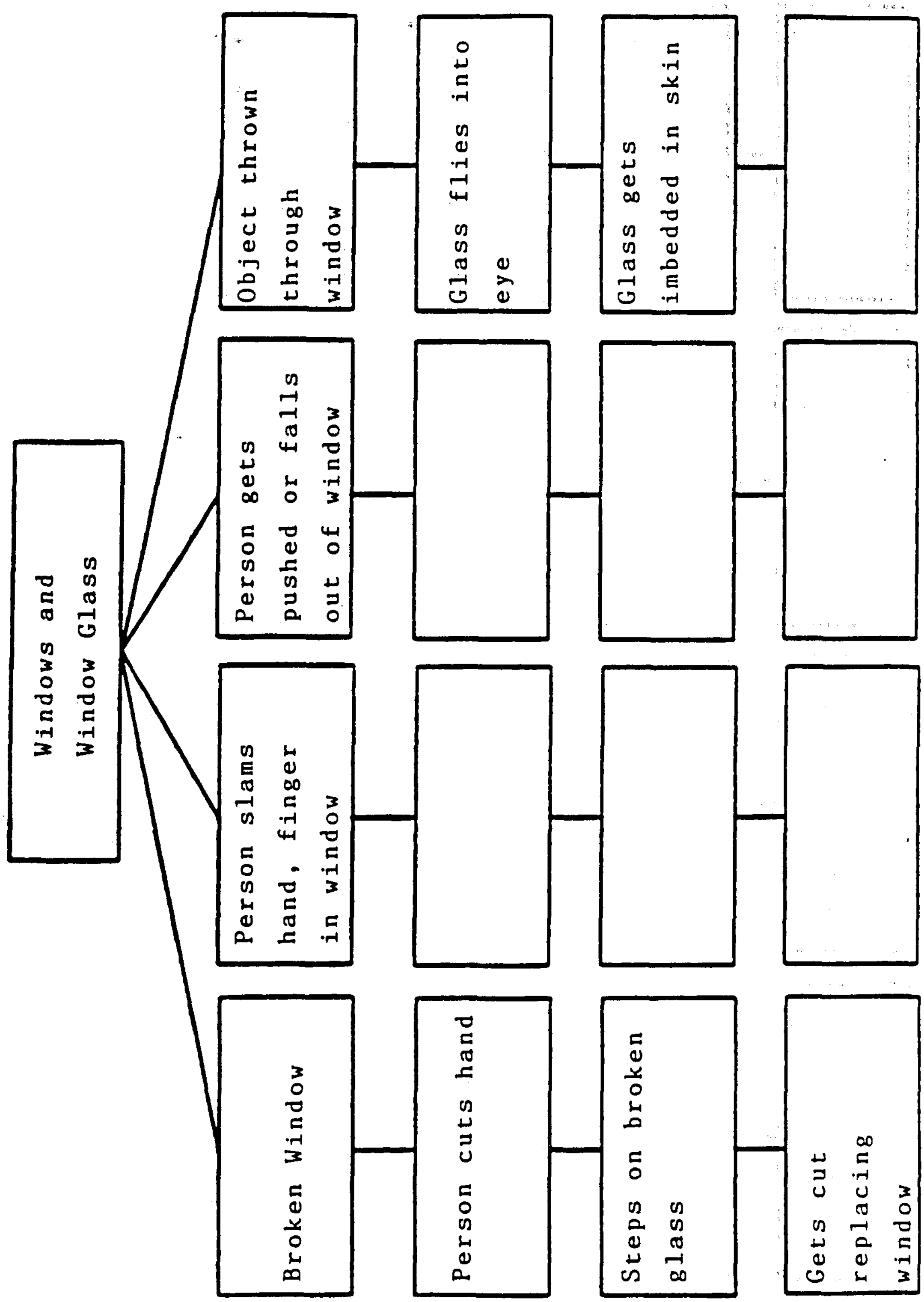

Skateboards
Mechanical problems
Wheel falls off
Lose balance and fall off
Roll over fingers
Hit head
Break a bone or receive a cut or bruise
Collide with an object or person
Hit by a vehicle

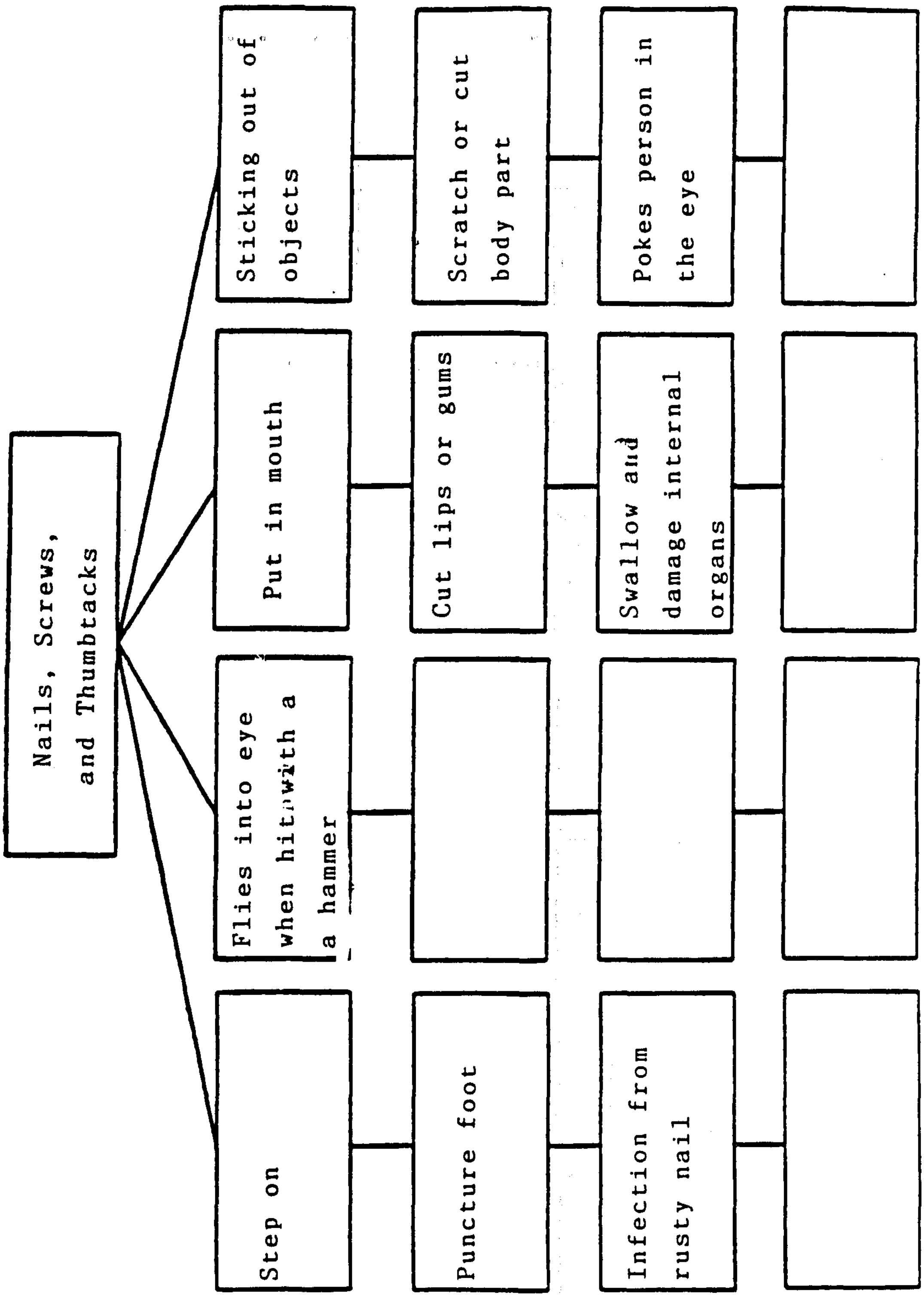

Drinking Glasses
Glass explodes from temperature change
Goes in eye
Imbeds in skin
Drinking
Hit glass against teeth and chip a tooth
Broken glass
Step on glass
Glass breaks while cleaning (cut hand)
Cracked glass
Cut lips or gums while drinking
Cut hand

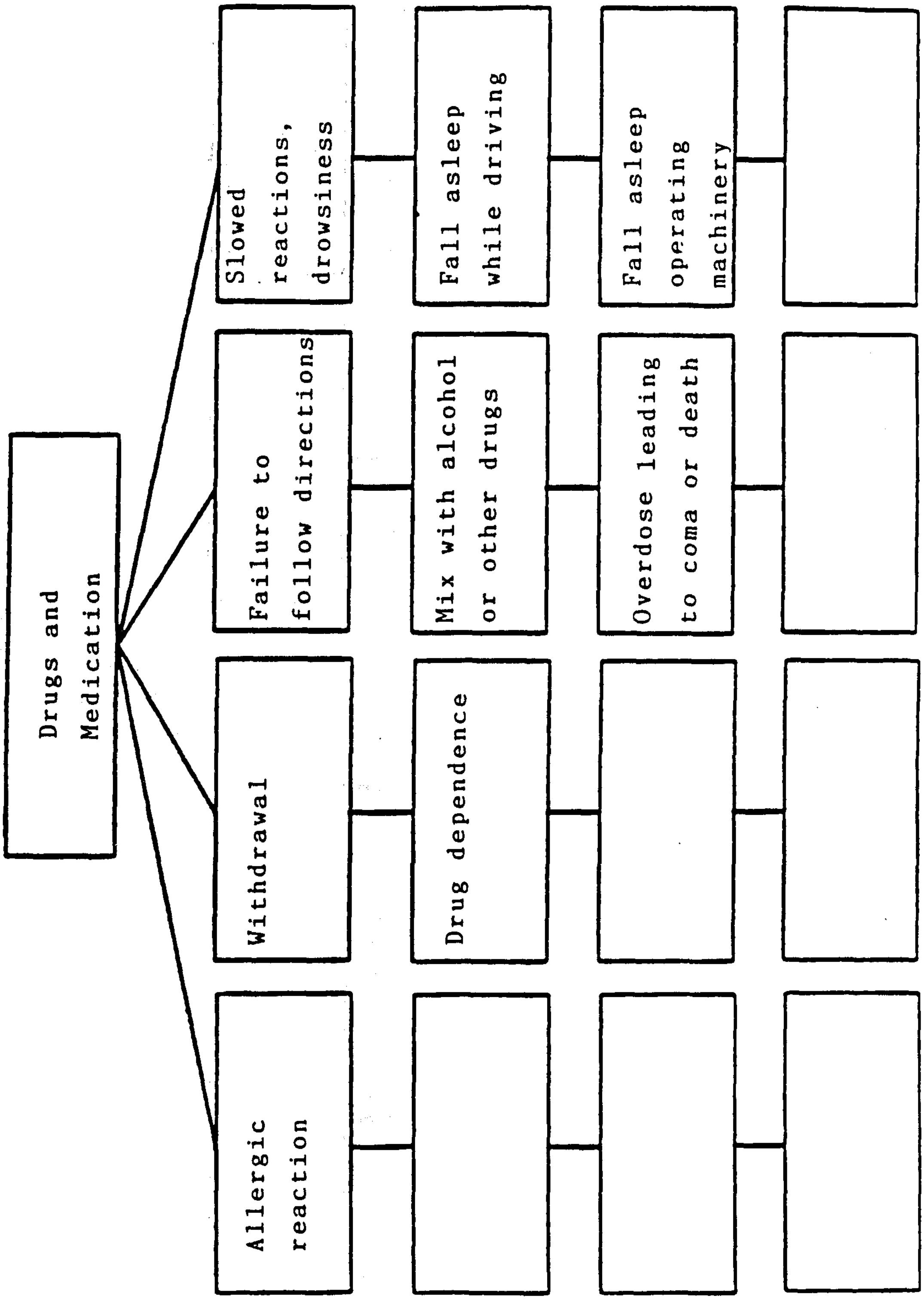

All Terrain Vehicles (ATVs)
Mechanical Problems
Tire blows out and vehicle crashes
Person inhales fumes
Gas tank blows up and causes burns
ATV tips over
Driver falls and injures head/body
Gets crushed under vehicle
Run over by vehicle
Another ATV hits drivers vehicle
Driver error
Crashes into another vehicle
Hits a stationary object

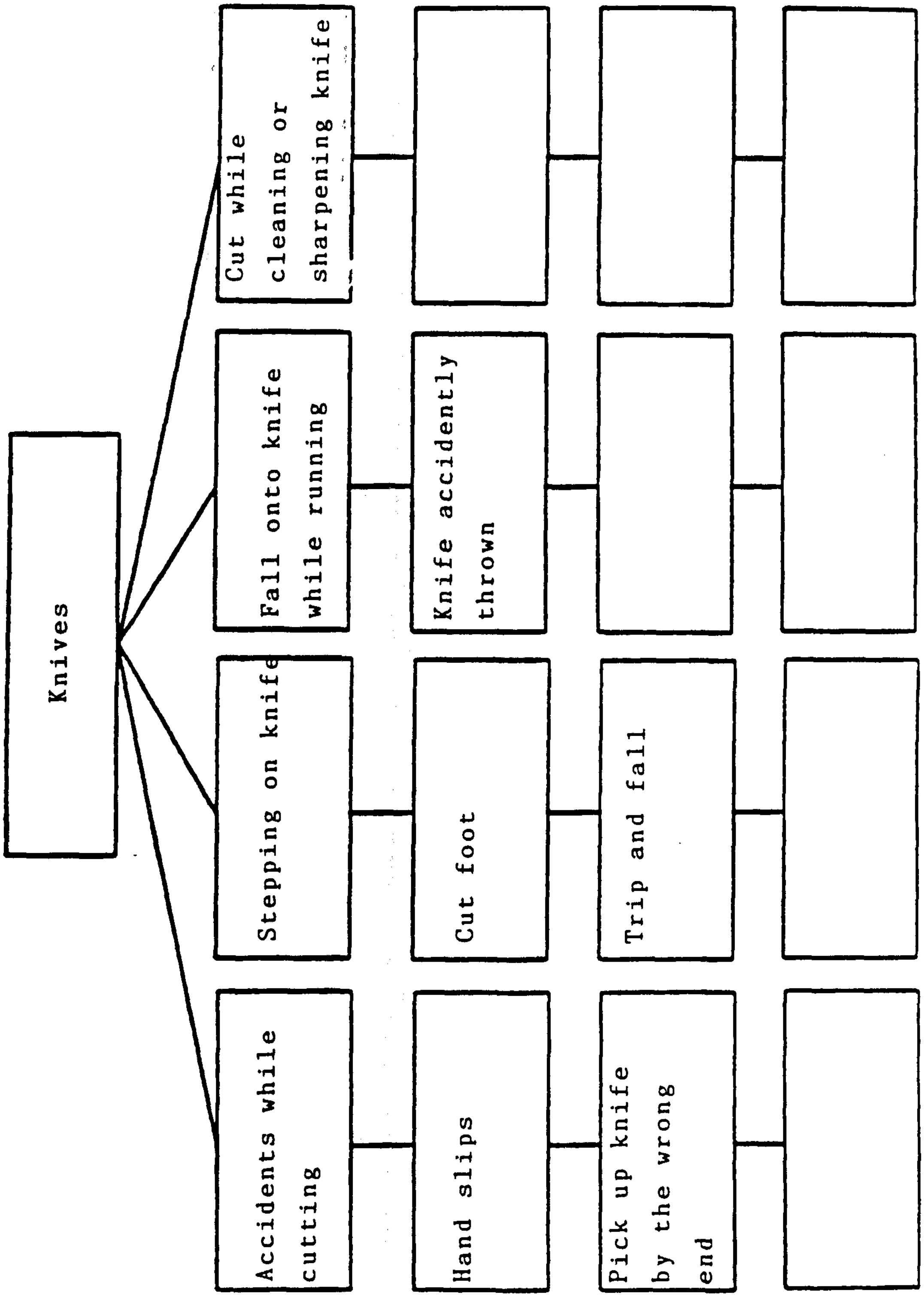

Ladders
Person falls
Stands on top step loses balance
Slips on rung
Wind knocks person off balance
Ladder falls
Slips on uneven ground. Person falls off
Ladder knocked out from under a person.
Object falls from ladder and hits someone
Trip over ladder
Sqeeze finger in hinge

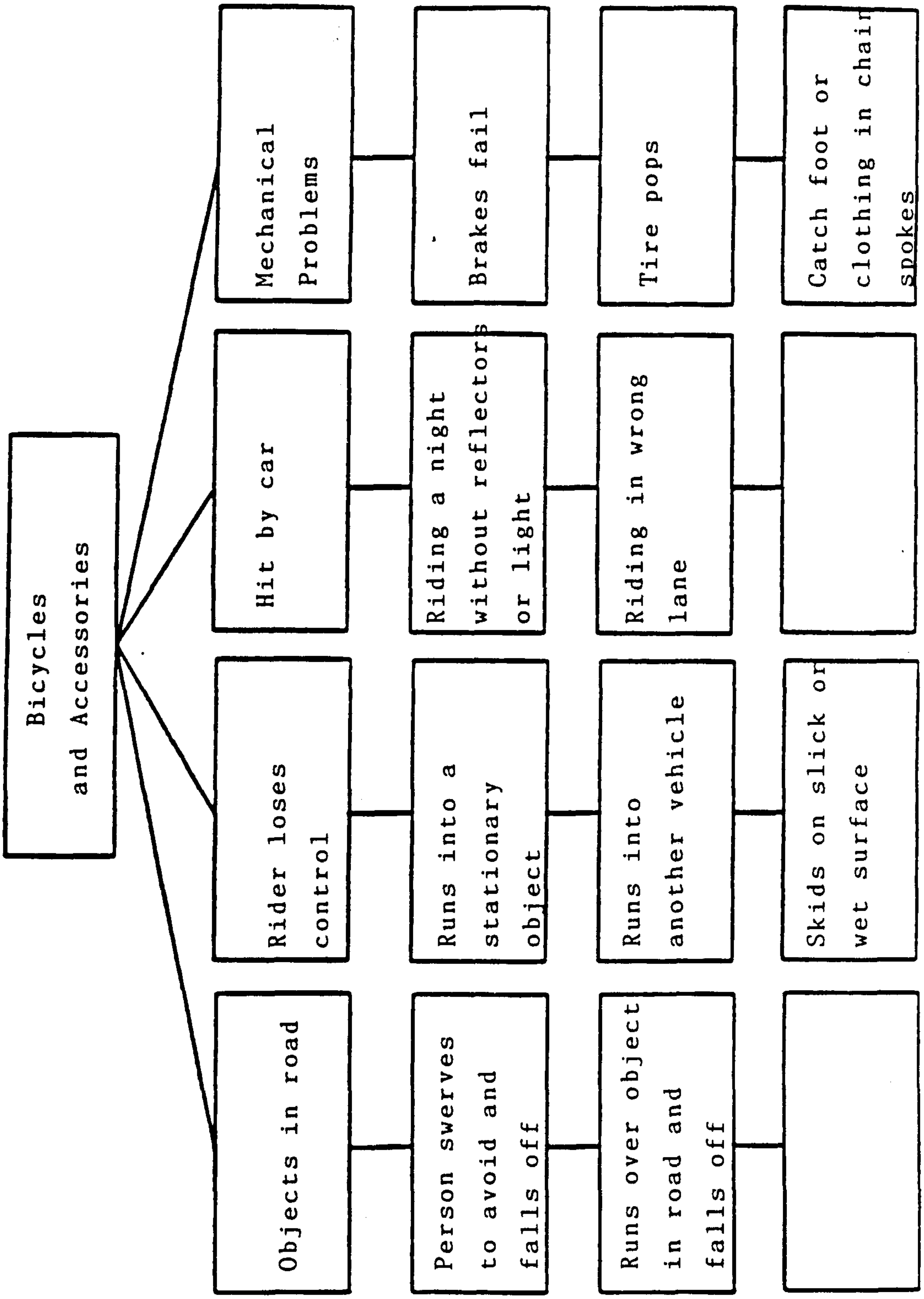

Bathtubs and Showers
Slipping accidents
Hit head on walls or bottom
Fall through glass door
Hit head on knobs or faucet
Stub toes climbing in or out
Drowning accidents
Fall asleep in tub
Pass out
Knocked unconscious
Accidents with water
Scalding
Object falls in tub (electrocution)


Windows and Window Glass
Broken Window
Person cuts hand
Steps on broken glass
Gets cut replacing window
Person slams hand, finger in window
Person gets pushed or falls out of window
Object thrown through window
Glass flies into eye
Glass gets imbedded in skin


Nails, Screws, and Thumbtacks
Sticking out of objects
Scratch or cut body part
Pokes person in the eye
Put in mouth
Cut lips or gums
Swallow and damage internal organs
Flies into eye when hit with a hammer
Step on
Puncture foot
Infection from rusty nail


Drugs and Medication
Slowed reactions, drowsiness
Fall asleep while driving
Fall asleep operating machinery
Failure to follow directions
Mix with alcohol or other drugs
Overdose leading to coma or death
Withdrawal
Drug dependence
Allergic reaction


Knives
Accidents while cutting
Hand slips
Pick up knife by the wrong end
Stepping on knife
Cut foot
Trip and fall
Fall onto knife while running
Knife accidently thrown
Cut while cleaning or sharpening knife


Bicycles and Accessories
Mechanical Problems
Brakes fail
Tire pops
Catch foot or clothing in chain spokes
Hit by car
Riding a night without reflectors or light
Riding in wrong lane
Rider loses control
Runs into a stationary object
Runs into another vehicle
Skids on slick or wet surface
Objects in road
Person swerves to avoid and falls off
Runs over object in road and falls off

Appendix B

Materials and Instructions

CONSENT FORM

We are conducting research in the area of consumer products. You will be asked to evaluate and answer questions regarding 18 common consumer products. There is no risk involved, however you are free to withdraw without penalty.

The results of your participation will remain confidential. Your individual performance will not be compared to that of other subjects. Your anonymity is guaranteed.

Participant's consent

I have read the above statement and understand the conditions under which I agree to participate.

Signed

____

print name below

____

course number ________________

INSTRUCTIONS TO BE READ TO HURRIED GROUP SUBJECTS

We are interested in how well people can estimate the frequency of injuries that are associated with commonly used consumer products.

You will be asked to estimate how often these products were associated with emergency room cases during 1986 in the United States. Suicide attempts and cases involving assault are not included.

After the experiment you may examine the actual data if you wish.

I will read to you one product category at a time. I would like you to give me a frequency estimate as fast as you can. Your estimate should be made within 2 seconds after you hear the product category. I will go on to the next category about 2 seconds after each estimate that you give me. It is extremely important that you give me your estimate as quickly as possible.

I can tell you that during 1986, approximately 88,000 emergency room cases were associated with "Swimming pools and accessories." I have given you a paper to remind you of this frequency.

Please remember that these estimates should be done at a very fast pace. If you have any questions during the task please wait until we have gone through the whole list before asking the question because we do not want to interfere with the pace.

Are there any questions before we start?

INSTRUCTIONS TO BE READ TO UNHURRIED GROUP SUBJECTS

We are interested in how well people can estimate the frequency of injuries that are associated with commonly used consumer products.

You will be asked to estimate how often these products were associated with emergency room cases during 1986 in the United States. Suicide attempts and cases involving assault are not included.

After the experiment you may examine the actual data if you wish.

I will read to you one product category at a time. I would like you to give me a frequency estimate, taking as much time as you need to make the estimate. I will go on to the next category about 2 seconds after each estimate that you give me. You do not need to hurry your estimates.

I can tell you that during 1986, approximately 88,000 emergency room cases were associated with "Swimming pools and accessories." I have given you a paper to remind you of this frequency.

If you have any questions during the task please wait until we have gone through the whole list before asking your questions.

Are there any questions before we start?

INSTRUCTIONS TO BE READ TO GENERATE GROUP SUBJECTS

One way of evaluating the ways that accidents and injuries can occur is through the use of a fault tree. A fault tree is a method of organizing alternatives to a problem.

I have given you an example of a fault tree for emergency room accidents associated with "Swimming pools and accessories". The diagram lists some of the ways that swimming accidents can occur . The top row lists general types of accidents, and the bottom rows list more specific accident scenarios.

You will be asked to make fault trees for each product category. You do not have to fill in the entire fault tree for each product, but try to think of as many accident scenarios as you can. Try to use the top row for more general examples and the bottom rows for more specific scenarios.

You may take as much time as you like to fill out the fault trees.

After fault tree completion

We are interested in how well people can estimate the frequency of injuries that are associated with commonly used consumer products.

You will be asked to estimate how often these products were associated with emergency room cases during 1986 in the United States. Suicide attempts and cases involving assault are not included.

After the experiment you may examine the actual data if you wish.

I will read to you one product category at a time. I would like you to give me a frequency estimate taking as much time as you need to make the estimate. You may use the fault trees you have been given to make your estimates. I will go onto to the next category about 2 seconds after each estimate that you give me.

I can tell you that during 1986, approximately 88,000 emergency room cases were associated with "Swimming pools and accessories." I have given you a paper to remind you of this frequency.

If you have any questions during the task please wait until we have gone through the whole list before asking your questions.

Are there any questions before we start?

INSTRUCTIONS TO BE READ TO PROVIDED GROUP SUBJECTS

One way of evaluating the ways that accidents and injuries can occur is through the use of a fault tree. A fault tree is a method of organizing alternatives to a problem.

You have been given fault trees for 18 common consumer products. The top row of each fault tree lists general types of accidents, and the bottom rows list more specific accident scenarios.

You will be asked to familiarize yourself with the information in these fault trees. You make take as much time as you like to read over the fault trees.

After fault tree completion

We are interested in how well people can estimate the frequency of injuries that are associated with commonly used consumer products.

You will be asked to estimate how often these products were associated with emergency room cases during 1986 in the United States. Suicide attempts and cases involving assault are not included.

After the experiment you may examine the actual data if you wish.

I will read to you one product category at a time. I would like you to give me a frequency estimate, taking as much time as you need to make the estimate. You may use the fault trees you have been given to make your estimates. I will go on to the next category about 2 seconds after each estimate that you give me.

I can tell you that during 1986, approximately 88,000 emergency room cases were associated with "Swimming pools and accessories." I have given you a paper to remind you of this frequency.

If you have any questions during the task please wait until we have gone through the whole list before asking your questions.

Are there any questions before we start?

PRECAUTIONARY INTENT

I am going to read you a list of products. Using the scale below, please rate the amount of precaution you would be willing to take when using each product.

|-------|-------|-------|-------|-------|-------|-------|-------|

1	2	3	4	5	6	7	8	9
no precaution at all		little precaution			moderate precaution			extreme precaution

Labels are provided for some of the ratings, however you may use any whole number between 1 and 9 in making your rating.

CONFIDENCE RATINGS

Please rate how well you think that you have done overall in estimating injury frequencies. You should make a rating on a scale from 1 to 9 according to the following scale.

|-------|-------|-------|-------|-------|-------|-------|-------|

1	2	3	4	5	6	7	8	9
No relationship between estimated and actual frequencies.			Moderate relationship between estimated and actual frequencies.				Perfect relationship between estimated and actual frequencies.	

Labels are provided for some of the ratings, however you may use any whole number between 1 and 9 in making your rating.

INJURY EXPERIENCE

I am going to read a list of products to you. Please answer either yes or no to the following question for each product.

Have you or someone you know ever received an injury related to this product that required medical attention?

SUBJECT DATA SHEET

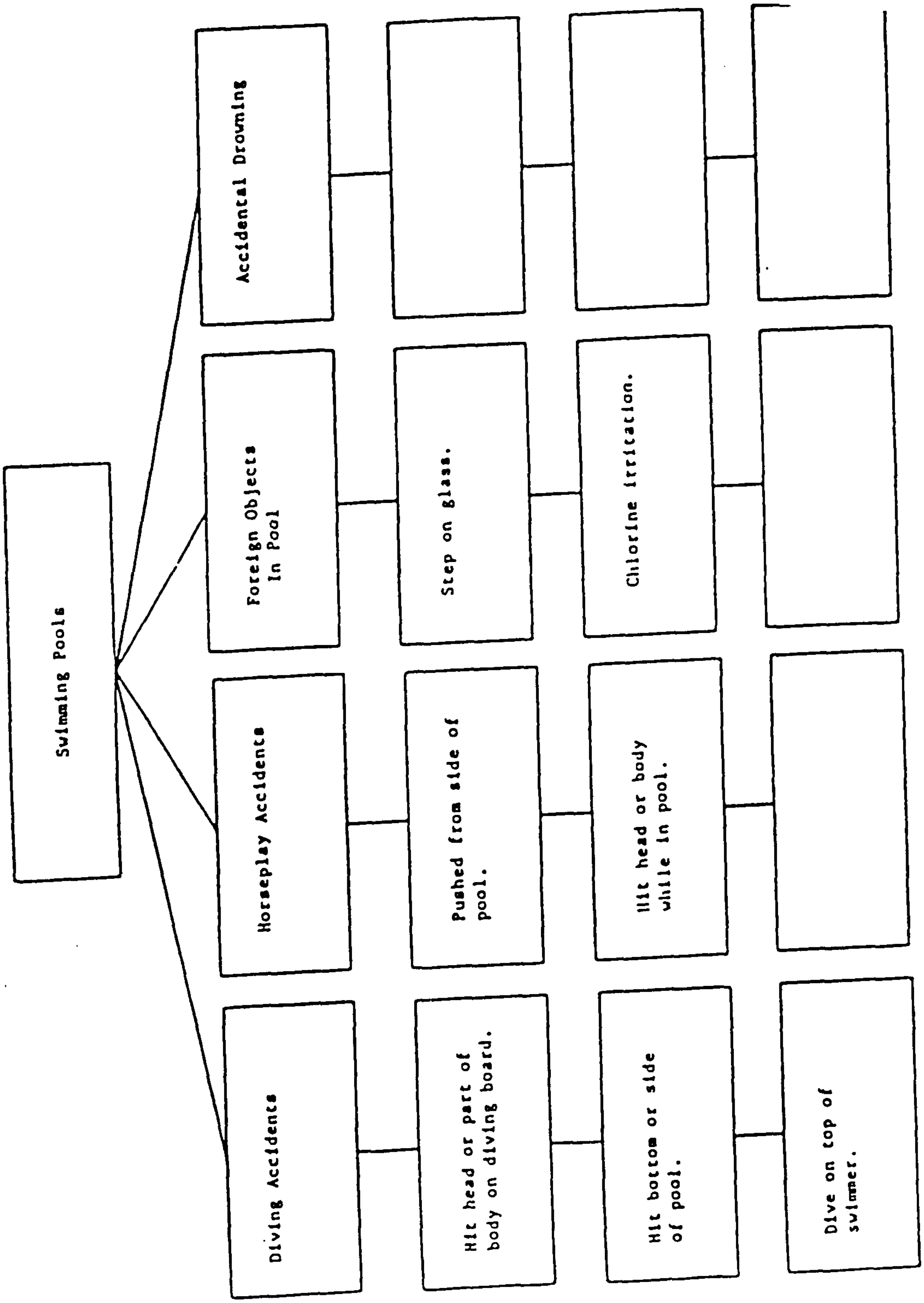
Subject Number____________________

Product Name	Estimate	Precaution	Confidence	Injury

Example of Actual Frequency

Swimming Pools and Accessories	88,000

Example of Fault Tree



Debrief

To the subjects:

Your participation in this study has been extremely helpful to applied cognitive psychologists investigating product safety and ways in which products are perceived by the consumer.

If you are interested in the outcome of this study, or would like more information related to this line of research, you may contact at the University of Richmond Psychology department, Dr. Michael S. Wogalter (phone 289-8125) or Elaine Martin (phone 358-8572). Thank you for your participation.

It would be greatly appreciated if you would not discuss with anyone the purpose or procedure of this study as it might affect the results on subsequent testings. Thanks.

INSTRUCTIONS TO THE PARTICIPANTS

You should have a list of 18 products. Before you begin to write anything, please read through the entire list of products so that you are familiar with the variety and range of products listed.

You will be rating the products along 7 dimensions with scales ranging from 0 to 8. Note that the scales show only a few verbal labels. These verbal labels are presented to help you base your ratings. You may use any whole number between 0 and 8 when making your ratings.

You should work on the questions in the order shown on the attached yellow sheet. For example, suppose your sheet has the order:

"4, 6, 3, 5, 7,1, 2"

You should start on Question 4 and then after you have rated all of the products on Question 4, you should then begin to work on Question 6, and then Question 3, and so on. Place your answer in the appropriate space next to each product. ***Note that even though you might work on Question 4 first you should not put your answers in the first column -- you should put your answers to this question in the fourth column.***

Although it is not necessary to spend a long period of time answering each question, it is important that you carefully consider each product in relation to other products before deciding on your answers.

Please ask the experimenter if you have any questions.

1. How <u>frequently</u> do you use this product?

0	1	2	3	4	5	6	7	8
never		infrequent		frequent		very frequent		extremely frequent

2. How <u>knowledgeable</u> are you <u>about the hazards</u> related to this product?

0	1	2	3	4	5	6	7	8
not at all knowledgeable		slightly knowledgeable		knowledgeable		very knowledgeable		extremely knowledgeable

3. How <u>severely</u> might you be <u>injured</u> with this product?

0	1	2	3	4	5	6	7	8
not at all		slight injury		severe injury		extremely severe injury		death

4. How <u>likely</u> (<u>probable</u>) are you <u>to read a warning</u> for this product?

0	1	2	3	4	5	6	7	8
not at all		not likely		likely		very likely		extremely likely

5. How <u>technologically complex</u> do you consider this product?

0	1	2	3	4	5	6	7	8
not at all complex		slightly complex		complex		very complex		extremely complex

6. How <u>likely</u> (<u>probable</u>) would it be that you would be <u>severely injured</u> (<u>requiring emergency room care or resulting in permanent injury</u>) by this product <u>in the next year</u>?

0	1	2	3	4	5	6	7	8
not at all		unlikely		somewhat likely		likely		extremely likely

7. How <u>likely</u> (<u>probable</u>) would it be that you would receive <u>any sort of minor injury</u> by this product <u>in the next year</u>?

0	1	2	3	4	5	6	7	8
not at all		unlikely		somewhat		likely		extremely

NAME: ______________________ Sex. _________
Form A

Product Names	Q-1	Q-2	Q-3	Q-4	Q-5	Q-6	Q-7
1. Ladders	___	___	___	___	___	___	___
2. Bicycles and Accessories	___	___	___	___	___	___	___
3. Fireworks	___	___	___	___	___	___	___
4. Chainsaws	___	___	___	___	___	___	___
5. Drugs and Medication	___	___	___	___	___	___	___
6. Bleach	___	___	___	___	___	___	___
7. All Terrain Vehicles (ATVs)	___	___	___	___	___	___	___
8. Bathtubs and Showers	___	___	___	___	___	___	___
9. Skateboards	___	___	___	___	___	___	___
10. Fans	___	___	___	___	___	___	___
11. Nails, Screws, Thumbtacks	___	___	___	___	___	___	___
12. Vacuum Cleaners	___	___	___	___	___	___	___
13. Gasoline	___	___	___	___	___	___	___
14. Windows, Window Glass	___	___	___	___	___	___	___
15. Drinking Glasses	___	___	___	___	___	___	___
16. Knives	___	___	___	___	___	___	___
17. Televisons	___	___	___	___	___	___	___
18. Hammers	___	___	___	___	___	___	___

NAME. ______________ Sex. ________

Form B

Product Names	Q-1	Q-2	Q-3	Q-4	Q-5	Q-6	Q-7
1. Vacuum Cleaners	___	___	___	___	___	___	___
2. All Terrain Vehicles (ATVs)	___	___	___	___	___	___	___
3. Gasoline	___	___	___	___	___	___	___
4. Knives	___	___	___	___	___	___	___
5. Hammers	___	___	___	___	___	___	___
6. Televisions	___	___	___	___	___	___	___
7. Drinking Glasses	___	___	___	___	___	___	___
8. Fans	___	___	___	___	___	___	___
9. Bicycles and Accessories	___	___	___	___	___	___	___
10. Fireworks	___	___	___	___	___	___	___
11. Skateboards	___	___	___	___	___	___	___
12. Ladders	___	___	___	___	___	___	___
13. Windows, Window Glass	___	___	___	___	___	___	___
14. Chainsaws	___	___	___	___	___	___	___
15. Drugs and Medication	___	___	___	___	___	___	___
16. Bathtubs and Showers	___	___	___	___	___	___	___
17. Bleach	___	___	___	___	___	___	___
18. Nails, Screws, Thumbtacks	___	___	___	___	___	___	___

Debrief

To the subjects:

Your participation in this study has been extremely [illegible] cognitive psychologists investigating product safety and [illegible] products are perceived and used by consumers.

If you are interested in the outcome of this study, or would [illegible] information related to this line of research, you may contact [illegible] sity of Richmond Psychology department, Dr. Michael S. Woga[illegible] 289-8125) or Elaine Martin (phone 358-8572). Thank you [illegible] participation.

It would be greatly appreciated if you [illegible] discuss with anyone the purpose or [illegible] study as it might affect the results on [illegible] testings. Thanks.

Appendix c

Data and Analyses for Response Times

Hurried Group Response Times For Estimates

	sub1	sub2	sub3	sub4	sub5	sub6	sub7	sub8	sub9	sub10	sub11	sub12	sub13	sub14	sub15	sub16
1	1.000	4.500	1.700	5.600	2.100	1.900	1.100	3.900	1.800	1.900	2.000	1.600	1.500	1.000	1.100	2.100
2	1.200	3.100	.900	4.300	1.700	1.700	.900	3.800	2.300	1.600	4.200	1.900	2.100	.800	2.200	2.600
3	.900	2.400	1.100	3.300	.900	2.100	.600	4.000	2.900	1.000	3.200	2.100	2.100	1.800	3.000	2.000
4	1.300	2.600	1.300	3.700	.800	1.800	.800	1.900	1.800	2.500	2.900	3.000	2.500	.800	.900	2.900
5	1.000	1.600	1.900	2.500	1.300	.900	.700	2.300	1.900	2.400	1.000	2.800	1.700	.900	.800	2.100
6	1.200	2.200	1.100	3.000	1.100	2.000	.600	2.600	2.800	3.800	2.900	3.700	2.100	1.000	1.100	1.100
7	.900	2.000	.800	2.200	.900	2.200	1.000	3.900	2.000	2.000	2.900	2.500	3.000	2.000	2.900	1.000
8	2.000	1.900	.900	2.600	2.000	2.100	1.100	3.500	2.000	3.900	1.800	2.000	1.100	1.100	2.200	.900
9	1.800	2.700	1.000	2.100	1.700	2.000	1.000	5.000	3.200	2.100	4.000	2.100	.900	.900	1.900	1.900
10	.900	1.600	1.000	2.600	1.100	1.900	1.100	3.100	1.100	3.600	2.200	2.200	.900	2.400	2.000	2.900
11	1.100	2.200	.900	2.800	.800	2.000	.800	2.900	1.800	2.900	1.700	1.800	1.100	.700	1.000	3.000
12	1.000	2.000	1.300	3.000	2.100	3.100	.900	6.200	2.000	2.000	2.500	3.000	1.300	1.200	2.300	1.100
13	1.700	2.300	1.100	1.500	1.500	3.000	.800	5.100	1.100	3.200	2.700	1.500	2.200	1.000	2.100	1.700
14	1.700	1.700	.800	1.900	1.100	2.500	1.000	3.200	1.700	1.500	2.800	3.000	3.400	.800	.900	2.200
15	.800	1.500	2.000	1.600	1.600	1.900	.800	4.300	3.100	2.100	1.500	2.800	2.000	1.300	2.000	1.300
16	1.000	2.100	1.500	1.900	1.100	1.900	.900	4.600	2.800	3.000	2.300	2.100	1.800	1.300	1.000	3.000
17	1.000	1.900	.900	1.700	.900	1.600	.700	3.200	1.000	2.200	2.600	3.100	2.200	.900	.900	2.100
18	1.500	2.000	1.200	2.000	1.500	2.200	1.500	2.400	1.100	3.100	1.800	1.900	1.900	1.000	1.500	1.800

Unhurried Group Response Times For Estimates

	sub1	sub2	sub3	sub4	sub5	sub6	sub7	sub8	sub9	sub10	sub11	sub12	sub13	sub14	sub15	sub16
1	12.100	7.800	2.100	14.400	5.500	6.100	4.300	4.200	3.200	7.000	3.200	5.200	3.000	2.300	10.100	3.600
2	4.600	6.100	2.300	12.600	2.100	3.100	2.100	2.100	3.400	9.600	3.000	3.100	2.200	1.500	3.500	2.100
3	3.700	6.000	1.500	3.500	4.000	2.900	1.500	3.600	2.900	4.900	2.800	3.000	4.000	1.700	7.300	3.700
4	5.000	5.800	2.600	3.100	5.000	4.200	2.300	3.100	3.800	12.900	4.100	4.300	3.100	2.300	5.000	3.000
5	5.900	6.800	2.400	3.500	3.400	2.600	1.000	6.200	5.500	3.100	2.200	3.000	2.900	1.900	11.000	2.200
6	4.100	3.200	2.000	4.100	3.000	2.800	2.200	3.100	2.700	4.000	2.000	4.800	2.800	3.600	5.900	2.100
7	3.600	2.200	1.900	5.600	2.800	4.700	2.800	3.700	3.900	2.600	7.700	2.900	3.000	2.900	11.900	2.800
8	4.900	3.700	3.500	3.000	4.100	3.000	3.000	2.900	3.000	1.100	4.500	2.000	3.100	1.800	9.200	1.900
9	3.000	4.100	3.000	6.700	3.000	1.900	2.200	3.300	3.500	2.900	3.500	6.600	2.800	3.000	8.100	2.600
10	6.200	2.600	2.200	4.500	2.800	2.300	1.300	2.800	2.900	2.100	2.100	2.100	2.000	2.100	8.000	1.900
11	6.100	2.300	1.900	4.000	4.000	4.100	1.200	3.400	3.100	2.300	4.600	2.500	1.900	2.300	7.400	2.000
12	3.200	2.400	2.300	2.500	5.100	6.200	2.900	2.700	2.800	1.800	3.000	3.200	2.100	1.900	14.800	1.100
13	2.900	3.300	2.500	7.000	2.200	2.100	3.000	2.800	5.100	2.700	5.500	4.500	1.600	2.100	9.900	1.900
14	4.500	2.000	2.600	3.200	1.900	4.000	1.800	2.800	3.000	3.000	2.100	4.400	2.700	2.200	15.000	2.000
15	3.300	3.100	2.500	3.600	5.300	2.300	1.100	1.600	2.700	1.000	3.700	3.000	2.300	1.800	3.100	1.500
16	8.600	3.200	2.100	4.100	3.900	1.900	2.900	2.800	6.000	1.700	4.800	8.000	1.800	1.000	9.000	2.100
17	5.000	2.500	3.100	5.200	2.900	3.200	1.800	1.900	4.800	2.200	2.000	5.700	2.000	2.000	15.800	2.000
18	6.000	3.500	3.200	4.500	1.000	5.700	2.800	2.600	2.300	1.900	5.300	6.100	2.600	1.600	5.800	2.000

Response Times Unhurred vs Hurried and 3 Product Groups

Anova table for a 2-factor repeated measures Anova.

Source:	df:	Sum of Squares:	Mean Square:	F-test:	P value:
Group (A)	1	77.37	77.37	15.367	.0005
subjects w. groups	30	151.041	5.035		
Repeated Measure (B)	2	2.575	1.287	2.057	.1367
AB	2	1.651	.826	1.319	.275
B x subjects w. groups	60	37.544	.626		

There were no missing cells found.

The AB Incidence table

	Repeated Mea...	RT Mean ...	RT Mean ...	RT Mean ...	Totals:
Group	level 1	16 2.01	16 1.986	16 1.884	48 1.96
Group	level 2	16 4.168	16 3.53	16 3.57	48 3.756
Totals:		32 3.089	32 2.758	32 2.727	96 2.858

Log Response Times Unhurred vs Hurried and 3 Product Groups

Anova table for a 2-factor repeated measures Anova.

Source:	df:	Sum of Squares:	Mean Square:	F-test:	P value:
Group (A)	1	1.725	1.725	22.744	.0001
subjects w. groups	30	2.275	.076		
Repeated Measure (B)	2	.034	.017	2.157	.1246
AB	2	.022	.011	1.366	.2629
B x subjects w. groups	60	.474	.008		

There were no missing cells found.

The AB Incidence table

	Repeated Mea...	Log RT M...	Log RT M...	Log RT M...	Totals:
Group	level 1	16 .247	16 .248	16 .232	48 .242
	level 2	16 .557	16 .492	16 .483	48 .51
	Totals:	32 .402	32 .37	32 .357	96 .376

Appendix D

Group Estimates and Correlations

~~Accident Frequency~~ Estimations - All Groups

	Subject ID	Group	Sex	Vacuum	Fireworks	Bleach	Fans	Gasoline	TVs	Chainsaw
1	1	1	1	1000	85000	28000	20000	85000	50000	5000
2	2	1	2	40000	100000	50000	75000	90000	50000	50000
3	3	1	2	50000	50000	100000	60000	100000	00000	40000
4	4	1	1	5000	100000	10000	20000	20000	5000	20000
5	5	1	1	10000	50000	15000	5000	9000	20000	10000
6	6	1	1	60000	80000	60000	70000	50000	50000	110000
7	7	1	1	1000	5000	5000	500	1000	500	200
8	8	1	2	7000	60000	1500	1000	40000	2000	60000
9	9	1	1	20	20000	50000	50000	70000	10	10000
10	10	1	1	30000	250000	75000	50000	80000	68000	40000
11	11	1	2	500	5000	3000	10000	5000	2000	10000
12	12	1	2	10000	50000	30000	60000	20000	6000	75000
13	13	1	2	75000	100000	50000	50000	100000	25000	150000
14	14	1	1	200	5000	5000	2000	50000	500	20000
15	15	1	2	12000	60000	30000	30000	30000	8000	50000
16	16	1	1	10000	100000	90000	40000	40000	50000	70000
17	17	2	2	400	35000	700	300	8000	20000	60000
18	18	2	1	1000	100000	350000	400000	1000000	40000	100000
19	19	2	2	20000	200000	20000	50000	90000	50000	200000
20	20	2	1	1000	40000	5000	2000	10000	5000	15000
21	21	2	1	200	7000	800	400	1000	10000	600
22	22	2	2	1000	20000	2000	15000	15000	1000	12000
23	23	2	2	25000	50000	100000	50000	90000	30000	45000
24	24	2	2	50000	75000	60000	85000	85000	65000	95000
25	25	2	1	5000	20000	80000	5000	100000	10000	90000
26	26	2	2	8000	80000	6000	16000	36000	10000	35000
27	27	2	1	20000	110000	30000	5000	100000	20000	75000
28	28	2	1	2000	60000	3000	15000	45000	2000	60000
29	29	2	2	25000	150000	100000	25000	75000	20000	40000
30	30	2	1	15000	80000	40000	70000	70000	15000	40000
31	31	2	1	40000	125000	30000	00000	90000	40000	100000
32	32	2	1	5000	35000	12000	10000	25000	5000	26000
33	33	3	1	50	200000	50000	10000	20000	100	50000
34	34	3	1	2000	2000	20000	1000	90000	40000	60000
35	35	3	2	15000	80000	40000	10000	40000	10000	60000
36	36	3	2	20000	60000	15000	5000	30000	35000	10000
37	37	3	2	50000	60000	50000	40000	70000	50000	60000
38	38	3	2	30000	25000	5000	40000	20000	30000	10000
39	39	3	1	10000	15000	40000	15000	40000	5000	10000
40	40	3	2	6000	60000	4000	12000	18000	5000	12000
41	41	3	2	10000	160000	30000	50000	95000	600	100000
42	42	3	1	200	10000	500	1000	2000	2000	10000

	Hammers	Skateboards	Drinking Glasses	ATVs	Ladders	Bathtubs	Windows	Nails
1	10000	32000	1000	7000	72000	100000	5000	2000
2	60000	50000	50000	90000	50000	75000	75000	100000
3	350000	400000	120000	300000	60000	150000	100000	300000
4	25000	90000	2000	100000	40000	90000	10000	50000
5	25000	35000	10	20000	15000	10000	8000	5000
6	45000	80000	75000	40000	65000	40000	110000	70000
7	1000	100	1000	200000	200	1000	5000	2000
8	1000	100000	1000	70000	3000	50000	50000	100
9	30000	50000	33000	100000	100	70000	40000	50000
10	200000	98000	150000	160000	100000	190000	100000	100000
11	100	10000	10000	5000	1000	1500	15000	20000
12	6000	80000	2000	20000	40000	80000	15000	25000
13	100000	75000	25000	100000	95000	100000	95000	150000
14	3000	100000	600	15000	5000	25000	1000	1500
15	5000	10000	5000	10000	10000	25000	40000	25000
16	60000	170000	15000	90000	20000	60000	15000	120000
17	55000	40000	500	90000	25000	105000	40000	50000
18	100000	800000	100000	200000	250000	50000	100000	10000
19	200000	200000	, 40000	80000	100000	100000	100000	30000
20	40000	5000	50000	22000	10000	10000	75000	40000
21	2000	35000	500	40000	400	1000	4000	2000
22	10000	10000	1000	5000	15000	20000	50000	10000
23	50000	70000	55000	70000	80000	100000	25000	45000
24	70000	80000	30000	95000	70000	75000	60000	75000
25	5000	50000	5000	15000	100000	90000	85000	20000
26	10000	30000	6000	75000	22000	70000	25000	5000
27	90000	150000	50000	200000	100000	85000	170000	125000
28	8000	50000	8000	60000	20000	40000	15000	8000
29	200000	100000	100000	50000	100000	150000	150000	200000
30	50000	50000	30000	80000	50000	50000	50000	80000
31	65000	105000	50000	125000	75000	70000	80000	60000
32	6000	75000	5000	60000	50000	25000	100000	15000
33	40000	20000	25000	50000	50000	500000	100000	10000
34	50000	80000	5000	100000	1000	1000	150000	100000
35	20000	25000	10000	60000	60000	15000	60000	40000
36	30000	15000	20000	20000	40000	40000	150000	25000
37	50000	60000	50000	90000	70000	60000	50000	20000
38	50000	100000	10000	70000	60000	40000	70000	100000
39	25000	20000	15000	20000	30000	45000	40000	30000
40	25000	50000	2000	40000	50000	20000	15000	30000
41	900	550	50000	150000	115000	175000	125000	15000
42	2000	10000	200	40000	5000	1000	200	2000

	Drugs & Medicine	Knives	Bicycles
1	90000	10000	54000
2	120000	100000	75000
3	500000	400000	200000
4	100000	150000	120000
5	90000	15000	50000
6	180000	75000	60000
7	100000	10000	50000
8	200000	1050	2000
9	100000	30000	100000
10	100000	200000	200000
11	40000	20000	20000
12	90000	60000	60000
13	200000	95000	95000
14	1000000	500000	250000
15	100000	30000	50000
16	200000	80000	150000
17	70000	3000	80000
18	500000	800000	800000
19	300000	300000	100000
20	200000	100000	15000
21	1000	1000	1000
22	50000	35000	2000
23	120000	70000	80000
24	100000	80000	40000
25	90000	85000	40000
26	45000	25000	65000
27	100000	200000	95000
28	80000	85000	45000
29	300000	100000	200000
30	100000	80000	100000
31	95000	110000	75000
32	100000	60000	60000
33	1000000	500000	750000
34	300000	100000	10000
35	90000	45000	80000
36	200000	150000	100000
37	80000	80000	70000
38	100000	50000	90000
39	80000	60000	75000
40	38000	20000	90000
41	200000	250000	130000
42	100000	6000	20000

	Subject ID	Group	Sex	Vacuum	Fireworks	Bleach	Fans	Gasoline	TVs	Chainsaw
43	43	3	1	25000	40000	30000	30000	30000	20000	30000
44	44	3	2	1200	32000	98000	8000	43000	8000	55000
45	45	3	1	2000	3000	8000	10000	25000	17000	3572
46	46	3	1	250	50000	100	200	12000	150	50
47	47	3	2	10000	150000	10000	75000	90000	20000	100000
48	48	3	2	5000	17000	25000	7000	10000	10000	15000
49	49	4	1	5000	30000	10000	10000	65000	25000	40000
50	50	4	2	50000	50000	30000	60000	20000	40000	20000
51	51	4	2	11000	20000	8000	10000	90000	8000	8000
52	52	4	1	20000	30000	150000	75000	175000	30000	30000
53	53	4	1	2000	20000	10000	1000	8000	20000	20000
54	54	4	1	100	15000	20000	100	1000	10000	2000
55	55	4	2	15000	50000	75000	10000	90000	15000	50000
56	56	4	2	500	3500	35000	2500	45000	15000	1500
57	57	4	2	9000	10000	11000	20000	50000	15000	35000
58	58	4	1	5000	40000	20000	10000	60000	5000	20000
59	59	4	2	60000	80000	90000	90000	80000	75000	60000
60	60	4	1	10000	45000	15000	8000	40000	20000	60000
61	61	4	2	10000	60000	30000	20000	25000	60000	20000
62	62	4	2	3000	35000	10000	15000	80000	10000	15000
63	63	4	1	2000	8000	1000	1000	5000	1000	7000
64	64	4	1	1000	20000	2000	400	10000	4000	5000

	Hammers	Skateboards	Drinking Glasses	ATVs	Ladders	Bathtubs	Windows	Nails
43	50000	100000	20000	25000	50000	25000	40000	35000
44	1200	20000	35000	3500	64000	92000	6200	135000
45	15000	20000	15000	10000	12000	4000	25000	17000
46	100	1500	1750	10000	100	15000	1500	30000
47	10000	20000	15000	100000	30000	90000	100000	10000
48	5000	40000	2000	35000	3000	25000	15000	2000
49	30000	20000	5000	80000	40000	50000	20000	5000
50	75000	65000	75000	60000	45000	40000	75000	70000
51	15000	20000	8000	8000	8000	30000	60000	20000
52	50000	50000	125000	100000	100000	175000	100000	100000
53	10000	50000	2000	50000	10000	20000	30000	5000
54	1000	15000	50	30000	10000	5000	6000	2000
55	40000	10000	20000	30000	50000	30000	75000	25000
56	4500	8000	1500	20000	3000	45000	7500	2500
57	25000	10000	15000	60000	30000	55000	60000	40000
58	15000	50000	20000	90000	40000	60000	60000	15000
59	100000	110000	80000	100000	60000	150000	80000	70000
60	15000	3000	5000	80000	40000	5000	50000	4000
61	1000	40000	40000	100000	35000	45000	60000	10000
62	5000	10000	2000	30000	10000	70000	80000	50000
63	5000	12000	2000	20000	7000	10000	50000	50000
64	2000	10000	500	10000	5000	15000	1000	4000

	Drugs & Medicine	Knives	Bicycles
43	25000	60000	50000
44	180000	55000	120000
45	35000	150000	15000
46	75000	1000	5000
47	200000	75000	60000
48	160000	12000	50000
49	100000	90000	90000
50	80000	90000	85000
51	80000	90000	75000
52	60000	150000	75000
53	300000	150000	200000
54	50000	20000	30000
55	95000	90000	75000
56	150000	70000	50000
57	100000	50000	35000
58	75000	5000	80000
59	160000	100000	150000
60	60000	50000	50000
61	200000	100000	70000
62	100000	30000	25000
63	30000	6000	10000
64	100000	5000	8000

Group Estimation Means

	Product Name	NEISS	Hurried	Unhurried	Generate	Provided
1	vacuum cleaner	11117.000	19482.500	13662.500	11668.750	12725.000
2	fireworks	12602.000	70000.000	74187.500	60250.000	32281.250
3	bleach	15109.000	37656.250	52468.750	26600.000	32312.500
4	fans	17454.000	40218.750	53043.750	19637.500	20812.500
5	gasoline	17768.000	49375.000	115000.000	39687.500	52750.000
6	televisions	25435.000	27313.125	21437.500	15803.125	22062.500
7	chainsaws	41387.000	45012.500	62100.000	36601.375	24593.750
8	hammers	48479.000	57568.750	60062.500	23387.500	24593.750
9	skateboards	81066.000	86256.250	115625.000	36378.125	30187.500
10	drinking glasses	81606.000	30663.125	33187.500	17246.875	25065.625
11	ATVs	86400.000	82937.500	79187.500	51468.750	54250.000
12	ladders	90019.000	36018.750	66712.500	40006.250	30812.500
13	bath tubs	101866.000	66718.750	65062.500	71750.000	50312.500
14	windows/glass	128777.000	42750.000	70562.500	59243.750	50906.250
15	nails screws etc	214656.006	63787.500	48437.500	37562.500	29531.250
16	drugs/meds	216246.000	200625.000	140687.500	178937.500	108750.000
17	knives	333478.000	111003.125	133375.000	100875.000	68500.000
18	bicycles	546420.000	96000.000	112375.000	107187.500	69250.000

Correlation of Group Estimates and NEISS Frequencies

Correlation Matrix for Variables: X_1 ... X_5

	NEISS	Hurried	Unhurried	Generate	Provided
NEISS	1				
Hurried	.538	1			
Unhurried	.54	.802	1		
Generate	.653	.923	.771	1	
Provided	.615	.88	.81	.95	1

Correlation of Hurried Group Estimates with NEISS Frequencies

Corr. Coeff. X_1 : Hurried Y_1 : NEISS

Count:	Covariance:	Correlation:	R-squared:
18	3.151E9	.538	.29

Correlation of Unhurried Group Estimates with NEISS Frequencies

Corr. Coeff. X_1 : Unhurried Y_1 : NEISS

Count:	Covariance:	Correlation:	R-squared:
18	2.75E9	.54	.292

Correlation of Generate Group Estimates with NEISS Frequencies

Corr. Coeff. X_1 : Generate Y_1 : NEISS

Count:	Covariance:	Correlation:	R-squared:
18	3.78E9	.653	.426

Correlation of Provided Group Estimates with NEISS Frequencies

Corr. Coeff. X_1 : Provided Y_1 : NEISS

Count:	Covariance:	Correlation:	R-squared:
18	2.013E9	.615	.378

	Product Name	NEISS	Hurried	Unhurried	Generate	Provide
1	L vacuum cleaner	4.050	4.290	4.140	4.070	4.100
2	L fireworks	4.100	4.850	4.870	4.780	4.510
3	L bleach	4.180	4.580	4.720	4.420	4.510
4	L fans	4.240	4.600	4.720	4.290	4.320
5	L gasoline	4.250	4.690	5.060	4.600	4.720
6	L televisions	4.410	4.440	4.330	4.200	4.340
7	L chainsaws	4.620	4.650	4.790	4.560	4.390
8	L hammers	4.690	4.760	4.780	4.370	4.390
9	L skateboards	4.910	4.940	5.060	4.560	4.480
10	L drinking glasses	4.910	4.490	4.520	4.240	4.400
11	L all terrain vehicles	4.940	4.920	4.900	4.710	4.730
12	L ladders	4.950	4.560	4.820	4.600	4.490
13	L bathtubs/showers	5.010	4.820	4.810	4.860	4.700
14	L windows/glass	5.110	4.630	4.850	4.770	4.710
15	L nails screws etc.	5.330	4.800	4.690	4.570	4.470
16	L drugs/meds	5.330	5.300	5.150	5.250	5.040
17	L knives	5.520	5.050	5.130	5.000	4.840
18	L bicycles	5.750	4.980	5.050	5.030	4.840

Correlation of Estimate Logarithms with NEISS Frequencies

Correlation Matrix for Variables: X_1 ... X_5

	NEISS	Hurried	Unhurried	Generate	Provide
NEISS	1				
Hurried	.636	1			
Unhurried	.527	.849	1		
Generate	.681	.878	.831	1	
Provide	.662	.824	.823	.928	1

Correlation of Hurried Group Logarithms with NEISS Frequencies

Corr. Coeff. X_1 : Hurried Y_1 : NEISS

Count:	Covariance:	Correlation:	R-squared:
18	.08	.636	.405

Correlation of Unhurried Group Logarithms with NEISS Frequencies

Corr. Coeff. X_1 : Unhurried Y_1 : NEISS

Count:	Covariance:	Correlation:	R-squared:
18	.072	.527	.277

Correlation of Generate Group Logarithms with NEISS Frequencies

Corr. Coeff. X_1 : Generate Y_1 : NEISS

Count:	Covariance:	Correlation:	R-squared:
18	.109	.681	.463

Correlation of Provided Group Logarithms with NEISS Frequencies

Corr. Coeff. X_1 : Provide Y_1 : NEISS

Count:	Covariance:	Correlation:	R-squared:
18	.078	.662	.438

	PRODUCT NAME	SQR NEISS	SQR Hurried	SQR Unhurried	SQR Generate	SQR Provided
1	S vacuum cleaner	105.437	139.580	116.887	108.022	112.805
2	S fireworks	112.259	264.575	272.374	245.459	179.670
3	S bleach	122.919	194.052	229.061	163.095	179.757
4	S fans	132.114	200.546	230.312	140.134	144.265
5	S gasoline	133.297	222.205	339.116	199.217	229.674
6	S televisions	159.484	165.267	146.416	125.710	148.535
7	S chainsaws	203.438	212.161	249.199	191.315	156.824
8	S hammers	220.179	239.935	245.077	152.930	156.824
9	S skateboards	284.721	293.694	340.037	190.731	173.746
10	S drinking glasses	285.668	175.109	182.174	131.327	158.321
11	S ATVs	293.939	287.989	281.403	226.867	232.916
12	S ladders	300.032	189.786	258.288	200.016	175.535
13	S bath tubs	319.165	258.300	255.074	267.862	224.304
14	S windows/glass	358.855	206.761	265.636	243.400	225.624
15	S nails screws e...	463.310	252.562	220.085	193.810	171.847
16	S drugs/meds	465.023	447.912	375.083	423.010	329.773
17	S knives	577.476	333.171	365.205	317.608	261.725
18	S bicycles	739.202	309.839	335.224	327.395	263.154

Correlation of Square Roots of Estimates with NEISS Frequencies

Correlation Matrix for Variables: X_1 ... X_5

	SQR NEISS	SQR Hur...	SQR Unh...	SQR Gen...	SQR Pro...
SQR NEISS	1				
SQR Hurried	.63	1			
SQR Unhurried	.545	.825	1		
SQR Generate	.712	.896	.798	1	
SQR Provided	.67	.847	.814	.938	1

Correlation of Square Roots of Hurried Group Estimates with NEISS Frequencies

Corr. Coeff. X_1 : SQR Hurried Y_1 : SQR NEISS

Count:	Covariance:	Correlation:	R-squared:
18	8085.221	.63	.397

Correlation of Square Roots of Unhurried Group Estimates with NEISS Frequencies

Corr. Coeff. X_1 : SQR Unhurried Y_1 : SQR NEISS

Count:	Covariance:	Correlation:	R-squared:
18	6816.25	.545	.297

Correlation of Square Roots of Generate Group Estimates with NEISS Frequencies

Corr. Coeff. X_1 : SQR Generate Y_1 : SQR NEISS

Count:	Covariance:	Correlation:	R-squared:
18	10118.072	.712	.506

Correlation of Square Roots of Provided Group Estimates with NEISS Frequencies

Corr. Coeff. X_1 : SQR Provided Y_1 : SQR NEISS

Count:	Covariance:	Correlation:	R-squared:
18	6327.405	.67	.449

Appendix E

Individual Correlations

Individual Correlations

	Group	All Products- Logs	Logs Low Frequencies	Logs Medium Frequency	Logs High Frequency	Actual Frequencies Corr	Actual Low Frequencies
1	1	-.009	.525	.237	.036	.037	.199
2	1	.405	.010	.200	.156	.389	-.121
3	1	.667	.723	.264	.442	.447	.660
4	1	.511	-.308	.150	.541	.647	-.383
5	1	.047	-.131	-.193	.505	.365	-.201
6	1	.229	-.597	-.313	.020	.163	-.570
7	1	.422	-.559	.274	.650	.224	-.477
8	1	-.095	-.390	.009	-.498	.002	-.333
9	1	.370	-.159	-.134	.186	.475	-.036
10	1	.398	.049	.423	.300	.350	-.219
11	1	.492	.313	.257	.599	.633	.064
12	1	.250	-.360	-.093	.242	.318	-.305
13	1	.371	-.731	-.492	-.073	.302	-.649
14	1	.549	.079	-.038	.549	.510	.075
15	1	.162	-.434	-.494	.266	.332	-.463
16	1	.358	.274	-.213	.501	.405	-.070
17	2	.486	.332	-.308	-.290	.347	.124
18	2	.294	.410	.557	.610	.431	.103
19	2	.388	.081	-.615	.170	.275	-.198
20	2	.612	.037	-.230	.030	.351	-.304
21	2	.089	.494	.325	-.422	-.122	.564
22	2	.203	-.126	-.326	-.631	.199	-.221
23	2	.295	.033	.083	.224	.259	-.085
24	2	-.083	.367	-.283	-.467	-.202	.253
25	2	.350	.073	-.004	-.370	.147	-.012
26	2	.240	-.154	.106	.046	.255	-.311
27	2	.599	-.225	.363	.067	.390	-.253
28	2	.448	-.158	.014	.331	.377	-.266
29	2	.595	-.403	.061	.068	.517	-.446
30	2	.510	-.156	.257	.829	.621	-.247
31	2	.273	-.116	.026	.260	.115	-.213
32	2	.565	-.253	.390	.176	.450	-.331
33	3	.504	-.206	-.296	.245	.704	-.427
34	3	.362	-.592	-.408	.166	.227	.467
35	3	.383	-.426	-.064	.603	.458	-.457
36	3	.587	-.044	.421	.259	.583	-.042
37	3	.139	-.097	.455	.235	.269	-.095
38	3	.619	.118	.464	.424	.582	.179
39	3	.637	-.278	.510	.553	.759	-.176
40	3	.453	-.303	.170	.772	.596	-.370
41	3	.275	-.574	.172	.034	.449	-.375
42	3	.398	.232	.011	.622	.285	-.221
43	3	.333	-.580	.054	.677	.264	-.600
44	3	.434	.161	.161	.379	.547	-.162
45	3	.589	.854	.611	.451	.454	.692
46	3	.348	-.281	.685	-.105	.124	-.365
47	3	.192	.036	-.080	-.152	.122	-.222
48	3	.236	.044	-.010	.140	.340	-.131
49	4	.411	.446	-.133	.361	.601	.259
50	4	.612	-.263	.539	.735	.654	-.231
51	4	.514	-.049	-.005	.491	.611	.043
52	4	.378	.230	.828	-.413	.137	.053
53	4	.641	.290	.019	.555	.717	.389
54	4	.429	.249	.263	.556	.502	.001
55	4	.323	-.167	-.456	.440	.430	-.164
56	4	.420	.503	.426	.269	.459	.252
57	4	.628	.477	-.146	-.455	.376	.264
58	4	.324	-.175	.701	-.206	.338	-.162
59	4	.511	.341	.226	.168	.555	.209
60	4	.137	.063	-.221	.461	.298	-.061
61	4	.345	.498	.672	.190	.415	.451
62	4	.350	.226	.014	-.006	.202	.036
63	4	.641	-.435	.180	-.400	.285	-.309
64	4	.300	.026	.107	.081	.104	-.210

	Group	All Products- Logs	Logs Low Frequencies	Logs Medium Frequency	Logs High Frequency	Actual Frequencies Corr	Actual Low Frequencies
1	1	-.009	.525	.237	.036	.037	.199
2	1	.405	.010	.200	.156	.389	-.121
3	1	.667	.723	.264	.442	.447	.668
4	1	.511	-.308	.150	.541	.647	-.383
5	1	.047	-.131	-.193	.505	.365	-.201
6	1	.229	-.597	-.313	.028	.163	-.578
7	1	.422	-.559	.274	.650	.224	-.477
8	1	-.095	-.390	.009	-.498	.002	-.333
9	1	.378	-.159	-.134	.186	.475	-.036
10	1	.398	.049	.423	.388	.358	-.219
11	1	.492	.313	.257	.599	.633	.064
12	1	.250	-.360	-.093	.242	.318	-.305
13	1	.371	-.731	-.492	-.073	.302	-.649
14	1	.549	.079	-.038	.549	.510	.075
15	1	.162	-.434	-.494	.266	.332	-.463
16	1	.358	.274	-.213	.581	.485	-.070
17	2	.486	.332	-.308	-.290	.347	.124
18	2	.294	.410	.557	.610	.431	.103
19	2	.388	.081	-.615	.170	.275	-.198
20	2	.612	.037	-.230	.038	.351	-.304
21	2	.089	.494	.325	-.422	-.122	.564
22	2	.283	-.126	-.326	-.631	.199	-.221
23	2	.295	.033	.883	.224	.259	-.085
24	2	-.083	.367	-.283	-.467	-.202	.253
25	2	.350	.073	-.004	-.370	.147	-.012
26	2	.240	-.154	.106	.046	.255	-.311
27	2	.599	-.225	.363	.067	.390	-.253
28	2	.448	-.158	.014	.331	.377	-.266
29	2	.595	-.403	.061	.068	.517	-.446
30	2	.510	-.156	.257	.829	.621	-.247
31	2	.273	-.116	.026	.260	.115	-.213
32	2	.565	-.253	.390	.176	.458	-.331
33	3	.584	-.206	-.296	.245	.704	-.427
34	3	.362	-.592	-.408	.166	.227	.467
35	3	.383	-.426	-.064	.603	.458	-.457
36	3	.587	-.044	.421	.259	.583	-.042
37	3	.139	-.097	.455	.235	.269	-.095
38	3	.619	.118	.464	.424	.582	.179
39	3	.637	-.278	.510	.553	.759	-.176
40	3	.453	-.303	.170	.772	.596	-.370
41	3	.275	-.574	.172	.034	.449	-.375
42	3	.398	.232	.011	.622	.285	-.221
43	3	.333	-.580	.054	.677	.264	-.600
44	3	.434	.161	.161	.379	.547	-.162
45	3	.589	.854	.611	.451	.454	.692
46	3	.348	-.281	.685	-.185	.124	-.365
47	3	.192	.036	-.080	-.152	.122	-.222
48	3	.236	.044	-.010	.140	.340	-.134
49	4	.411	.446	-.133	.361	.601	.259
50	4	.612	-.263	.539	.735	.654	-.231
51	4	.514	-.049	-.085	.491	.611	.043
52	4	.378	.230	.828	-.413	.137	.053
53	4	.641	.290	.019	.555	.717	.389
54	4	.429	.249	.263	.556	.502	.001
55	4	.323	-.167	-.456	.440	.430	-.164
56	4	.428	.583	.426	.269	.459	.252
57	4	.628	.477	-.146	-.455	.376	.264
58	4	.324	-.175	.701	-.206	.338	-.162
59	4	.511	.341	.226	.168	.555	.209
60	4	.137	.063	-.221	.461	.298	-.061
61	4	.345	.498	.672	.190	.415	.451
62	4	.350	.226	.014	-.806	.202	.036
63	4	.641	-.435	.188	-.400	.285	-.389
64	4	.300	.026	.107	.081	.184	-.210

	Actual Medium Frequencies	Actual High Frequencies
1	.482	-.096
2	.218	-.063
3	.083	.154
4	.464	.606
5	.027	.332
6	-.382	-.182
7	.348	.316
8	.052	-.344
9	.353	.369
10	.149	.522
11	-.027	.267
12	-.160	.121
13	-.609	-.206
14	.153	.203
15	-.628	.113
16	.001	.463
17	-.272	-.103
18	.384	.828
19	-.697	.107
20	-.164	-.155
21	.442	-.431
22	-.252	-.522
23	.871	.106
24	-.274	-.537
25	-.049	-.453
26	.226	.223
27	.426	-.039
28	-.063	.299
29	-.209	.044
30	.311	.732
31	.088	.178
32	.546	.020
33	-.218	.403
34	-.151	-.283
35	.033	.499
36	.347	.104
37	.483	.353
38	.478	.304
39	.433	.593
40	.514	.865
41	.283	.074
42	.286	.060
43	.131	.665
44	.036	.216
45	.449	.222
46	.442	-.228
47	-.191	-.238
48	.234	.062
49	.106	.557
50	.353	.652
51	-.086	.525
52	.772	-.372
53	.269	.514
54	.572	.430
55	-.441	.382
56	.400	.130
57	.037	-.432
58	.611	.111
59	.157	.250
60	-.042	.415
61	.660	.088
62	.175	-.739
63	.355	-.476
64	.352	-.127

Anova of Actual Individual Correlations by Group

One Factor ANOVA X_1 : Group Y_1 : Actual Frequencies Corr

Analysis of Variance Table

Source:	DF:	Sum Squares:	Mean Square:	F-test:
Between groups	3	.233	.078	2.061
Within groups	60	2.264	.038	p = .115
Total	63	2.498		

Model II estimate of between component variance = .013

One Factor ANOVA X_1 : Group Y_1 : Actual Frequencies Corr

Group:	Count:	Mean:	Std. Dev.:	Std. Error:
Group 1	16	.355	.185	.046
Group 2	16	.276	.217	.054
Group 3	16	.423	.197	.049
Group 4	16	.423	.176	.044

One Factor ANOVA X_1 : Group Y_1 : Actual Frequencies Corr

Comparison:	Mean Diff.:	Fisher PLSD:	Scheffe F-test:	Dunnett t:
Group 1 vs. 2	.079	.137	.444	1.155
Group 1 vs. 3	-.067	.137	.32	.979
Group 1 vs. 4	-.067	.137	.32	.98
Group 2 vs. 3	-.147	.137*	1.518	2.134
Group 2 vs. 4	-.147	.137*	1.519	2.135

Anova of Actual Individual Correlations by Group

One Factor ANOVA X_1 : Group Y_1 : Actual Frequencies Corr

Comparison:	Mean Diff.:	Fisher PLSD:	Scheffe F-test:	Dunnett t:
Group 3 vs. 4	-6.250E-5	.137	2.760E-7	.001

Anova of Low, Medium, High Individual Correlations by Group

Anova table for a 2-factor repeated measures Anova.

Source:	df:	Sum of Squares:	Mean Square:	F-test:	P value:
Group (A)	3	.769	.256	1.976	.1272
subjects w. groups	60	7.783	.13		
Repeated Measure (B)	2	2.451	1.226	12.21	.0001
AB	6	.672	.112	1.116	.3571
B x subjects w. groups	120	12.046	.1		

There were no missing cells found.

The AB Incidence table

	Repeated Mea...	Actual Lo...	Actual M...	Actual Hi...	Totals:
Group	level 1	16 -.177	16 .033	16 .161	48 .006
Group	level 2	16 -.115	16 .082	16 .019	48 -.005
Group	level 3	16 -.144	16 .224	16 .229	48 .103
Group	level 4	16 .046	16 .266	16 .119	48 .144
Totals:		64 -.097	64 .151	64 .132	192 .062

Upper Triangle: .05 level ; Lower Triangle: .01 level

	A	B	C	D
A. A 2	X	-	-	-
B. A 1	-	X	-	-
C. A 3	-	-	X	-
D. A 4	-	-	-	X

Upper Triangle: .05 level ; Lower Triangle: .01 level

	A	B	C
A. B 1	X	-	s
B. B 2	-	X	-
C. B 3	s	-	X

Anova of Logs Individual Correlations by Group

One Factor ANOVA X_1 : Group Y_1 : All Products- Logs

Analysis of Variance Table

Source:	DF:	Sum Squares:	Mean Square:	F-test:
Between groups	3	.12	.04	1.251
Within groups	60	1.922	.032	p = .2994
Total	63	2.043		

Model II estimate of between component variance = .003

One Factor ANOVA X_1 : Group Y_1 : All Products- Logs

Group:	Count:	Mean:	Std. Dev.:	Std. Error:
Group 1	16	.321	.21	.053
Group 2	16	.371	.195	.049
Group 3	16	.411	.158	.039
Group 4	16	.436	.145	.036

One Factor ANOVA X_1 : Group Y_1 : All Products- Logs

Comparison:	Mean Diff.:	Fisher PLSD:	Scheffe F-test:	Dunnett t:
Group 1 vs. 2	-.051	.127	.213	.799
Group 1 vs. 3	-.09	.127	.669	1.416
Group 1 vs. 4	-.115	.127	1.097	1.814
Group 2 vs. 3	-.039	.127	.127	.617
Group 2 vs. 4	-.064	.127	.344	1.015

Anova of Logs Individual Correlations by Group

One Factor ANOVA X_1 : Group Y_1 : All Products- Logs

Comparison:	Mean Diff.:	Fisher PLSD:	Scheffe F-test:	Dunnett t:
Group 3 vs. 4	-.025	.127	.053	.398

Anova of Logs Low Medium High Individual Correlations by Group

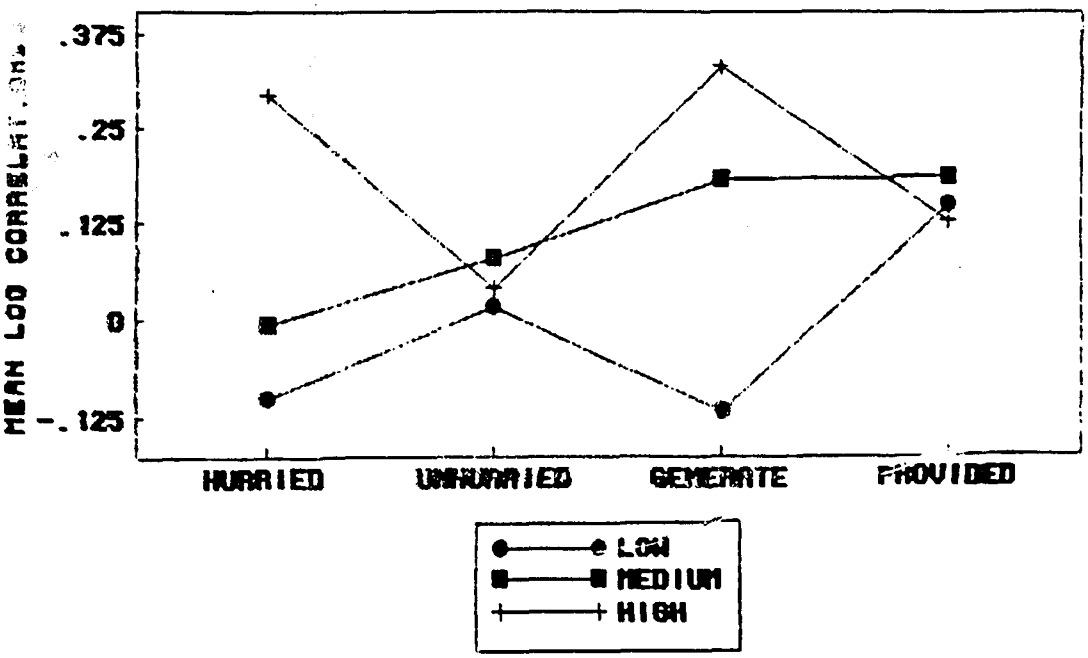
Anova table for a 2-factor repeated measures Anova.

Source:	df:	Sum of Squares:	Mean Square:	F-test:	P value:
Group (A)	3	.405	.135	.877	.458
subjects w. groups	60	9.237	.154		
Repeated Measure (B)	2	1.447	.723	6.733	.0017
AB	6	1.619	.27	2.512	.0252
B x subjects w. groups	120	12.89	.107		

There were no missing cells found.

The AB Incidence table

	Repeated Mea...	Logs Low ...	Logs Medi...	Logs High...	Totals:
Group	level 1	16 -.106	16 -.01	16 .287	48 .057
	level 2	16 .015	16 .076	16 .04	48 .044
	level 3	16 -.121	16 .179	16 .326	48 .128
	level 4	16 .146	16 .184	16 .127	48 .152
Totals:		64 -.017	64 .107	64 .195	192 .095


MEAN LOG CORRELAT.ONS
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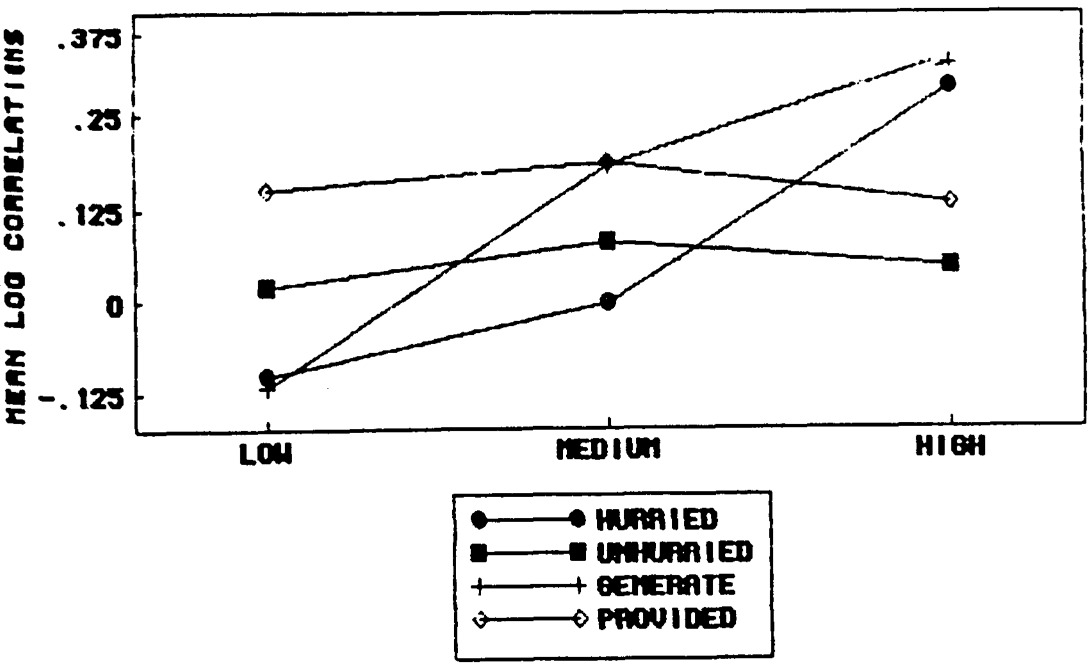
.25
.125
0
-.125
HURRIED
UNHURRIED
GENERATE
PROVIDED
LOW
MEDIUM
HIGH


MEAN LOG CORRELATIONS
.375
.25
.125
0
-.125
LOW
MEDIUM
HIGH
HURRIED
UNHURRIED
GENERATE
PROVIDED

Effect	MSn	DFn	DFe	MSe	F	p
A at LOW	.247	3	174	.123	2.013	.114
A at MEDIUM	.137	3	174	.123	1.111	.346
A at HIGH	.291	3	174	.123	2.365	.073
B at HURRIED	.673	2	120	.107	6.263	.003
B at UNHURRIED	.015	2	120	.107	.141	.868
B at GENERATE	.831	2	120	.107	7.740	.001
B at PROVIDED	.014	2	120	.107	.126	.882

Upper Triangle: .05 level ; Lower Triangle: .01 level

	A	B	C	D
A. PROVIDED	X	-	s	s
B. GENERATE	-	X	-	s
C. HURRIED	s	-	X	-
D. UNHURRIE	s	s	-	X

Upper Triangle: .05 level ; Lower Triangle: .01 level

	A	B	C
A. HIGH FRE	X	s	s
B. MED FREQ	-	X	-
C. LOW FREQ	s	-	X

Appendix F

Estimate Differences from NEISS Frequencies

ANOVA Summary Table for Relax/Seagate0:MacTerminal 2.2:Martin Thesis Estimate Diffs-te

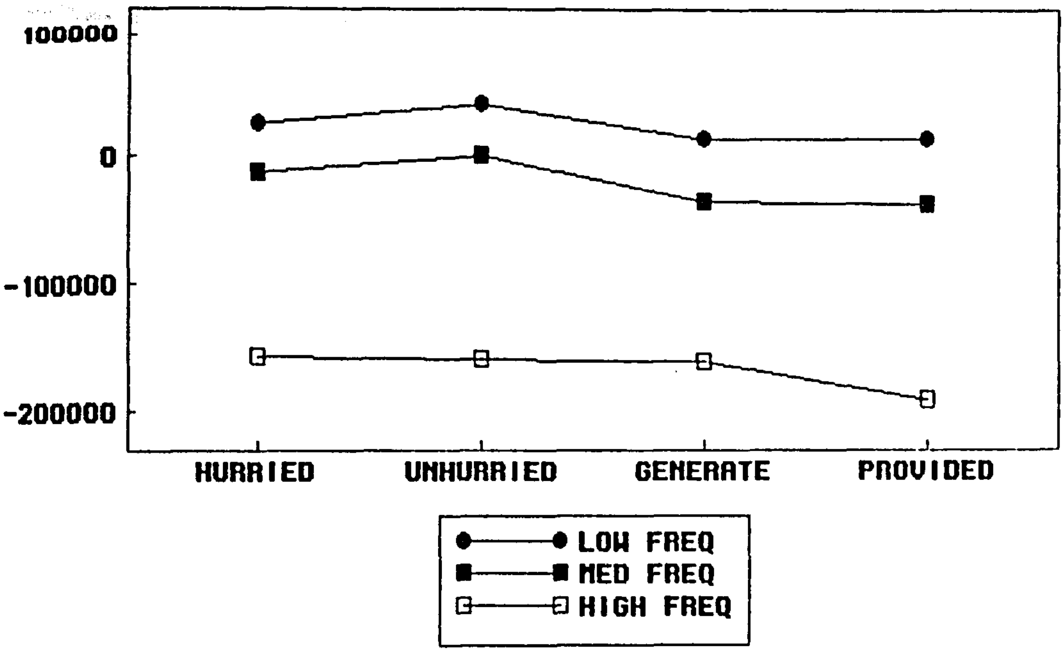
Source of Variation	df	Sum of Squares	Mean Square	F	p	Epsilon Correction
A	2	482530023386.695	241265011693.348	7.184	.0065	
Error	15	503752622059.876	33583508137.325			
B	3	10744494627.486	3581498209.162	14.919	.0000	
AB	6	2624403406.306	437400567.718	1.822	.1162	
Error	45	10803031636.958	240067369.710			.78

Upper Triangle: .05 level ; Lower Triangle: .01 level

	A	B	C	D
A. PROVIDED	X	-	s	s
B. GENERATE	-	X	-	s
C. HURRIED	s	-	X	-
D. UNHURRIE	s	s	-	X

Upper Triangle: .05 level ; Lower Triangle: .01 level

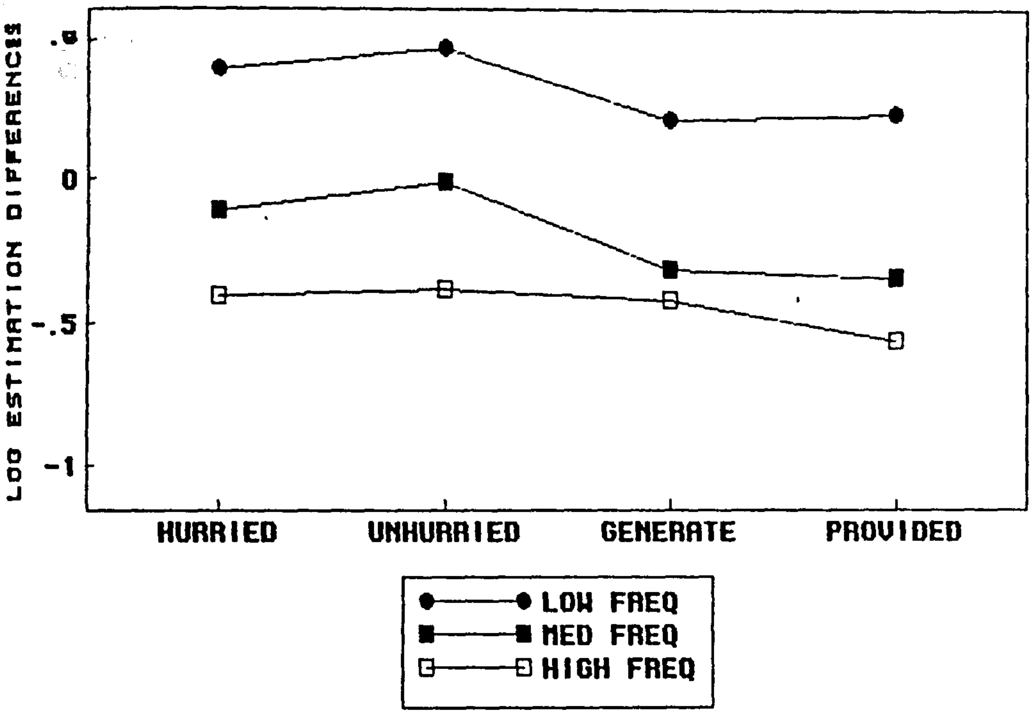
	A	B	C
A. HIGH FRE	X	s	s
B. MED FREQ	-	X	-
C. LOW FREQ	s	-	X


100000
0
-100000
-200000
HURRIED
UNHURRIED
GENERATE
PROVIDED
LOW FREQ
MED FREQ
HIGH FREQ

ANOVA Summary Table for Relax/Seagate0:MacTerminal 2.2:Martin-Log Estimate Diffs-Text

Source of Variation	df	Sum of Squares	Mean Square	F	p	Epsilon Correction
A	2	7.094	3.547	15.710	.0002	
Error	15	3.387	.226			
B	3	.710	.237	25.162	.0000	
AB	6	.147	.024	2.599	.0301	
Error	45	.423	.009			.95

Effect	MSn	DFn	DFe	MSe	F	P
A at HURRIED	.935	2	19	.064	14.722	.000
A at UNHURRIED	1.037	2	19	.064	16.337	.000
A at GENERATE	.659	2	19	.064	10.372	.001
A at PROVIDED	.990	2	19	.064	15.583	.000
B at LOW FREQ	.087	3	45	.009	9.227	.000
B at MED FREQ	.158	3	45	.009	16.759	.000
B at HIGH FREQ	.041	3	45	.009	4.373	.009


LOG ESTIMATION DIFFERENCES
.5
0
-.5
-1
HURRIED
UNHURRIED
GENERATE
PROVIDED
LOW FREQ
MED FREQ
HIGH FREQ

ANOVA Summary Table for TERMINAL/CLR:absolute values2

Source of Variation	df	Sum of Squares	Mean Square	F	p	Epsilon Correction
A	3	900046106.731	300015368.910	.298	.8264	
Error	60	60318969842.327	1005316164.039			
B	2	1078371905403.59	539185952701.793	508.002	.0000	
AB	6	8309444686.238	1384907447.706	1.305	.2602	
Error	120	127366309500.280	1061385912.502			.78

Upper Triangle: .05 level ; Lower Triangle: .01 level

	A	B	C
A. b 1	X	s	s
B. b 2	s	X	s
C. b 3	s	s	X

Upper Triangle: .05 level ; Lower Triangle: .01 level

	A	B	C
A. b 1	X	s	s
B. b 2	-	X	s
C. b 3	s	s	X

Appendix G

Products as a Random Variable

ANOVA using Products as Random Variable

Anova table for a 2-factor repeated measures Anova.

Source:	df:	Sum of Squares:	Mean Square:	F-test:	P value:
Product Groups (A)	2	3.166E10	1.583E10	5.007	.0216
subjects w. groups	15	4.743E10	3.162E9		
Repeated Measure (B)	3	1.074E10	3.581E9	14.919	.0001
AB	6	2.624E9	437390829.014	1.822	.1162
B x subjects w. groups	45	1.080E10	240068027.765		

There were no missing cells found.

The AB Incidence table

	Repeated Mea...	Hurried	Unhurried	Generate	Provided	Totals:
Product Groups	level 1	6 40674.271	6 54966.667	6 28941.146	6 28823.958	24 38351.51
	level 2	6 56409.479	6 69479.167	6 34181.479	6 31583.854	24 47913.495
	level 3	6 96814.062	6 95083.333	6 92592.708	6 62875	24 86841.276
Totals:		18 64632.604	18 73176.389	18 51905.111	18 41094.271	72 57702.094

Upper Triangle: .05 level ; Lower Triangle: .01 level

	A	B	C
A. A 3	X	s	s
B. A 2	-	X	-
C. A 1	s	-	X

Upper Triangle: .05 level ; Lower Triangle: .01 level

	A	B	C	D
A. B 4	X	-	s	s
B. B 3	-	X	-	s
C. B 1	s	-	X	-
D. B 2	s	s	-	X

ANOVA using Products as Random Variable

Anova table for a 2-factor repeated measures Anova.

Source:	df:	Sum of Squares:	Mean Square:	F-test:	P value:
PRODUCT GROUP (A)	2	1.834	.917	5.745	.014
subjects w. groups	15	2.394	.16		
Repeated Measure (B)	3	.71	.237	25.162	.0001
AB	6	.147	.024	2.599	.0301
B x subjects w. groups	45	.423	.009		

There were no missing cells found.

The AB Incidence table

Repeated Mea...		Hurried	Unhurried	Generate	Provide	Totals:
PRODUCT GROUP	level 1	6 4.575	6 4.64	6 4.393	6 4.417	24 4.506
	level 2	6 4.72	6 4.812	6 4.507	6 4.48	24 4.63
	level 3	6 4.93	6 4.947	6 4.913	6 4.767	24 4.889
Totals:		18 4.742	18 4.799	18 4.604	18 4.554	72 4.675

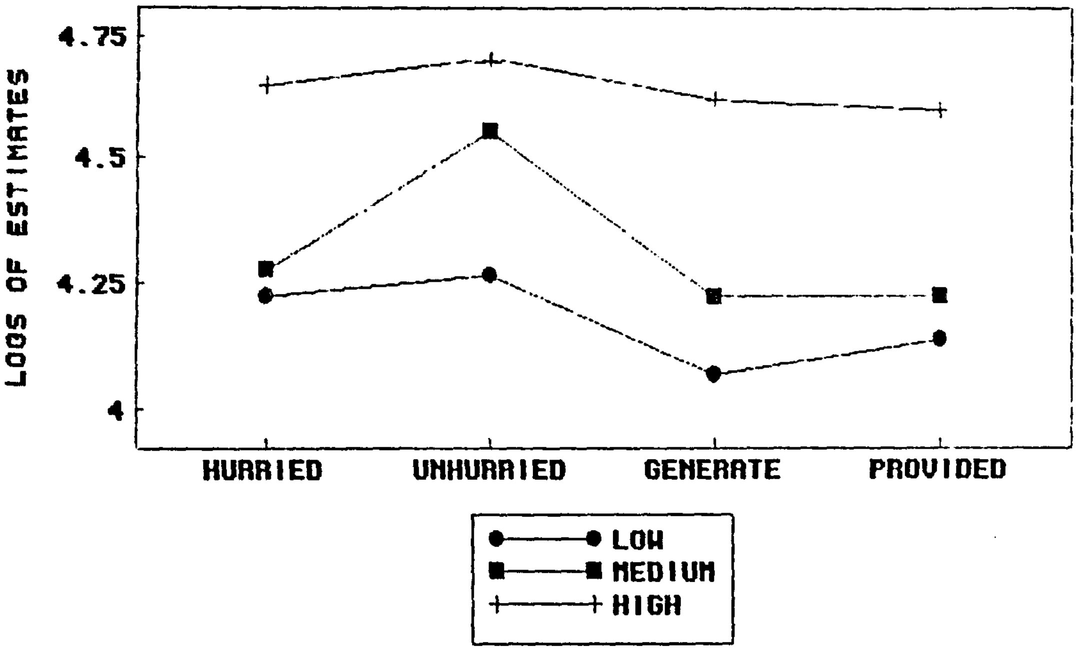
Effect	MSn	DFn	DFe	MSe	F	p
A at B 1	.319	2	15	.119	2.683	.101
A at B 2	.294	2	15	.077	3.840	.045
A at B 3	.479	2	15	.084	5.706	.014
A at B 4	.363	2	15	.080	4.558	.028
B at A 1	.046	3	45	.012	3.976	.013
B at A 2	.153	3	45	.012	13.248	.000
B at A 3	.012	3	45	.012	1.041	.383

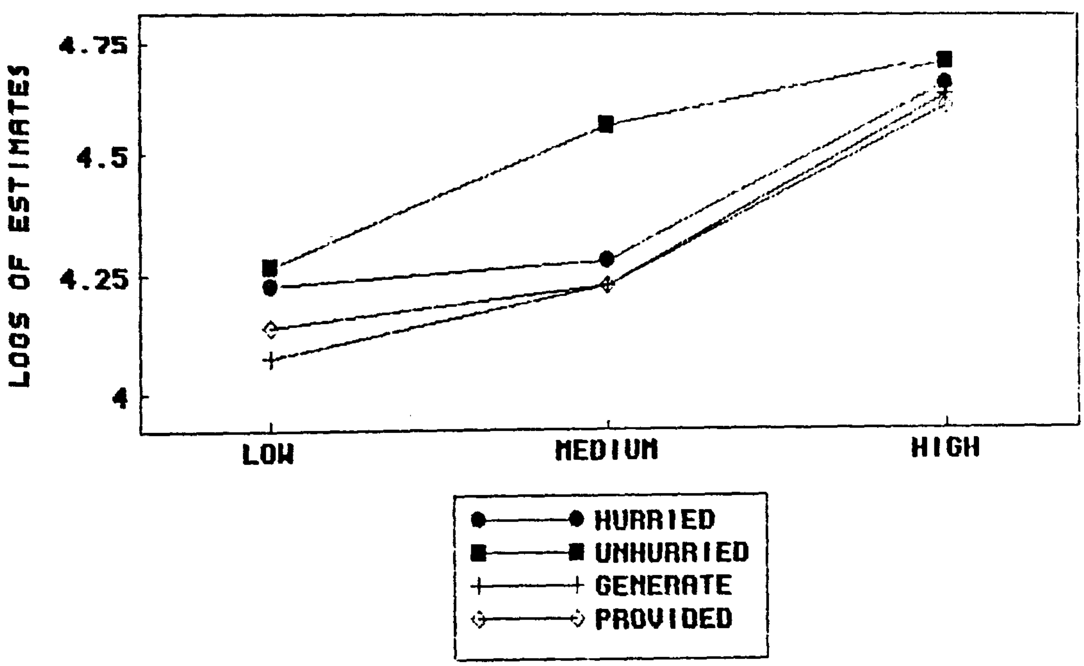
Upper Triangle: .05 level ; Lower Triangle: .01 level

	A	B	C	D
A. GENERATE	X	-	-	s
B. PROVIDED	-	X	-	s
C. HURRIED	-	-	X	s
D. UNHURRIE	s	s	s	X

Upper Triangle: .05 level ; Lower Triangle: .01 level

	A	B	C
A. LOW	X	-	s
B. MEDIUM	-	X	-
C. HIGH	-	-	X


4.75
4.5
4.25
4
LOGS OF ESTIMATES
HURRIED
UNHURRIED
GENERATE
PROVIDED
LOW
MEDIUM
HIGH


4.75
4.5
4.25
4
LOGS OF ESTIMATES
LOW
MEDIUM
HIGH
HURRIED
UNHURRIED
GENERATE
PROVIDED

ANOVA - Products as Random Variable

Anova table for a 2-factor repeated measures Anova.

Source:	df:	Sum of Squares:	Mean Square:	F-test:	P value:
Product Groups (A)	2	4.825E11	2.413E11	7.184	.0065
subjects w. groups	15	5.038E11	3.358E10		
Repeated Measure (B)	3	1.074E10	3.581E9	14.919	.0001
AB	6	2.624E9	437390829.014	1.822	.1162
B x subjects w. groups	45	1.080E10	240068027.765		

There were no missing cells found.

The AB Incidence table

	Repeated Mea...	HURRIED ...	UNHURRIE...	GENERAT...	PROVIDED...	Totals:
Product Groups	level 1	6 24093.438	6 38385.833	6 12360.312	6 12243.125	24 21770.677
	level 2	6 -1.508E4	6 -2013.667	6 -3.731E4	6 -3.991E4	24 -2.358E4
	level 3	6 -1.601E5	6 -1.618E5	6 -1.643E5	6 -1.94E5	24 -1.701E5
Totals:		18 -5.036E4	18 -4.182E4	18 -63088.5	18 -73899.34	72 -5.729E4

Effect	MSn	DFn	DFe	MSe	F	P
A at LOW	.247	3	60	.119	2.087	.111
A at MEDIUM	.137	3	60	.116	1.170	.326
A at HIGH	.291	3	60	.134	2.165	.101
B at HURRIED	.673	2	120	.107	6.263	.003
B at UNHURRIED	.015	2	120	.107	.141	.869
B at GENERATE	.831	2	120	.107	7.740	.001
B at PROVIDED	.014	2	120	.107	.126	.882

Upper Triangle: .05 level ; Lower Triangle: .01 level

	A	B	C
A. A 1	X	-	s
B. A 2	-	X	-
C. A 3	-	-	X

Upper Triangle: .05 level ; Lower Triangle: .01 level

	A	B	C	D
A. B 4	X	-	s	s
B. B 3	-	X	-	s
C. B 1	s	-	X	-
D. B 2	s	s	-	X

ANOVA using Product Means as Random Variable

Anova table for a 2-factor repeated measures Anova.

Source:	df:	Sum of Squares:	Mean Square:	F-test:	P value:
PRODUCT GROUP (A)	2	7.094	3.547	15.71	.0002
subjects w. groups	15	3.387	.226		
Repeated Measure (B)	3	.71	.237	25.162	.0001
AB	6	.147	.024	2.599	.0301
B x subjects w. groups	45	.423	.009		

There were no missing cells found.

The AB Incidence table

	Repeated Mea...	Log Hurri...	Log Unhur...	Log Gener...	Log Provi...	Totals:
PRODUCT GROUP	level 1	6 .37	6 .435	6 .188	6 .212	24 .301
	level 2	6 -.117	6 -.025	6 -.33	6 -.357	24 -.207
	level 3	6 -.412	6 -.395	6 -.428	6 -.575	24 -.453
Totals:		18 -.053	18 .005	18 -.19	18 -.24	72 -.119

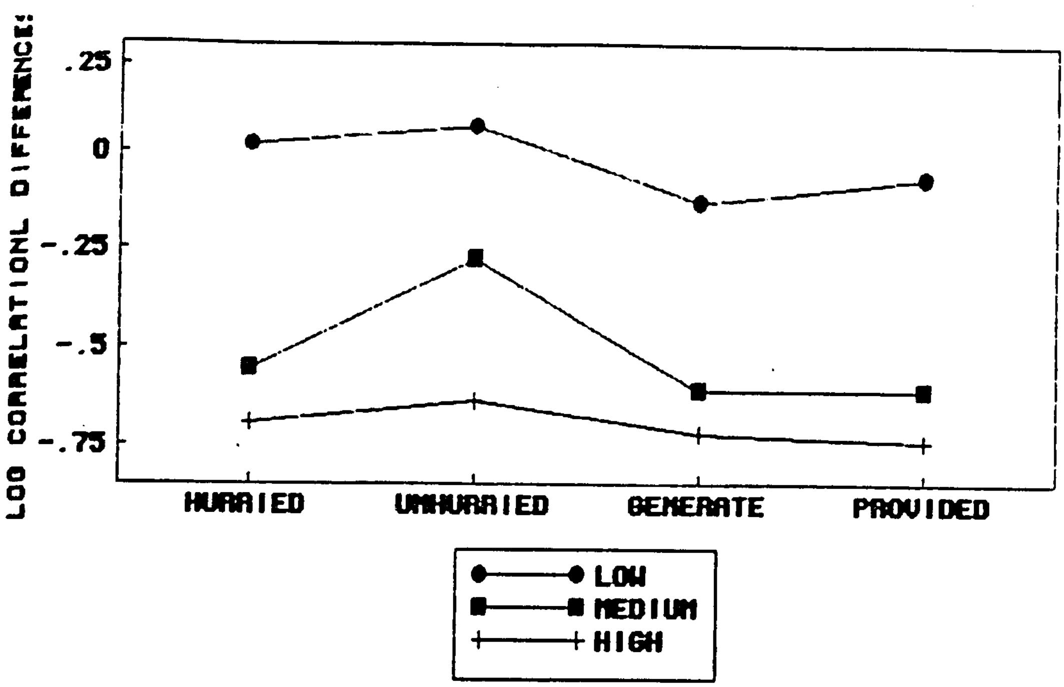
Effect	MSn	DFn	DFe	MSe	F	P
A at B 1	.862	2	15	.136	6.348	.010
A at B 2	.740	2	15	.106	6.996	.007
A at B 3	.589	2	15	.092	6.429	.010
A at B 4	.770	2	15	.089	8.697	.003
B at A 1	.046	3	45	.012	3.968	.014
B at A 2	.153	3	45	.012	13.227	.000
B at A 3	.012	3	45	.012	1.043	.383

Upper Triangle: .05 level ; Lower Triangle: .01 level

	A	B	C	D
A. GENERATE	X	-	-	s
B. PROVIDED	-	X	-	s
C. HURRIED	-	-	X	s
D. UNHURRIE	s	s	s	X

Upper Triangle: .05 level ; Lower Triangle: .01 level

	A	B	C
A. HIGH	X	-	s
B. MEDIUM	-	X	s
C. LOW	s	-	X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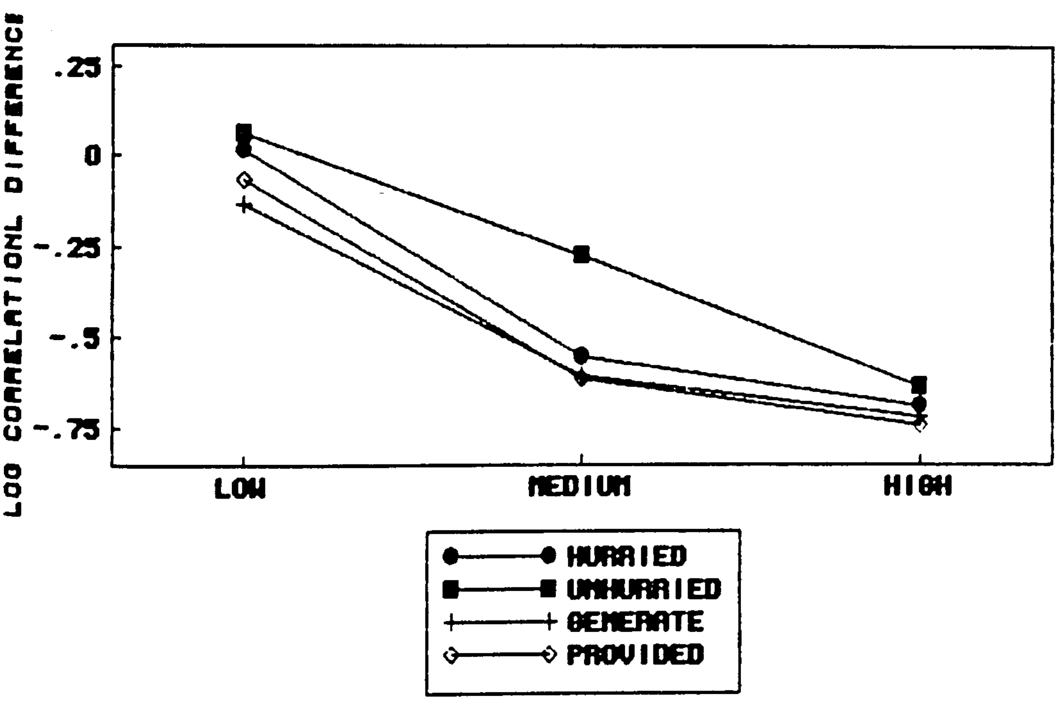
UNHURRIED
GENERATE
PROVIDED
LOW
MEDIUM
HIGH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MEDIUM
HIGH
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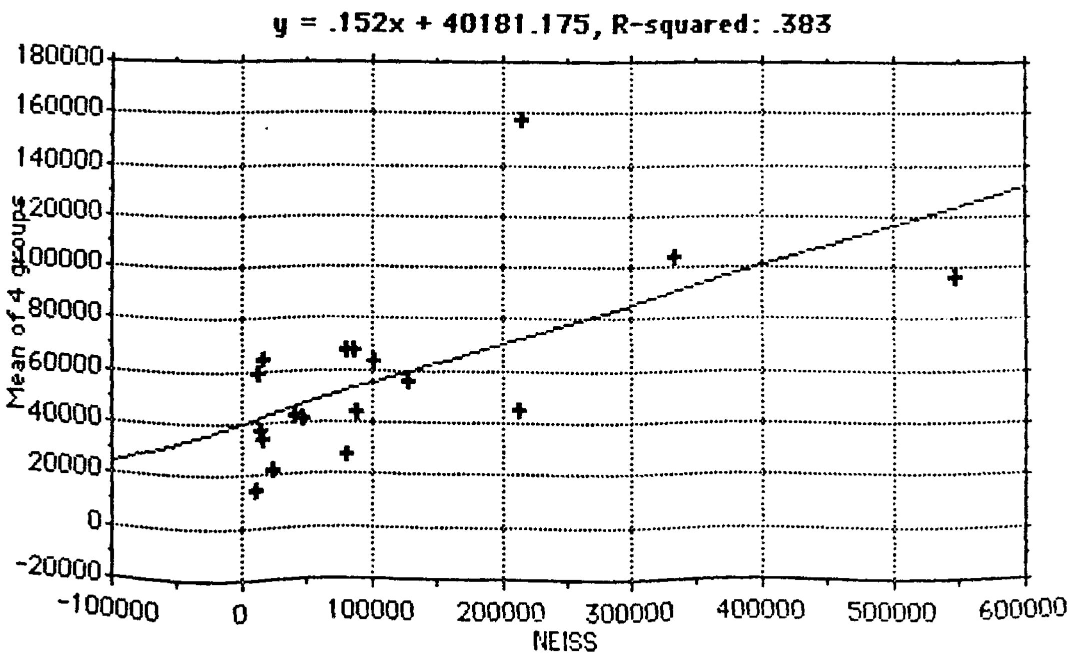
UNHURRIED
GENERATE
PROVIDED

Scatter Plots



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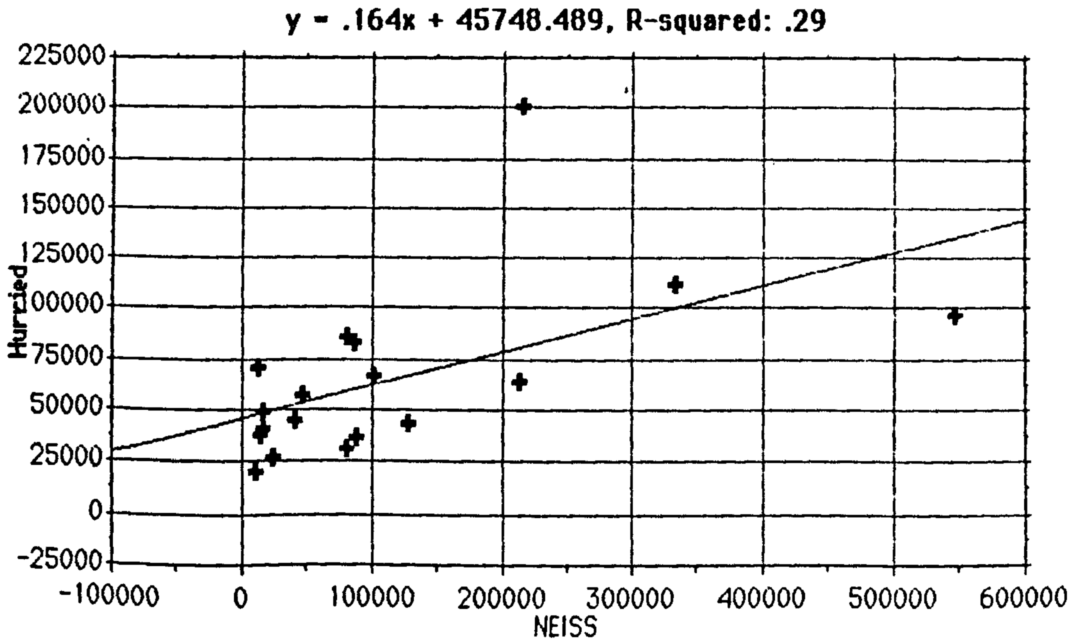

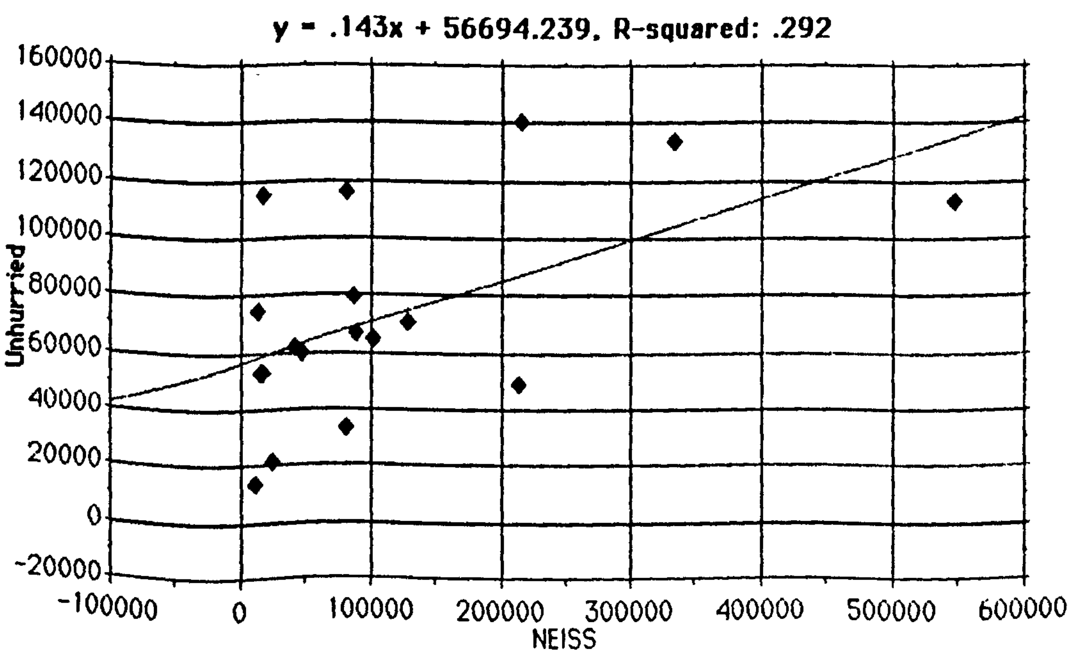

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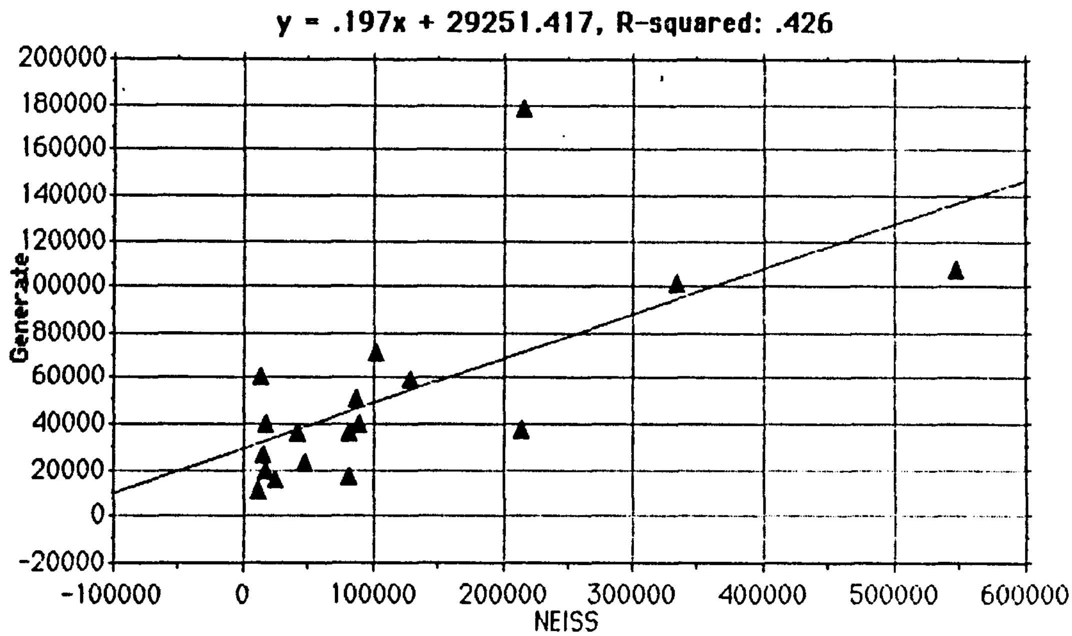

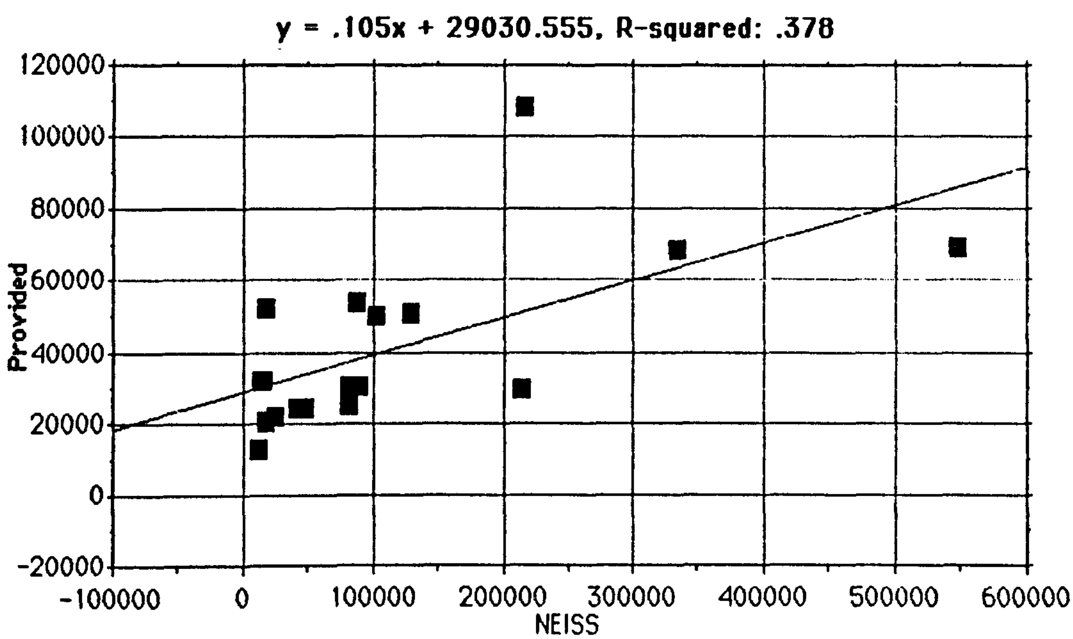

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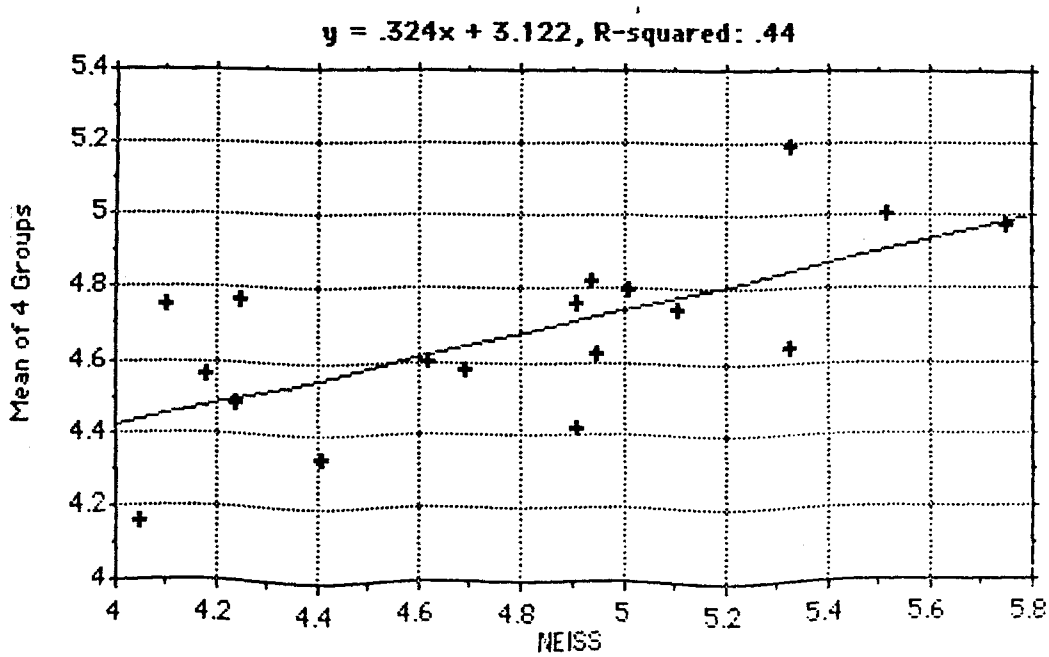

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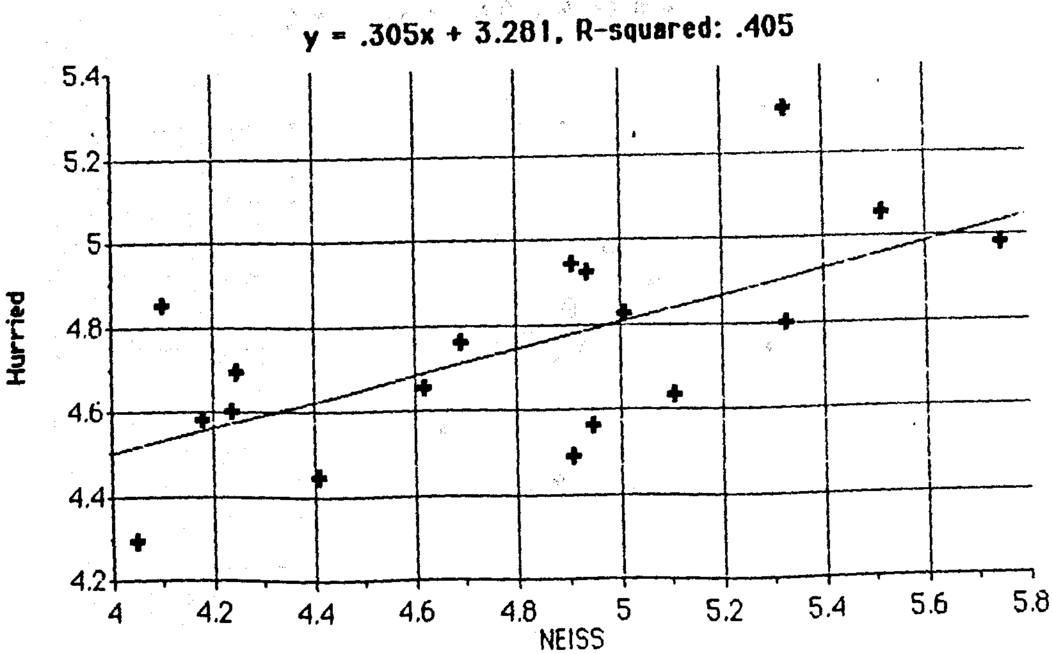

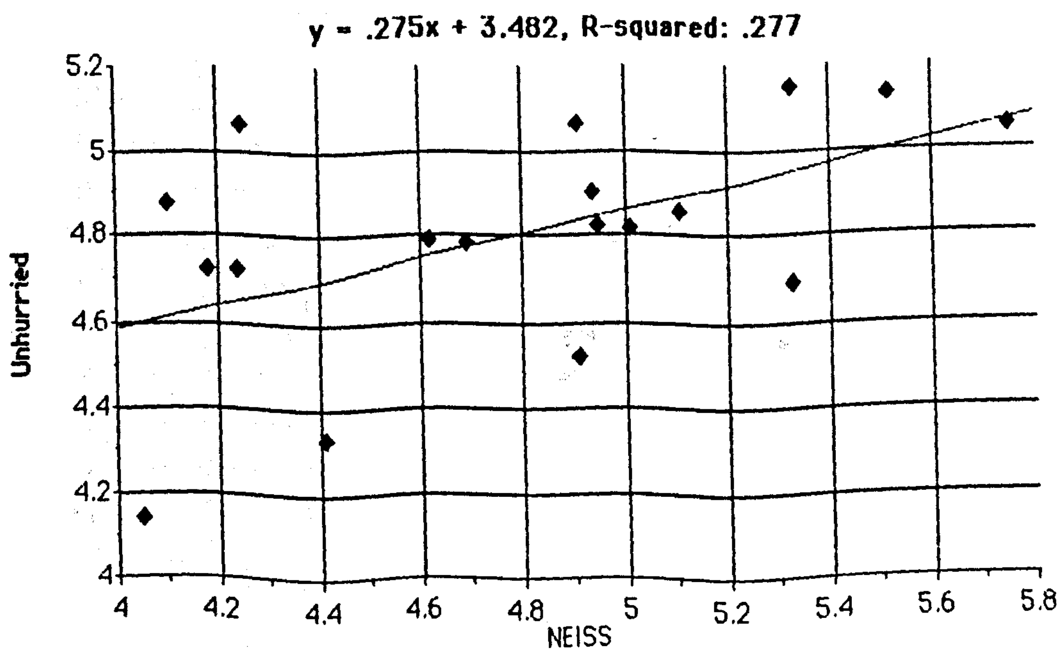

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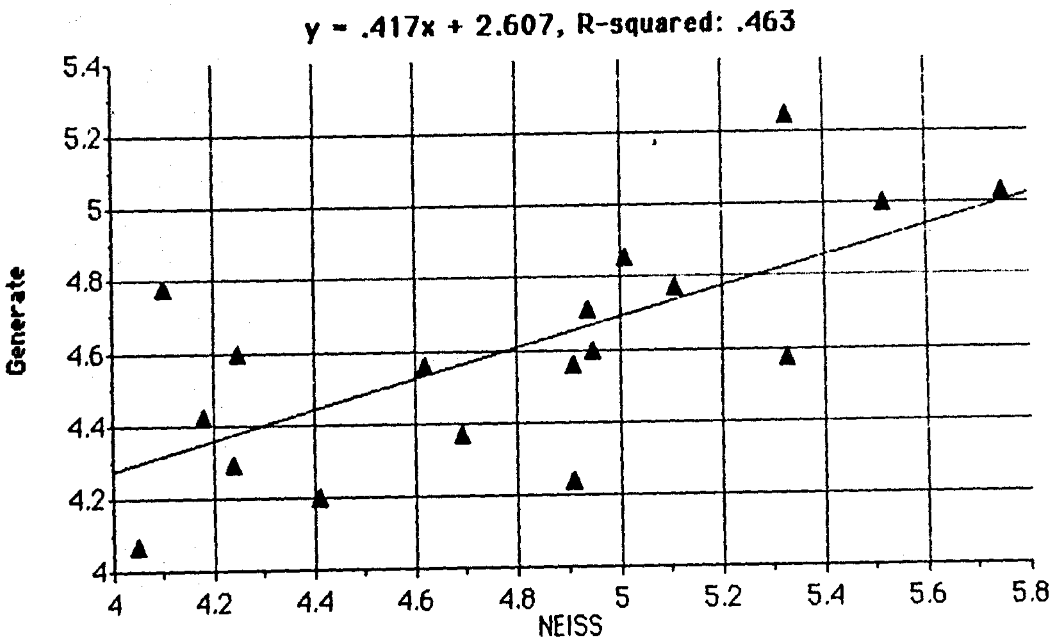

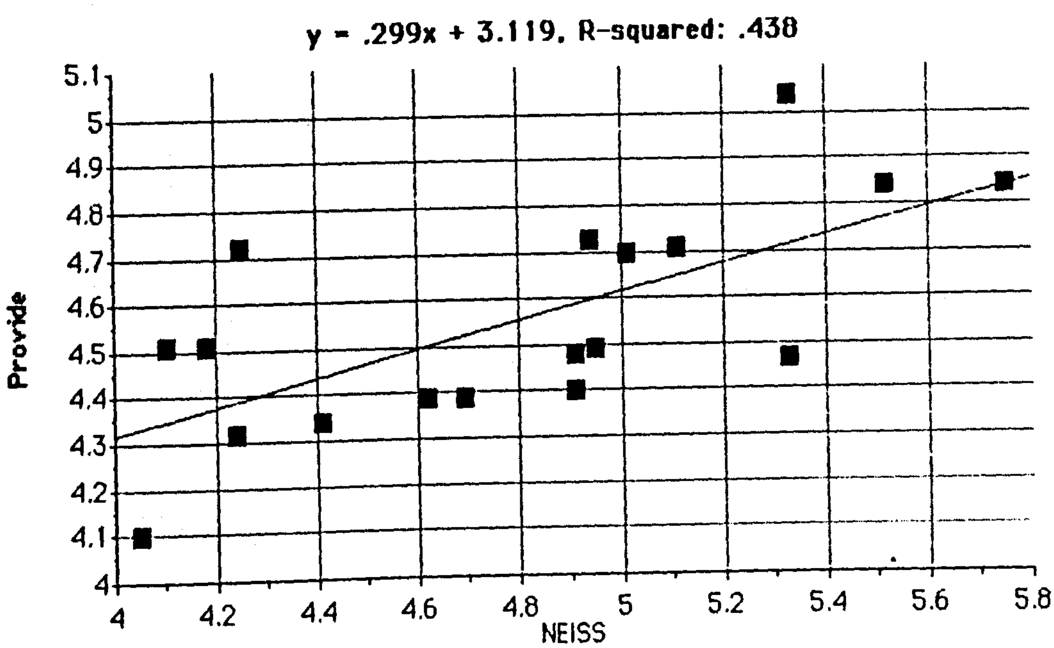

Appendix H

Data and Analyses for Precautionary Intent

Precaution Data and Means

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$ type precaut1.out

 8-SEP-88   SPSS-X RELEASE 2.2 FOR VAX/VMS
                                              PAGE    1
18:53:34    UNIVERSITY OF RICHMOND             DEC VAX-11/780 VMS V4.5


For VMS V4.5            UNIVERSITY OF RICHMOND          License Number 10534

*******************************************************************************
   1  0  TITLE
   2  0    MEANS FOR PRECAUTION AND CONFIDENCE
   3  0  FILE HANDLE
   4  0    DATA/NAME = 'PRECAUT.TEM'
   5  0  DATA LIST
   6  0    FILE = DATA RECORDS = 2
   7  0    /1 ID 1-2 GROUP 4 SEX 6 VACUUMP 8 FIREWORP 10 BLEACHP 12 FANSP 14
             GASP 16
   8  0     TVP 18 CHAINSAP 20 HAMMERP 22 SKATEP 24 DRINKP 26 ATVP 28
             LADDERP 30
   9  0     BATHTUBP 32 WINDOWP 34 NAILSP 36 DRUGSP 38 KNIVESP 40 CYCLESP 42
             RATING 44
  10  0    /2 VACCUMA 1 FIREWORA 3 BLEACHA 5 FANSA 7 GASA 9 TVA 11 CHAINSAA 13
  11  0     HAMMERA 15 SKATEA 17 DRINKA 19 ATVA 21 LADDERA 23 BATHTUBA 25
              WINDOWA 27
  12  0     NAILSA 29 DRUGSA 31 KNIVESA 33 CYCLES 35

THE ABOVE DATA LIST STATEMENT WILL READ   2 RECORDS FROM FILE DATA
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GROUP	1	4	4	F	1	0
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VACUUMP	1	8	8	F	1	0
FIREWORP	1	10	10	F	1	0
BLEACHP	1	12	12	F	1	0
FANSP	1	14	14	F	1	0
GASP	1	16	16	F	1	0
TVP	1	18	18	F	1	0
CHAINSAP	1	20	20	F	1	0
HAMMERP	1	22	22	F	1	0
SKATEP	1	24	24	F	1	0
DRINKP	1	26	26	F	1	0
ATVP	1	28	28	F	1	0
LADDERP	1	30	30	F	1	0
BATHTUBP	1	32	32	F	1	0
WINDOWP	1	34	34	F	1	0
NAILSP	1	36	36	F	1	0
DRUGSP	1	38	38	F	1	0
KNIVESP	1	40	40	F	1	0
CYCLESP	1	42	42	F	1	0
RATING	1	44	44	F	1	0
VACCUMA	2	1	1	F	1	0

FIREWORA	2	3	3	F	1	0
BLEACHA	2	5	5	F	1	0
FANSA	2	7	7	F	1	0
GASA	2	9	9	F	1	0
TVA	2	11	11	F	1	0
CHAINSAA	2	13	13	F	1	0
HAMMERA	2	15	15	F	1	0
SKATEA	2	17	17	F	1	0
DRINKA	2	19	19	F	1	0
ATVA	2	21	21	F	1	0
LADDERA	2	23	23	F	1	0
BATHTUBA	2	25	25	F	1	0
WINDOWA	2	27	27	F	1	0
NAILSA	2	29	29	F	1	0
DRUGSA	2	31	31	F	1	0
KNIVESA	2	33	33	F	1	0
CYCLES	2	35	35	F	1	0

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END OF DATALIST TABLE.

   13  0  VALUE LABELS
   14  0    GROUP 1 'HURRIED' 2 'UNHURR' 3 'GENERATE' 4' PROVIDE' 5 'ONLY'/
   15  0    SEX 1 'MALE' 2 'FEMALE'/
   16  0

 8-SEP-88   MEANS FOR PRECAUTION AND CONFIDENCE
                                                 PAGE   3
18:53:38    UNIVERSITY OF RICHMOND              DEC VAX-11/780 VMS V4.5

   17  0  COMPUTE LOW = (VACUUMP + FIREWORP + BLEACHP + FANSP + GASP + TVP)/6
   18  0  COMPUTE MEDIUM = (CHAINSAP + HAMMERP + SKATEP + DRINKP + ATVP +
              LADDERP)/6
   19  0  COMPUTE HIGH = (BATHTUBP + WINDOWP + NAILSP + DRUGSP + KNIVESP +
                CYCLESP)/6
   20  0  LIST / VARIABLES = GROUP LOW MEDIUM HIGH
   21  0

THERE ARE  2229752 BYTES OF MEMORY AVAILABLE.
THE LARGEST CONTIGUOUS AREA HAS  1783801 BYTES.

      356 BYTES OF MEMORY REQUIRED FOR LIST PROCEDURE.
      224 BYTES HAVE ALREADY BEEN ACQUIRED.
      132 BYTES REMAIN TO BE ACQUIRED.

 8-SEP-88   MEANS FOR PRECAUTION AND CONFIDENCE
                                                 PAGE   4
18:53:39    UNIVERSITY OF RICHMOND              DEC VAX-11/780 VMS V4.5
```

GROUP	LOW	MEDIUM	HIGH
1	3.50	4.50	4.50
1	4.17	5.00	3.67

1	1.50	4.50	3.83
1	4.17	6.17	6.50
1	2.83	4.83	4.33
1	4.50	5.83	6.00
1	3.83	5.50	4.50
1	3.33	5.67	3.50
1	4.17	5.67	5.17
1	3.67	4.83	5.33
1	5.83	6.33	6.33
1	4.67	5.67	6.00
1	4.33	5.67	6.83
1	2.67	6.33	4.00
1	3.67	4.67	4.17
1	4.50	4.67	6.17
2	4.33	6.17	6.17
2	4.00	6.67	4.00
2	5.83	7.33	6.33
2	5.50	6.33	6.17
2	2.83	5.00	4.83
2	4.00	6.00	5.33
2	3.67	5.33	4.33
2	4.67	5.50	4.67
2	3.50	4.00	3.17
2	4.17	5.17	6.00
2	3.00	6.83	5.17
2	5.00	6.83	6.17
2	5.83	6.83	6.33
2	4.50	7.50	7.17
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2	4.00	6.33	5.67
3	4.83	7.17	6.00
3	5.67	6.50	6.00
3	4.67	5.33	5.50
3	5.33	5.67	4.83
3	5.67	6.50	5.83
3	5.83	7.00	7.17
3	4.83	6.00	6.50
3	3.67	4.50	3.67
3	4.33	6.00	6.00
3	4.50	5.83	4.83
3	5.50	7.67	7.17
3	6.00	7.00	7.00
3	3.33	4.50	3.33
3	4.67	4.83	5.50
3	6.17	8.17	8.00
3	5.33	6.17	6.67
4	4.50	6.50	5.17
4	3.83	6.00	4.67
4	5.50	4.00	5.00

GROUP	LOW	MEDIUM	HIGH
4	4.33	6.17	5.50
4	4.17	5.83	4.67
4	4.67	6.50	5.83
4	4.33	5.17	4.17
4	5.33	6.33	5.83
4	6.83	8.33	7.33
4	4.33	6.00	6.83
4	7.00	7.83	7.33
4	6.00	7.00	6.00
4	5.83	6.83	7.33
4	5.33	4.83	6.33
4	5.00	5.17	6.67
4	3.50	4.50	5.33
5	4.33	5.00	5.67
5	5.33	6.33	6.17
5	5.00	7.00	6.50
5	3.00	4.17	3.50
5	5.50	5.83	4.83
5	4.17	6.17	5.33
5	4.17	5.67	3.83
5	4.67	6.33	5.17
5	3.67	6.17	4.50
5	5.67	7.00	6.67
5	7.17	6.17	7.00
5	6.33	7.17	6.67
5	4.83	6.17	5.83
5	4.50	4.50	4.83
5	5.67	6.67	7.17
5	4.17	6.50	5.17

NUMBER OF CASES READ = 80 NUMBER OF CASES LISTED = 80

8-SEP-88 MEANS FOR PRECAUTION AND CONFIDENCE
PAGE 6
18:53:40 UNIVERSITY OF RICHMOND DEC VAX-11/780 VMS V4.5

PRECEDING TASK REQUIRED 1.65 SECONDS CPU TIME; 2.47 SECONDS ELAPSED.

22 0 EXECUTE

8-SEP-88 MEANS FOR PRECAUTION AND CONFIDENCE
PAGE 7
18:53:41 UNIVERSITY OF RICHMOND DEC VAX-11/780 VMS V4.5

PRECEDING TASK REQUIRED 0.08 SECONDS CPU TIME; 0.08 SECONDS ELAPSED.

ANOVA Summary Table for Relax/Seagate0:MacTerminal 2.2:LMH
PRECAUTION GROUP M

Source of Variation	df	Sum of Squares	Mean Square	F	p	Epsilon Correction
A	4	27.994	6.998	2.935	.0260	
Error	75	178.819	2.384			
B	2	75.121	37.560	107.187	.0000	
AB	8	4.024	.503	1.435	.1862	
Error	150	52.563	.350			.98

HURRIED	LOW	3.8337
HURRIED	MEDIUM	5.3650
HURRIED	HIGH	5.0519
UNHURRIE	LOW	4.3956
UNHURRIE	MEDIUM	6.1869
UNHURRIE	HIGH	5.4800
GENERATE	LOW	5.0206
GENERATE	MEDIUM	6.1775
GENERATE	HIGH	5.8750
PROVIDED	LOW	5.0300
PROVIDED	MEDIUM	6.0619
PROVIDED	HIGH	5.8744
ONLY	LOW	4.8862
ONLY	MEDIUM	6.0531
ONLY	HIGH	5.5525

HURRIED	4.7502
UNHURRIE	5.3542
GENERATE	5.6910
PROVIDED	5.6554
ONLY	5.4973

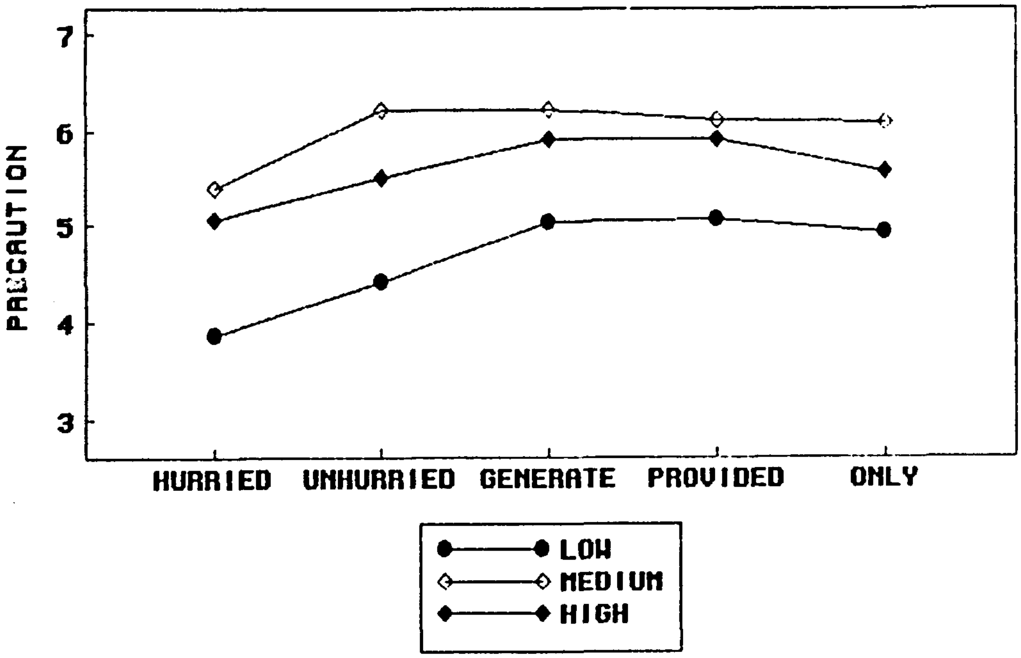
Upper Triangle: .05 level ; Lower Triangle: .01 level

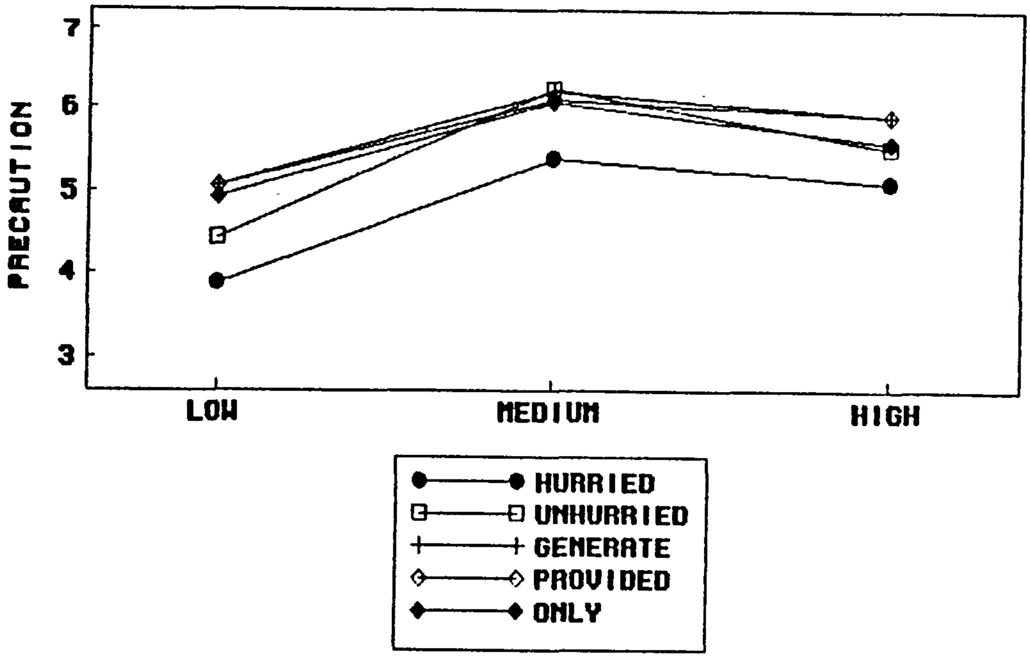
	A	B	C	D	E
A. HURRIED	X	-	s	s	s
B. UNHURRIE	-	X	-	-	-
C. ONLY	-	-	X	-	-
D. PROVIDED	s	-	-	X	-
E. GENERATE	s	-	-	-	X

LOW	4.6332
MEDIUM	5.9689
HIGH	5.5667

Upper Triangle: .05 level ; Lower Triangle: .01 level

	A	B	C
A. LOW	X	s	s
B. HIGH	s	X	s
C. MEDIUM	s	s	X


PRECAUTION
7
6
5
4
3
HURRIED
UNHURRIED
GENERATE
PROVIDED
ONLY
LOW
MEDIUM
HIGH


PRECAUTION
7
6
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4
3
LOW
MEDIUM
HIGH
HURRIED
UNHURRIED
GENERATE
PROVIDED
ONLY

Appendix I

Analyses for Injury Responses

T tests of Estimates and Injury Response

Unpaired t-Test X_1: Column 40 Y_1: AVACUUM

DF:	Unpaired t Value:	Prob. (2-tail):
62	-.189	.8507

Group:	Count:	Mean:	Std. Dev.:	Std. Error:
Group 1	1	11000	•	•
Group 2	63	14438.413	18051.372	2274.259

Unpaired t-Test X_2: Column 41 Y_2: AFIREWORKS

DF:	Unpaired t Value:	Prob. (2-tail):
62	.129	.898

Group:	Count:	Mean:	Std. Dev.:	Std. Error:
Group 1	33	60000	40792.922	7101.136
Group 2	31	58306.452	62832.406	11285.033

Unpaired t-Test X_3: Column 42 Y_3: ABLEACH

DF:	Unpaired t Value:	Prob. (2-tail):
62	.476	.6356

Group:	Count:	Mean:	Std. Dev.:	Std. Error:
Group 1	9	44888.889	41114.001	13704.667
Group 2	55	36010.909	53256.443	7181.097

Unpaired t-Test X_4: Column 43 Y_4: AFANS

DF:	Unpaired t Value:	Prob. (2-tail):
62	-.974	.3337

Group:	Count:	Mean:	Std. Dev.:	Std. Error:
Group 1	8	15375	19167.961	6776.897
Group 2	56	36007.143	59092.249	7896.534

T tests of Estimates and Injury Response

Unpaired t-Test X_5: Column 44 Y_5: AGASOLINE

DF:	Unpaired t Value:	Prob. (2-tail):
62	2.105	.0394

Group:	Count:	Mean:	Std. Dev.:	Std. Error:
Group 1	21	109761.905	207875.18	45362.083
Group 2	43	41953.488	32312.428	4927.599

Unpaired t-Test X_6: Column 45 Y_6: ATELEVISIONS

DF:	Unpaired t Value:	Prob. (2-tail):
62	1.636	.107

Group:	Count:	Mean:	Std. Dev.:	Std. Error:
Group 1	4	38750	33757.715	16878.858
Group 2	60	20514.333	20779.561	2682.63

Unpaired t-Test X_7: Column 46 Y_7: ACHAINSAWS

DF:	Unpaired t Value:	Prob. (2-tail):
62	-.262	.7941

Group:	Count:	Mean:	Std. Dev.:	Std. Error:
Group 1	22	40300	32902.728	7014.885
Group 2	42	43007.667	42122.457	6499.636

Unpaired t-Test X_8: Column 47 Y_8: AHAMMERS

DF:	Unpaired t Value:	Prob. (2-tail):
62	.748	.4572

Group:	Count:	Mean:	Std. Dev.:	Std. Error:
Group 1	31	47229.032	69446.378	12472.938
Group 2	33	35930.303	50435.277	8779.655

T tests of Estimates and Injury Response

Unpaired t-Test X_9: Column 48 Y_9: ASKATEBOARDS

DF:	Unpaired t Value:	Prob. (2-tail):
62	-.434	.6661

Group:	Count:	Mean:	Std. Dev.:	Std. Error:
Group 1	41	62564.634	124424.866	19431.899
Group 2	23	75217.391	84885.461	17699.842

Unpaired t-Test X_{10}: Column 49 Y_{10}: ADRINKING GLASSES

DF:	Unpaired t Value:	Prob. (2-tail):
62	.854	.3963

Group:	Count:	Mean:	Std. Dev.:	Std. Error:
Group 1	16	32937.5	30538.432	7634.608
Group 2	48	24408.542	35788.139	5165.573

Unpaired t-Test X_{11}: Column 50 Y_{11}: AATVS

DF:	Unpaired t Value:	Prob. (2-tail):
62	1.945	.0563

Group:	Count:	Mean:	Std. Dev.:	Std. Error:
Group 1	34	79632.353	65253.737	11190.923
Group 2	30	52600	41693.132	7612.09

Unpaired t-Test X_{12}: Column 51 Y_{12}: ALADDERS

DF:	Unpaired t Value:	Prob. (2-tail):
62	.159	.8743

Group:	Count:	Mean:	Std. Dev.:	Std. Error:
Group 1	26	44400	51549.122	10109.615
Group 2	38	42694.737	34403.849	5581.041

T tests of Estimates and Injury Response

Unpaired t-Test X_{13}: Column 52 Y_{13}: ABATHTUBS

DF:	Unpaired t Value:	Prob. (2-tail):
62	.349	.7283

Group:	Count:	Mean:	Std. Dev.:	Std. Error:
Group 1	27	67185.185	50399.204	9699.331
Group 2	37	60743.243	85594.297	14071.616

Unpaired t-Test X_{14}: Column 53 Y_{14}: AWINDOWS

DF:	Unpaired t Value:	Prob. (2-tail):
62	1.185	.2405

Group:	Count:	Mean:	Std. Dev.:	Std. Error:
Group 1	48	59535.417	44732.284	6456.549
Group 2	16	44856.25	36598.141	9149.535

Unpaired t-Test X_{15}: Column 54 Y_{15}: ANAILS

DF:	Unpaired t Value:	Prob. (2-tail):
62	.515	.6083

Group:	Count:	Mean:	Std. Dev.:	Std. Error:
Group 1	36	47902.778	60319.367	10053.228
Group 2	28	40878.571	44834.943	8473.008

Unpaired t-Test X_{16}: Column 55 Y_{16}: ADRUGS

DF:	Unpaired t Value:	Prob. (2-tail):
62	-1.598	.1151

Group:	Count:	Mean:	Std. Dev.:	Std. Error:
Group 1	56	143821.429	152743.529	20411.213
Group 2	8	251250	311101.155	109990.868

T tests of Estimates and Injury Response

Unpaired t-Test X_{17}: Column 56 Y_{17}: AKNIVES

DF:	Unpaired t Value:	Prob. (2-tail):
62	.029	.977

Group:	Count:	Mean:	Std. Dev.:	Std. Error:
Group 1	56	103625.893	133307.223	17813.927
Group 2	8	102125	165119.383	58378.518

Unpaired t-Test X_{18}: Column 57 Y_{18}: ACYCLES

DF:	Unpaired t Value:	Prob. (2-tail):
62	.245	.807

Group:	Count:	Mean:	Std. Dev.:	Std. Error:
Group 1	56	97767.857	141563.091	18917.164
Group 2	8	85250	62522.567	22105.066

T-TEST OF PRECAUTION AS FUNCTION OF ACCIDENTS

Unpaired t-Test X_5: GASA Y_5: GASP

DF:	Unpaired t Value:	Prob. (2-tail):
78	2.193	.0313

Group:	Count:	Mean:	Std. Dev.:	Std. Error:
Group 1	23	7	1.128	.235
Group 2	57	6.07	1.898	.251

Unpaired t-Test X_6: TVA Y_6: TVP

DF:	Unpaired t Value:	Prob. (2-tail):
78	1.882	.0636

Group:	Count:	Mean:	Std. Dev.:	Std. Error:
Group 1	5	4	[illegible]	.894
Group 2	75	2.587	1.603	.185

Unpaired t-Test X_7: CHAINSAA Y_7: CHAINSAP

DF:	Unpaired t Value:	Prob. (2-tail):
78	.367	.7146

Group:	Count:	Mean:	Std. Dev.:	Std. Error:
Group 1	24	8.5	.933	.19
Group 2	56	8.411	1.023	.137

Unpaired t-Test X_8: HAMMERA Y_8: HAMMERP

DF:	Unpaired t Value:	Prob. (2-tail):
78	.995	.3229

Group:	Count:	Mean:	Std. Dev.:	Std. Error:
Group 1	38	5.105	1.886	.306
Group 2	42	4.69	1.841	.284

T-TEST OF PRECAUTION AS FUNCTION OF ACCIDENTS

Unpaired t-Test X_9: SKATEA Y_9: SKATEP

DF:	Unpaired t Value:	Prob. (2-tail):
78	-.276	.783

Group:	Count:	Mean:	Std. Dev.:	Std. Error:
Group 1	50	6.18	1.859	.263
Group 2	30	6.3	1.915	.35

Unpaired t-Test X_{10}: DRINKA Y_{10}: DRINKP

DF:	Unpaired t Value:	Prob. (2-tail):
78	2.794	.0065

Group:	Count:	Mean:	Std. Dev.:	Std. Error:
Group 1	23	3.739	1.839	.384
Group 2	57	2.579	1.614	.214

Unpaired t-Test X_{11}: ATVA Y_{11}: ATVP

DF:	Unpaired t Value:	Prob. (2-tail):
78	1.76	.0824

Group:	Count:	Mean:	Std. Dev.:	Std. Error:
Group 1	38	7.632	1.651	.268
Group 2	42	6.976	1.675	.258

Unpaired t-Test X_{12}: LADDERA Y_{12}: LADDERP

DF:	Unpaired t Value:	Prob. (2-tail):
78	2.186	.0318

Group:	Count:	Mean:	Std. Dev.:	Std. Error:
Group 1	32	6.594	1.624	.287
Group 2	48	5.708	1.868	.27

T-TEST OF PRECAUTION AS FUNCTION OF ACCIDENTS

Unpaired t-Test X_{13}: BATHTUBA Y_{13}: BATHTUBP

DF:	Unpaired t Value:	Prob. (2-tail):
78	1.39	.1684

Group:	Count:	Mean:	Std. Dev.:	Std. Error:
Group 1	32	4.438	2.501	.442
Group 2	48	3.771	1.789	.258

Unpaired t-Test X_{14}: WINDOWA Y_{14}: WINDOWP

DF:	Unpaired t Value:	Prob. (2-tail):
78	2.657	.0096

Group:	Count:	Mean:	Std. Dev.:	Std. Error:
Group 1	59	5.102	1.739	.226
Group 2	21	3.905	1.868	.408

Unpaired t-Test X_{15}: NAILSA Y_{15}: NAILSP

DF:	Unpaired t Value:	Prob. (2-tail):
78	1.993	.0497

Group:	Count:	Mean:	Std. Dev.:	Std. Error:
Group 1	43	4.977	1.596	.243
Group 2	37	4.108	2.283	.375

Unpaired t-Test X_{16}: DRUGSA Y_{16}: DRUGSP

DF:	Unpaired t Value:	Prob. (2-tail):
78	.177	.8603

Group:	Count:	Mean:	Std. Dev.:	Std. Error:
Group 1	69	7.812	1.448	.174
Group 2	11	7.727	1.618	.488

T-TEST OF PRECAUTION AS FUNCTION OF ACCIDENTS

Unpaired t-Test X_{17}: KNIVESA Y_{17}: KNIVESP

DF:	Unpaired t Value:	Prob. (2-tail):
78	-.102	.9188

Group:	Count:	Mean:	Std. Dev.:	Std. Error:
Group 1	71	7.056	1.548	.184
Group 2	9	7.111	1.167	.389

Unpaired t-Test X_{18}: CYCLESA Y_{18}: CYCLESP

DF:	Unpaired t Value:	Prob. (2-tail):
78	1.532	.1296

Group:	Count:	Mean:	Std. Dev.:	Std. Error:
Group 1	69	5.261	1.86	.224
Group 2	11	4.364	1.362	.411

SIGN TEST-INJURY EXPERIENCE GROUPS

One Sample t-Test X_1: Injury Exp > Estimates

DF:	Sample Mean:	Pop. Mean:	t Value:	Prob. (2-tail):
17	.667	.5	1.458	.1631

One Sample t-Test X_2: Injury Exp > Precaution

DF:	Sample Mean:	Pop. Mean:	t Value:	Prob. (2-tail):
17	.833	.5	3.688	.0018

Appendix J

Analyses from Product Perception Study

	Q1 Freq Mean	Q2 Know Haz Mean	Q3 Severity Mean	Q4 Read Warning Mean	Q5 Tech Complex Mean	Q6 Likely Sev Inj Mean	Q7 Likely Min Inj Mean	Product Name	Frequency Group	Freq Use Group	Order
1	4.0000	3.8387	1.4516	1.0645	3.7419	.2903	.8710	Vacuum clean...	1	2	1
2	1.1935	5.9355	6.1613	4.9677	3.3226	1.5484	2.1290	Fireworks	1	1	2
3	2.2581	4.4839	3.6774	3.0968	2.6452	.5806	1.2903	Bleach	1	1	3
4	5.0968	5.3871	3.1290	1.5806	2.8065	.7742	1.2903	Fans	1	2	4
5	6.4516	5.5806	5.5806	3.7419	3.3871	1.3871	1.8387	Gasoline	1	3	5
6	6.7742	4.4516	2.1935	1.6129	5.9032	.7419	.7742	Televisions	1	3	6
7	.3226	5.5806	7.1935	6.5484	4.6774	.8387	1.1613	Chainsaws	2	1	7
8	3.3226	6.0000	4.0968	.8387	1.2903	.8065	3.7742	Hammers	2	2	8
9	.8065	5.1935	4.8065	1.1290	1.6452	.6452	1.2258	Skateboards	2	1	9
10	7.2581	5.2903	2.2581	.2903	1.1935	.8387	1.5484	Drinking glasses	2	3	10
11	1.3226	3.9355	7.1935	4.1935	5.8710	2.0000	1.8710	All terrain veh...	2	1	11
12	1.8065	6.2581	5.0645	1.3548	1.0000	1.3226	1.9355	Ladders	2	1	12
13	7.8710	5.1935	3.6774	.3871	2.3548	1.1935	1.8387	Bathtubs etc.	3	3	13
14	5.8710	5.7419	3.8710	.7742	1.8710	1.6452	2.4516	Windows etc	3	3	14
15	4.5484	5.8065	2.3871	.3871	1.3226	.7419	3.1613	Nails, screws ...	3	2	15
16	3.8065	5.5161	7.1290	6.9677	5.2258	1.9032	2.7097	Drugs and meds	3	2	16
17	6.7097	6.7742	6.3548	1.9677	1.1613	2.0000	4.4839	Knives	3	3	17
18	3.0645	5.9032	4.6774	1.3548	3.0000	1.6129	2.6452	Bicycles	3	2	18

Thesis Part 2 - Product Rating Means

One Factor ANOVA X_1 : Frequency Group Y_1 : Q1 Freq Mean

Analysis of Variance Table

Source:	DF:	Sum Squares:	Mean Square:	F-test:
Between groups	2	24.825	12.413	2.489
Within groups	15	74.799	4.987	p = .1165
Total	17	99.624		

Model II estimate of between component variance = 3.713

One Factor ANOVA X_1 : Frequency Group Y_1 : Q1 Freq Mean

Group:	Count:	Mean:	Std. Dev.:	Std. Error:
Group 1	6	4.296	2.249	.918
Group 2	6	2.473	2.561	1.045
Group 3	6	5.312	1.828	.746

One Factor ANOVA X_1 : Frequency Group Y_1 : Q1 Freq Mean

Comparison:	Mean Diff.:	Fisher PLSD:	Scheffe F-test:	Dunnett t:
Group 1 vs. 2	1.823	2.748	.999	1.414
Group 1 vs. 3	-1.016	2.748	.311	.788
Group 2 vs. 3	-2.839	2.748*	2.424	2.202

* Significant at 95%

Thesis Part 2 - Product Rating Means

One Factor ANOVA X_1 : Frequency Group Y_2 : Q2 Know Haz Mean

Analysis of Variance Table

Source:	DF:	Sum Squares:	Mean Square:	F-test:
Between groups	2	2.304	1.152	2.162
Within groups	15	7.994	.533	p = .1496
Total	17	10.298		

Model II estimate of between component variance = .31

One Factor ANOVA X_1 : Frequency Group Y_2 : Q2 Know Haz Mean

Group:	Count:	Mean:	Std. Dev.:	Std. Error:
Group 1	6	4.946	.808	.33
Group 2	6	5.376	.815	.333
Group 3	6	5.823	.531	.217

One Factor ANOVA X_1 : Frequency Group Y_2 : Q2 Know Haz Mean

Comparison:	Mean Diff.:	Fisher PLSD:	Scheffe F-test:	Dunnett t:
Group 1 vs. 2	-.43	.898	.521	1.02
Group 1 vs. 3	-.876	.898	2.162	2.079
Group 2 vs. 3	-.446	.898	.56	1.059

Thesis Part 2 - Product Rating Means

One Factor ANOVA X_1 : Frequency Group Y_3 : Q3 Severity Mean

Analysis of Variance Table

Source:	DF:	Sum Squares:	Mean Square:	F-test:
Between groups	2	6.226	3.113	.917
Within groups	15	50.902	3.393	p = .4209
Total	17	57.128		

Model II estimate of between component variance = -.14

One Factor ANOVA X_1 : Frequency Group Y_3 : Q3 Severity Mean

Group:	Count:	Mean:	Std. Dev.:	Std. Error:
Group 1	6	3.699	1.857	.758
Group 2	6	5.102	1.894	.773
Group 3	6	4.683	1.773	.724

One Factor ANOVA X_1 : Frequency Group Y_3 : Q3 Severity Mean

Comparison:	Mean Diff.:	Fisher PLSD:	Scheffe F-test:	Dunnett t:
Group 1 vs. 2	-1.403	2.267	.87	1.319
Group 1 vs. 3	-.984	2.267	.428	.925
Group 2 vs. 3	.419	2.267	.078	.394

Thesis Part 2 - Product Rating Means

One Factor ANOVA X_1 : Frequency Group Y_4 : Q4 Read Warning Mean

Analysis of Variance Table

Source:	DF:	Sum Squares:	Mean Square:	F-test:
Between groups	2	1.506	.753	.154
Within groups	15	73.311	4.887	p = .8585
Total	17	74.817		

Model II estimate of between component variance = -2.067

One Factor ANOVA X_1 : Frequency Group Y_4 : Q4 Read Warning Mean

Group:	Count:	Mean:	Std. Dev.:	Std. Error:
Group 1	6	2.677	1.516	.619
Group 2	6	2.392	2.45	1
Group 3	6	1.973	2.522	1.03

One Factor ANOVA X_1 : Frequency Group Y_4 : Q4 Read Warning Mean

Comparison:	Mean Diff.:	Fisher PLSD:	Scheffe F-test:	Dunnett t:
Group 1 vs. 2	.285	2.721	.025	.223
Group 1 vs. 3	.704	2.721	.152	.552
Group 2 vs. 3	.419	2.721	.054	.329

Thesis Part 2 - Product Rating Means

One Factor ANOVA X_1 : Frequency Group Y_5: Q5 Tech Complex Mean

Analysis of Variance Table

Source:	DF:	Sum Squares:	Mean Square:	F-test:
Between groups	2	4.74	2.37	.879
Within groups	15	40.435	2.696	p = .4354
Total	17	45.175		

Model II estimate of between component variance = -.163

One Factor ANOVA X_1 : Frequency Group Y_5: Q5 Tech Complex Mean

Group:	Count:	Mean:	Std. Dev.:	Std. Error:
Group 1	6	3.634	1.182	.482
Group 2	6	2.613	2.106	.86
Group 3	6	2.489	1.502	.613

One Factor ANOVA X_1 : Frequency Group Y_5: Q5 Tech Complex Mean

Comparison:	Mean Diff.:	Fisher PLSD:	Scheffe F-test:	Dunnett t:
Group 1 vs. 2	1.022	2.021	.581	1.078
Group 1 vs. 3	1.145	2.021	.73	1.208
Group 2 vs. 3	.124	2.021	.009	.13

Thesis Part 2 - Product Rating Means

One Factor ANOVA X_1 : Frequency Group Y_6 : Q6 Likely Sev Inj Mean

Analysis of Variance Table

Source:	DF:	Sum Squares:	Mean Square:	F-test:
Between groups	2	1.251	.625	2.628
Within groups	15	3.57	.238	p = .1051
Total	17	4.821		

Model II estimate of between component variance = .194

One Factor ANOVA X_1 : Frequency Group Y_6 : Q6 Likely Sev Inj Mean

Group:	Count:	Mean:	Std. Dev.:	Std. Error:
Group 1	6	.887	.484	.198
Group 2	6	1.075	.507	.207
Group 3	6	1.516	.472	.193

One Factor ANOVA X_1 : Frequency Group Y_6 : Q6 Likely Sev Inj Mean

Comparison:	Mean Diff.:	Fisher PLSD:	Scheffe F-test:	Dunnett t:
Group 1 vs. 2	-.188	.6	.223	.668
Group 1 vs. 3	-.629	.6*	2.494	2.233
Group 2 vs. 3	-.441	.6	1.225	1.565

* Significant at 95%