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Bismarck J. Manes

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A MARKET ANALYSIS OF CONSUMER BEHAVIOR
FOR COMPANIES IN A SELF-INSURANCE GROUP

by

Bismarck J. Manes Jr.

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A MARKET ANALYSIS OF CONSUMER BEHAVIOR
FOR COMPANIES IN A SELF-INSURANCE GROUP

Bismarck J. Manes Jr., M.A.

Western Michigan University, 2006

This study examined variables that influenced the purchase of costly safety equipment by small business owners. Participants were 21 members of a self-insurance group (SIG) comprised of auto recyclers. Eight sets of variables were examined: (a) marketing tools (video, graphic safety data, and price discount), (b) business demographics, (c) worker's compensation history, (d) personal history, (e) available technology, (f) safety management practices, (g) safety products purchased in the past, and (h) interest in safety services provided by the SIG. Purchasers (N=7) and non-purchasers (N=14) were divided into groups, and independent t-tests were calculated for each variable. Only one of 45 variables was statistically significant: purchase of other safety equipment in the past three years. The results nonetheless suggested other variables might have influenced purchasing: the size of the company, safety compensation costs, and current safety management practices. Additionally, the video appeared to be a much more effective marketing tool than either graphic safety data or a price discount. While exploratory in nature, this study was the first to identify potential variables affecting purchasing behavior of SIG members, and lays the foundation for future investigations with this innovative and growing consumer market.

ACKNOWLEDGMENTS

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Introduction

Analysis of consumer behavior based on the principles of behavior analysis

(Foxall, 2003) has contributed much to the literature in consumer and marketing research

since the ground-breaking work of John B. Watson in the 1920s (Hantula, DiClemente, &

Rajala, 2000). Watson assumed consumer behavior could be predicted if the person was

viewed as an organic machine, i.e., the behavior of a person was much like controlling

the behavior of a machine. Therefore, Watson conceptualized advertising not as a system

for disseminating information but rather as the process of establishing communication

networks between producers and groups of consumers with the goal of controlling

consumer behavior through behavioral techniques (i.e., respondent conditioning) used to

condition emotional responses. In the 1920s, Watson applied these strategies by

contributing to the creation of a national advertising industry which contacted the

American populace via mainstream media sources (DiClemente & Hantula, 2003).

Though Watson's influence on the advertising industry was immense and long-

lasting (product pairing is seen in most modern advertisements), his work did not

influence empirical research until the 1960s. Lindsley (1962) was the first to embark on

laboratory investigations of the applied operant theory of consumer behavior. In a

controlled laboratory setting, participants holding a small switch were exposed to

conjugate schedules of reinforcement such that the participant's responding directly and

immediately controlled the intensity, or brightness, of an image presented on a television.

This preparation has been utilized to examine various questions relevant to advertisement

effectiveness in terms of such variables as attending to an advertisement's story board,

the effects of satiation on advertising, and subjective "interest" in magazine articles. In

addition, respondent conditioning experiments have been designed with the goal of understanding pairing procedures in advertising media (e.g., pairing arbitrary stimuli and music), investigating advertising "tone" (e.g., positive versus negative) on subjective brand "attitude," influencing brand "attitudes" with visual images, and the effects of forward, backward, and second order conditioning on consumers (DiClemente & Hantula, 2003).

In the 1970s, partly as a result of the new applied behavior analysis movement (Baer, Wolf, & Risley, 1968), behavioral consumer research moved from lab studies focused on theory construction to research that emphasized changes in socially significant behaviors applied in situ. For example, research interested in modifying recycling patterns has examined the effects of visual prompts (i.e., flyers) which were handed out at supermarkets to increase returns of soft drink bottles (Geller, Farris, & Post, 1973). Another example involved using raffle and contest contingencies to increase recycling on a college campus (Witmer & Geller, 1976). Austin, Hatfield, Grindle, and Bailey (1993) increased recycling in an office setting by posting sign prompts alone. Applied researchers have also examined the utility of behavioral techniques for increasing energy conservation practices in residential and office settings, changing consumer behavior in the context of purchasing goods and services, and changing food choices towards healthier options.

This body of research describes behavioral procedures for influencing de-consumption, the disposition of goods, and resource conservation related behaviors. It is clear from this work that behavioral techniques may be used to successfully influence consumer-related practices. To further this literature, researchers must also begin

emphasizing the overall effectiveness of behavioral techniques for *increasing*

consumption of products. Such an approach would be in accord with more common

commercial marketing strategies (DiClemente & Hantula, 2003) and would occasion

opportunities for behavior analysts to disseminate behavioral strategies in marketing and

economics research publications.

Before reviewing two interesting examples of current research in consumer

behavior found in the *Journal of Economic Psychology*, the theoretical models on which

these empirical investigations are based will be discussed. This will facilitate comparison

of two models which, though both based on behavior analytic principles, differ in their

view of consumer behavior. Next, recent research examining increasing consumption

shall be discussed. The first study focuses on consumer brand choice at a supermarket

(Foxall & Schrezenmaier, 2003) and the second examines how pricing affects purchase

patterns in a simulated internet environment (Smith & Hantula, 2003). Finally, areas of

potential future research will be presented.

Operant Models of Consumer Behavior

Many arguments have been made supporting a radical behaviorist interpretation

of consumer choice (Foxall, 1986; Guerin, 2003) and several behavioral models of

marketing practice have been proposed (Foxall, 1992; Nord & Peter, 1980). The strength

of the radical behaviorist paradigm rests in its adherence to empirically testable theories

based on observable behavior. This strategy can be contrasted with traditional

approaches to consumer research which describe consumer choice in terms of

information processing and the cognitive precursors of consumption. Models derived

within competing paradigms (e.g., psychodynamics) typically rely on unobservable

phenomena (e.g., rationality) to explain consumer behavior (Foxall, 1986). In addition, researchers adhere to dualistic modes of analysis because this approach is amenable to the reification of currently fashionable consumer constructs. In other words, mainstream theories of consumption may influence researchers to adhere to accepted, though not validated experimentally, explanatory fictions such as "rationality" within the consumer's "mind" in order to conform to an existing theoretical framework. A behavioral perspective, on the other hand, provides a relatively straightforward and unambiguous empirical approach to consumer behavior theory (Foxall, 1986). In addition, in the last century, the behavioral approach to economics and consumer theory has steadily gained exposure in journals typically accessed by non-behaviorists, e.g., *The Journal of Marketing Research.*

Foxall's Behavioral Perspective Model

Foxall (1992, 1999) constructed the Behavioral Perspective Model (BPM) with the purpose of expanding the scope of contribution of behavior analysis to consumer research. The BPM states that consumer behavior is related to the environmental contingencies that control the behavior's rate of occurrence. Accordingly, this perspective interprets the consumer setting based on the three-term contingency (Skinner, 1953)—antecedent stimuli, behavior, and consequences—by identifying these variables and the effects of their interrelationship within the consumer setting. Further, the BPM recognizes the complexity of the situations in which much human social behavior takes place and therefore conceptualizes behavior at a molar, or systems, level of analysis (Foxall, 1992). In essence, the whole sequence of pre-purchase, purchase, and post-purchase activity is analyzed as a single response, or a single functional, unit (Baum,

2005). Accordingly, the strength of the response unit (i.e., purchase activity) is a function of the individual consumer's history of reinforcement. In addition, consumer activity is generalizable from one retail setting to another and may be extended to an array of consumable items (Foxall, 1992).

The BPM analyzes consumer behavior in three layers: the classification of consumer behavior, the continuum of the consumer behavior setting, and the consumer situation. In terms of classification, the BPM distinguishes between three kinds of consequences which determine behavior: utilitarian reinforcement, informational reinforcement, and aversive outcomes. *Utilitarian reinforcement* refers to increases in utility to the organism. Utility, in this sense, is analogous to value in use. This concept derives its influence from the functional performance of a product or service and from the feelings of enjoyment evoked by consuming it. *Informational reinforcement*, on the other hand, is akin to exchange value. Informational reinforcement is verbal and, therefore, is mediated by the actions of others. Examples include increases in social status (i.e., buying a luxury auto), prestige, and acceptance achieved by a consumer's efforts. Finally, *aversive consequences* are conceptually tied to all consumer events. In essence, this model assumes that consumer behavior is determined by the interaction of two response strengths—approach and avoidance responses. Therefore, consumer behavior simultaneously incurs reinforcement and response cost as a direct consequence of performance. Inherently, all consumer events involve the potential for both loss and gain. In conclusion, the classification of consumer behavior may be determined by distinguishing among the consequences involved in consumer events. It is assumed that the utility of these concepts will be determined through empirical analyses (Foxall, 1998).

The second level of the BPM involves the continuum of the consumer behavior setting. This continuum may be described as ranging from relatively open to relatively closed. An *open setting* provides that the consumer may perform behaviors from a wide range of repertoires to gain a variety of reinforcers. A *closed setting*, conversely, encourages conformity by presenting reinforcers contingent on one or two very closely specified responses and punishing all responses which deviate from the target response(s). In natural settings, the constraint placed on consumer settings varies greatly between the extremes of a purely open and a purely closed setting. By combining the consumer behavior classifications and the concept of continuum of setting, Foxall (1998) has composed a system for describing the *scope* of the consumer behavior setting. The consumer behavior setting scope is presented in Figure 1 as a matrix.

The third and final level discussed in the BPM is that of the *consumer situation*. Foxall (1998) has described this layer as "the meeting place of the consumer's learning history and the current consumer behavior setting" (p. 53). The consumer's learning history determines what can act as a discriminative stimulus of current behavior and, therefore, what events will act as probable reinforcers or punishers. This history, in turn, interacts with the current consumer setting such that the current setting provides the occasion for appropriate consumer responses based on past experience. In this way, consumer behavior is viewed as a function of the interaction of historical and current environments (Foxall). In summary, the BPM analyzes consumer behavior through an understanding of classes of consumer behavior based on its consequence, by determining the relative openness or closedness of the consumer setting, and through an appreciation of the influence of both historical and current contextual variables.

Closed ←————————————→ *Open*

	Contingency Category 2 FULFILLMENT + P + A - D	**Contingency Category 1** STATUS CONSUMPTION + P + A + D
ACCOMPLISHMENT (high Utilitarian, high Informational)		
HEDONSIM (high Utilitarian, low Informational)	**Contingency Category 4** INESCAPABLE ENTERTAINMENT + P - A - D	**Contingency Category 3** POPULAR ENTERTAINMENT + P - A + D
ACCUMULATION (low Utilitarian, high Informational)	**Contingency Category 6** TOKEN-BASED CONSUMPTION - P + A - D	**Contingency Category 5** COLLECTING AND SAVING - P + A +D
MAINTENANCE (low Utilitarian, low Informational)	**Contingency Category 8** MANDATORY CONSUMPTION - P - A - D	**Contingency Category 7** ROUTINE PURCHASING - P - A + D

Figure 1. The BPM contingency matrix and pattern of emotional response to consumer situations as presented by Foxall (1998). + P, + A, and + D indicate high pleasure, high arousal, and high dominance respectively; - P, - A, and – D indicate low pleasure, low arousal, and low dominance respectively.

Hantula's Behavioral Ecology of Consumption Model

The behavioral ecology of consumption model (DiClemente & Hantula, 2003) analyzes consumer behavior in terms of the short- and long-term adaptive importance of consumables for the organism. Because this model conceptualizes consumer behavior as being selected through evolutionary processes, this model is analogous to foraging theories of behavior and it uses quantitative models of foraging to guide experimentation and data interpretation. Multiple layers of foraging activities as assumed in the behavioral ecology model include search, choice, consumption, disposition, and handling (DiClemente & Hantula). Traditional prey and patch models are based on the assumption that foraging choices reflect optimization of energy intake (E) relative to time spent engaging in foraging (T) and is expressed quantitatively as E/T. In addition, foraging as a process provides the organism with (a) opportunities to behave and (b) resource costs that influence the optimality of choices (Smith & Hantula, 2003).

An important aspect of the behavioral ecology model's conceptual framework emerged from basic operant research based on the *delay-reduction hypothesis*. Delay-reduction views the layers of foraging activities as each contributing to the total delay in a choice sequence. This hypothesis states that the effectiveness of a conditioned reinforcer is a function of the reduction in the delay to the delivery of the primary reinforcer with which the conditioned reinforcer is correlated (Smith & Hantula, 2003). The goal of delay-reduction research is an understanding of patterns of behavior over long periods of time based on reinforcer magnitude or quality and delay until presentation. This quantitative delay-reduction model may be logically extended to the analogy of foraging practices and, thus, is utilized in the behavioral ecology of

consumption model to predict consumption patterns in preparations which simulate

foraging situations.

Current Research in Consumer Behavior

Reviews of the literature conclude that relatively little work has been conducted

from a behavioral perspective with respect to increasing consumption of products

(Hantula et al., 2000). Though some studies have explored techniques to increase

consumption (McCall & Belmont, 1996; McNally & Abernathy, 1989), the bulk of the

research examines the elimination of behavior or "de-consumption" (Austin et al., 1993;

Geller, Winett, & Everett, 1982). An experimental analysis of consumption behaviors is

complex in that typical consumer settings consist of relatively unrestrained or

uncontrollable environments. Due to the variable nature of typical consumer

environments, contingencies of reinforcement cannot be inferred from the behavior and

its consequences. Thus, experimental validation of behavioral models of consumer

behavior is required to ascertain whether these models are systematic and consistent with

the predictions of a behavioral analysis (Foxall, 1992).

Understanding Consumer Brand Choice

Foxall and Schrezenmaier (2003) were interested in examining whether matching

and maximization theories could explain (a) the degree of substitutability among product

brands and (b) the sensitivity of these products to price manipulations. Preliminary

research with consumer brand choice showed nearly perfect matching and maximization

in these situations. A behavioral analysis would predict that choices would be

systematically related to the schedule of rewards contingent on selection of the

product(s). Further, and in accordance with consumer theory from an economic

perspective, it is assumed that a particular brand will attract a relatively small proportion of buyers who consume that brand exclusively. In essence, heavy purchasers of a given brand will, in the course of a year for instance, buy *other* brands within the product category much more than they buy their subjectively *favored* brand (i.e., multi-brand purchasing). It was the goal of Foxall and colleagues to empirically test the feasibility of these hypotheses.

The substitutability of brands within product categories has been examined via matching analyses based on Herrnstein's (Herrnstein, 1961; Herrnstein, Rachlin, & Laibson, 1997) work on choice. Herrnstein (Herrnstein et al., 1997) defined choice as the rate of inter-subjectively observable events that are temporally distributed across choice options. His matching equation, which sprung from his work with non-humans in the basic laboratory, represents response frequency as a function of reinforcement frequency. From a molar perspective, Herrnstein's *matching law* states that the average reinforcement rate of response X comes to equal the average reinforcement rate of response Y. This paradigm contributes a framework from which to begin understanding consumption from a behavior analytic perspective (Foxall, 2003).

Expanding upon the work of Herrnstein, Baum (1974) proposed the *generalized matching law* in which the constants *b* and *s* represent bias and sensitivity, respectively:

(1) $$B_x/B_y = b(R_x/R_y)^S.$$

Bias describes preference for one reinforcer based on characteristics such as physical placement in the consumer situation or aesthetic qualities such as color or shape. *Sensitivity* in this model refers to the consumer's responsiveness to concurrently available alternate reinforcers.

In the current study by Foxall and Schrezenmaier (2003), data were collected for 80 adult consumers randomly selected from 10,000 households in Great Britain. After each shopping occasion, participants scanned their purchases into a barcode reader. Data were downloaded and organized in order to provide information of participants' shopping trends. The data presented in the article consist of a sub-sample of the 80 participants observed over a 16-week period. Prices paid, brand name, and quantity bought were collected for products in a range of categories: fruit juice, tea, butter, beans, coffee, cheese, and cereal (Foxall & Schrezenmaier).

The matching analysis utilized in this study followed the procedures designed by Herrnstein for use with matching research conducted on non-human and human subjects (Herrnstein et al., 1997). The matching law, in the context of consumer research, is translated into the amount purchased of each brand as a proportion of the total amount of the category purchased (*amount bought ratio*) as a function of the amount spent on that brand as a proportion of the total amount spent on the overall product category (*amount paid ratio*). *Maximization*, or responding which produces a maximal probability of reinforcement when two or more variable ratio schedules are available concurrently, was visually analyzed by the researchers by plotting the amount paid ratio against the probability of reinforcement. In this framework, the probability of reinforcement was operationalized as the reciprocal of the price of brand X over the reciprocal of the price of brand X plus the reciprocal of the mean of the prices of the other brands (Y) available to the consumer, such that:

(2) $$1/P_X/(1/P_X + 1/P_Y).$$

Results for this study will be summarized in three categories: *matching*, *multi-brand purchasing*, and *maximization.*

Matching. Within each of the nine product categories examined in this study, matching analyses (as described above) revealed that the brands purchased were close substitutes. This was determined by expressing the matching law logarithmically as a power function as described in Baum's (1974) generalized matching equation. In this paradigm, the unity of the exponent *s* (in other words, how closely this variable approximates a value of 1) indicates substitutability or lack of preference for one alternative over another (Equation 1). In this study, a high degree of substitutability was found for all products for all consumers who practiced multi-brand purchasing. In sum, multi-brand consumption patterns were more frequent than single-brand purchasing, as will be elaborated upon in the next section.

Multi-brand purchasing. Multi-brand purchasing was found for all of the products examined in this study. In general, the proportions of consumers who were sole purchasers of a particular brand were not as robust as expected. For example, the highest proportions for consumers who purchased only one particular brand involved fruit juices, where 44% were single-brand consumers, and butter where 59% were single-brand consumers. In sum, the degree of consistency as predicted by behavioral economics on brand choice in terms of whether consumers maximize by always selecting the cheapest alternative requires further empirical work and more thorough conceptual explanation based on these results.

Maximization. Maximization was observed with this group of consumers in that they consistently chose the cheapest brand on each shopping occasion. In general, the

results are consistent with the predictions of the behavioral economics model. More specifically, however, the set of product brands from which the majority of consumers purchased included only premium brands. Therefore, consumers did not maximize in any absolute sense because in each product set there were "economy" or generic product equivalents available that were considerably cheaper but were not among the brands within the consumers' product-selection repertoire. Interestingly, these results are consistent with the marketing view of branding whereby consumers' product-selection repertoires are determined according to individual standards of product quality and the purchase of the most price-advantageous brand within that set.

Understanding Pricing Effects and Consumer Behavior

Smith and Hantula (2003) posited that pricing variability in simulated Internet store environments would result in patch sampling behaviors as predicted by optimal foraging theory. In essence, it was assumed that the foraging organism would seek out the patch that most consistently provided the greatest energy per time input ratio. In addition, it was believed that pricing variability would yield delay-reduction effects similar to those produced with literal delay manipulations. This hypothesis was tested using full-time college students in an operant laboratory. The experimenter asked participants to accomplish a basic task according to a fictional scenario. Participants played the role of a "bulk CD buyer for a fictional disk jockey company" (Smith & Hantula) where their job entailed shopping for compact disks in a simulated Internet shopping situation. Unbeknownst to the "buyers," mean CD prices varied across the five experimenter controlled virtual stores; that is, store mean CD prices were $9.99, $11.99, $13.99, $15.99, and $17.99 with a randomly generated range of $4 around each mean for

each store. Participants were asked to purchase 40 CDs for the company from a list of 60

possible titles. A performance incentive in the form of opportunities to win bona fide $30

gift certificates was made contingent upon the number of successful sessions he or she

completed.

Virtual stores were identical in every aspect except mean CD price. In addition to

the variability introduced by price fluctuations, each CD was assigned a constant "in-

stock" probability (i.e., product availability) of 0.80. In terms of measures, multiple

dependent variables were observed including total number of purchases in each store, the

number of entries into each store, and total time spent in each store along with customer

satisfaction measures along five subjective dimensions; that is, store preference, speed of

service, product cost, quality of service, and whether participants would recommend the

store to friends (Smith & Hantula, 2003). In sum, manipulations in the price of

purchasable goods were studied as an attempt to extend the predictions of the delay-

reduction hypothesis to human consumption in a simulated environment.

All but two of the seven participants showed relatively consistent sensitivity to the

price manipulations. The researchers speculate that the two participants deviated from

the general shopping patterns as a result of inconsistent attending to the pricing

parameters. Inconsistent attending to features of the simulated Internet store may be a

result of variable individual histories related to Internet consumer interactions. Following

visual inspection, these data were described using a hyperbolic function as proposed by

Mazur (1987),

(3) $V = 1/1 + kD.$

In addition to a hyperbolic model, data were also linearly, exponentially, and logarithmically interpreted, but, nevertheless, the hyperbolic function accounted for a greater proportion of the variance than any of the other functions ($R^2 = 0.83$). Interestingly, participants rated the stores differently on the five customer-satisfaction dimensions corresponding to mean within store price according to statistical analyses. In sum, Store 1 was rated significantly higher ($p < 0.05$) than each of the other stores for cost, preference, likelihood of recommendation, and overall service quality. For speed, Store 1 was rated higher than Store 4 only. These results are interesting because each virtual store was identical *except* along the dimension of price. This, in theory, demonstrates the unexpected effects of relative reinforcer value as it relates to subjective ratings of customer-satisfaction.

Store preference as determined by shopping patterns showed relatively uniform responding. Over the course of the experiment, the total dollar amount spent within stores greatly shifted toward the least expensive store and the mean dollar amounts spent were stable thereafter. In conclusion, the data generated in this experiment support the researchers' primary hypothesis that price increases affect consumer preference analogously to increases in delay to conditioned reinforcement as predicted by the delay-reduction hypothesis.

Conclusions

A behavior analysis of consumer behavior provides researchers with a conceptually rich extension of the principles of behavior. Nevertheless, the practicality of such an approach remains contingent upon the result of empirical investigations which, though few and far between, are steadily gaining momentum. The goals of future

researchers should include, though should not be limited to: the dissemination of radical behaviorist principles and methodologies to economists and marketing researchers, the development and rigorous investigation of quantitative models which can be used to predict and influence consumer behavior, and strategies for marketing behavioral technologies to business, governments, and to mixed audiences via mainstream media.

Market Analysis from a Behavioral Perspective

The mission of the developing behavioral perspective of market analysis has been to describe the relationship between consumers and the organizations with which they interact. More specifically, the goal has been to explore the extent to which organizations exert control over consumers through advertising, promotion, and design (Hantula et al., 2000). According to Foxall (1992), marketer action takes two forms. First is the closure of the purchase setting by minimizing the probability of escape/avoidance and promoting occasions to consume. For example, advertising techniques, such as mailing promotional packages to potential customers, may bring consumer behavior under stimulus control. The second type of marketer action is the manipulation of reinforcers to increase the probability of the consumer engaging with and purchasing the product (Foxall, 1992). For example, group financial contingencies involving incentives and/or financial penalties (see discussion of self-insured groups below) may be presented as a means of influencing consumption of the product. Other variables, however, such as wider socioeconomic consequences (e.g., status and social acceptance within the group) may also influence consumer behavior.

In microeconomics texts, a *market* is defined as *the collection of buyers and sellers that, through their interactions, determine the price of a product* (Pindyck &

Rubinfeld, 2001). From a behavioral perspective, a *market* may be described as the collection of consumers that organizations interact with through their products and services, personnel, and advertising. Thus, an analysis of consumer behavior within a defined market involves a description of the interactions among organizational systems and contextual variables. Such analyses may serve organizations, including those within the field of behavior analysis (Bailey, 2000; Braksick & Smith, 2001), in the design of communications which successfully exert control over the behavior of target consumers.

The analysis of markets and communication systems will be critical aspects of the continued maturation of consumer behavior analysis (Foxall, 2003). As a result of our increasingly verbal existence (Hayes, 2000), communication systems now more than ever are powerful influences in the lives of information consumers. Some research has been conducted to expedite the nature of the relationship between information design (i.e., video or television programs) and behavior change (Biglan, 1995; Winett & Kramer, 1989), but more empirical work is needed in order to fully elucidate this relation especially when the relationship involves communications between geographically separated entities (DeRosa, Hantula, Kock, & D'Arcy, 2004).

Self-Insurance Group as a Market

An interesting example of a structured market system is that of self-insurance groups (SIGs; Alavosius, Adams, Ahern, & Follick, 2000). High risk industries, such as auto recycling, face increasingly expensive insurance premiums. In response to high cost, small employers band together to form a SIG in order to control the costs of their work-related injuries and illnesses. The member companies of the SIG pool their resources and collectively finance and manage their risk. When many employers form

such a collective, their pooled funds can grow sufficiently large to cover potential losses. Risk is spread across many companies, so that SIG members share the cost of excessive losses and also share the savings when occupational injuries occur infrequently. This is a huge advantage over traditional insurance where in most cases the insurance company retains any surplus as profit. Within the SIG, however, any surplus is returned to all member companies in proportion to the amount of money they contributed to the fund and their individual incurred losses. Moreover, losses that exceed the pool are shared by all SIG members. Thus, this system provides a powerful contingency that makes employers acutely sensitive to the importance of injury prevention. Each understands that the other companies in the SIG must prevent serious injuries to ensure the financial success of the group. This translates to a financial penalty for poor safety performance (Alavosius et al.). Furthermore, wider socioeconomic consequences may exist such that status and social acceptance within the group may also influence safety performance.

It is in this context that variables associated with a purchase or non-purchase of the safety product described in an information package (i.e., promotional video coupled with safety performance data and a monetary discount on purchase of the product) were examined. The safety product of interest in this study was a *power train lift*. The power train lift is a tool that assists auto workers in the removal of heavy auto parts. Once the automobile is elevated, the lift can be easily rolled under the part of the vehicle to be removed (e.g., a 100 pound gas tank that is partially filled with fuel). The lift is raised into position just below the auto part, the fasteners are removed, and the part is safely lowered. In addition, the tool reduces heavy lifting and carrying because the lift is mobile (i.e., rolls on wheels). At the time of this study, a power train lift cost

approximately $2,168.00 which is a significant cost item for small business owners in this industry.

The Automotive Recyclers of Michigan Self-Insurance Fund (ARMSIF) is a self-insured worker's compensation insurance group for auto recyclers. The administrator of ARMSIF expressed interest in the development of a videotape that would address some of the safety concerns within the SIG, with particular emphasis on the promotion of the power train lift. A review of the data (ARMSIF, 2004) showed that the bulk of the injuries occurring within the group involved the employee's lower back and hands/wrists. In addition, the third most expensive type of injury was related to lifting practices ($10,351.00 incurred between 2/1/2004 and 4/30/2004).

Brad Rose, co-owner of Morris Rose Auto Parts in Kalamazoo, MI, based on his assessment of the SIG's injury data and the prevalence of back/lifting injuries to auto dismantlers in the group, recommended the use of power train lift to minimize such injuries (B. Rose, personal communication, August, 19, 2004). Rose also expressed concern about fire hazards when fuel tanks are removed from wrecked vehicles, and indicated that use of the power train lift reduces human error and injury during both the removal process and the transportation of the fuel tanks in the shop (B. Rose, personal communication, August, 19, 2004). Fire damage within this industry occurs at low frequency but involves considerable risk to employees and resources. Because gasoline cannot be drained from fuel tanks until the tank has been detached and lowered from the vehicle, auto dismantlers are at risk of injury due to chemical exposure or to fires involving spilled fuel.

SIGs are highly inventive and innovative systems for controlling the expense of worker's compensation insurance by small business owners. Employers in communities such as that described above can be said to engage in practices that are resourceful, creative, and original. The opportunity to examine and work with businesses on the leading edge of their field was of great benefit to this study. The financial administrator and the board of directors of the SIG displayed enthusiasm and earnest interest in the development and implementation of this project. A history of reinforcing consequences for adopting innovative business management practices is critical when influencing business owners to participate in this type of research. Furthermore, because the management of the SIG was data-based (i.e., tracking injury rates and incurred cost for every company in the collective), many years of injury data were readily accessible for analysis.

The Current Study

The goal of the current study was to explore variables that may have differentiated ARMSIF business owners who purchased a costly piece of safety equipment (power train lift) from those who did not. The rationale for doing so was that this analysis might identify the variables that influenced purchasing behavior. More broadly, the goal of the study was to identify the variables that affected consumer behavior with this sample that could then be validated with auto recyclers nationwide, auto recyclers who were members of SIGs, and/or members of SIGs from other industries. A review of the literature did not reveal any marketing studies that have been conducted with any of these business groups.

The independent variable of the study was the purchase/non-purchase of the power train lift by the business owners. Eight sets of contextual variables were examined: (a) marketing tools included in a marketing information packet, (b) business demographics, i.e., the number of years as a member of the self-insured group and volume of business, (c) worker's compensation history, i.e., the total number of injuries, the number of lost time injuries since becoming a member of the self-insured group, and the amount of the insurance premium paid in 2005, (d) personal history, i.e, whether the owner started the business, had been an auto dismantler, and had been injured at work, (e) available technology, i.e., email, internet access, and DVD machine, (f) safety management practices, i.e., the frequency of safety inspections, existence of a written safety policy, and visits from the Office of Safety and Health Administration (OSHA), (g) safety products purchased over the past three years, and (h) potential interest in additional safety services offered by the SIG, which in this case was ARMSIF.

Of particular interest was whether the business owners who purchased the power train lift made more use of the marketing tools contained in a marketing information packet than those who did not. Because the marketing tools were relatively inexpensive to develop and distribute, if they did differentiate between purchasers and non-purchasers, they would constitute a cost-effective method to promote the purchase of safety equipment on a larger scale. The other variables associated with purchase could be used to further refine a marketing strategy. For example, if higher injury rates or the amount of insurance premiums differentiated between purchasers and non-purchasers, the marketing package could be sent to companies with higher injury rates and insurance premiums, and changed to highlight the benefits of the equipment with respect to those

variables. This targeted marketing plan could increase the effectiveness of the marketing package as well as reduce the overall cost of the marketing campaign.

The marketing information packet (detailed below) was distributed to participants either at the Auto Recyclers of Michigan Conference or by mail. None of the participants had purchased the power train lift even though the administrator of ARMSIF had previously encouraged all members to do so. This marketing method may be conceptualized as an open setting where contingencies cannot be closely manipulated by researchers (Foxall, 1992) and can be said to best approximate the general conditions under which business owners are typically exposed to marketing materials. In other words, each owner was exposed to the materials in an open setting (e.g., at the conference, and/or in their own offices) in contrast to a closed setting where contingencies are closely manipulated by researchers (e.g., human operant laboratories in academic settings).

The information package consisted of a cover letter and three marketing tools: (a) a promotional video, (b) graphic group and individual data showing safety-related data for ARMSIF and the owner's individual business, and (c) an offer of a rebate on the price of the power train lift. The cover letter is included as Appendix A.

The promotional video provided information about the benefits of owning a power train lift, as well as demonstrations that showed how to operate the tool. Specifically, the video depicted: (a) the administrator of ARMSIF providing a testimonial on the health benefits and financial payback of the power train lift; (b) the owner of a local auto recycling business providing a testimonial about the utility of the power train lift; and (c) a professional auto worker modeling proper practices for using the power

train lift. The videos were developed for this study and were filmed at a representative auto recycling shop. Everyone appearing in the video signed a release form (see Appendix B) allowing: (a) the distribution of the video within ARMSIF, and (b) the display of the video at professional conferences.

The second component of the marketing package consisted of a graphic representation of group injury rates and cost to the group. The owners also received a graphic display of their own company's safety performance. Data points showing the frequency of injury, amount of lost work time, and cost of worker's compensation from February 1, 2004 through January 31, 2005 were plotted. The graphic displays were designed so that owners could easily see how their business' safety performance and related costs contributed to the worker's compensation claims paid by the self-insurance fund. Thus, the data provided information on individual company performance and benchmarked each member company against the group's collective performance.

The offer of a discount on the price of the power train was contained in the cover letter (see Appendix A). With respect to the rebate, the letter stated, "In addition, all ARMSIF members who decide to purchase the safety product described in the video are eligible for a *rebate* from ARMSIF. The amount of the rebate will be determined by the board of directors of ARMSIF. At the end of the project, a group order will be placed with a local distributor of the product through the administrator of ARMSIF."

The effectiveness of the marketing tools was assessed using self-report data from a telephone survey conducted by the author. The telephone survey, which was also used to obtain information about other variables that may have distinguished purchasers from non-purchasers, is described in the *Method* section.

Method

Participants

Twenty-one out of 98 business owners affiliated with ARMSIF participated in

this study. After the research had been approved by Western Michigan University's

Human Subjects Institutional Review Board (See Appendix C for the approval letter),

consent forms were sent to all 98 business owners, 29 of whom signed and returned them.

The marketing information package was sent to all 29. Five were excluded because they

could not be reached by telephone to complete the survey (described below). The survey

was necessary to obtain information about the variables that might distinguish between

purchasers and non-purchasers. Three were excluded after the survey because their

businesses were demographically different than the other businesses in the sample.

Specifically, they differed in that (1) they dismantled commercial trucks instead of

automobiles (the power train lift is inappropriate for this type of dismantling process), (2)

their product volume was uncharacteristically high (e.g., 2000 autos/year), and/or (3) they

owned and operated more than one dismantling facility. Thus, the sample included

business owners who were members of ARMSIF and operated strictly *one automobile*

dismantling location having a product volume *less than or equal to 1000 autos per year*

($M = 432$, $SD = 271$, and range = 100 to 1000).

Independent Variable

The occurrence or nonoccurrence of a purchase was the independent variable. The

cover letter in the marketing information packet told participants to contact the

administrator of ARMSIF if they wished to purchase the power train lift. In addition,

participants were also asked to purchase the lift during the telephone survey if they had

not already contacted the administrator of ARMSIF. The administrator of ARMSIF made

a record of each owner that contacted him.

Dependent Variables

For the purposes of data analysis, the contextual variables will be referred to as

dependent variables. A total of 45 variables that potentially differentiated purchasers

from non-purchasers were examined. Thirty-four of these were obtained through a

structured telephone survey conducted by the author (see Appendix D). The remaining 11

variables were obtained from a data base provided by the administrator of ARMSIF and

the third party administrator. The data base contained three years of historic injury rate

and incurred cost of injury data. This information was received as an electronic data file

compiled by the insurance company servicing ARMSIF. Table 1 lists all of the dependent

variables, the number assigned to them for data analysis purposes, and their source (the

survey or ARMSIF data base).

Data Analysis

The 21 business owners were divided into two groups based on whether or not

they purchased the power train lift. Seven owners purchased the lift, fourteen did not.

Independent t-tests were conducted for each dependent variable. Because of the number

of variables that were examined, the Dunn-Bonferroni method was used to maintain the

family-wise error rate at the .05 significance level. In the Dunn-Bonferroni method, p is

compared with .05 divided by the number of comparisons. Thus, for each dependent

variable, p was compared to 0.001 (.05/45).

Table 1

Dependent Variables and Source

#	Description of DV	Source	#	Description of DV	Source
1	Product Volume (autos/year)	S	12	Total Number of Lifting Injuries while in ARMSIF	A
2	Number of Employees	A	13	Total Number of Material Handling Injuries while in ARMSIF	A
3	Member of ARMSIF Board of Directors	S	14	Gender	A
4	Number of Years in ARMSIF	A	15	Number of Businesses that were Family Started	S
5	Number of Years in Business	S	16	Number of Participants with History as an Auto Dismantler	S
6	Total Insurance Premium Paid in 2005 ($)	A	17	Number of Participants who have been Injured while at Work	S
7	Average Incurred Cost of Injuries per Year	A	18	Number of Businesses with Email Access	S
8	Total Number of Injuries while in ARMSIF	A	19	Number of Businesses with Internet Access	S
9	Total Lost Work-Time while in ARMSIF	A	20	Number of Businesses with Access to a VCR	S
10	Total Number of Strain Injuries while in ARMSIF	A	21	Number of Businesses with Access to a DVD Player	S
11	Total Number of Back/Shoulder Injuries while in ARMSIF	A	22	Number of Participants who Attended the 2005 ARM Conference	S

Table 1—Continued

Dependent Variables and Source

#	Description of DV	Source	#	Description of DV	Source
23	Number of Participants who Rated ARM as Influential for Educational Purposes	S	35	Number of Participants who found the Video variable Most Influential	S
24	Number of Participants who Rated ARM as Influential for their Business Growth	S	36	Number of Participants who found an Other variable Most Influential	S
25	Number of Participants who Conduct Safety Inspections	S	37	Number of Participants who Purchased PPE yearly	S
26	Number of Safety Inspections Conducted per Year	S	38	Number of Participants who Purchased Fire Extinguishers Yearly	S
27	Number of Participants with a Written Safety Policy in Place	S	39	Number of Participants who Purchased other Lifts or Carts	S
28	Number of Participants who Talk to their Employees regarding the Safety Policy	S	40	Number of Participants who have Purchased Safety-related Signage	S
29	Number of Participants who Review their Quarterly Safety Summary Report	S	41	Number of Participants who viewed the Video variable	S
30	Number of Businesses that have been Visited by OSHA	S	42	Number of Participants who read the Graphic Data variable	S
31	Number of Businesses that have been Fined by OSHA	S	43	Number of Participants interested in attending Safety-related Workshops	S
32	Subjective Self-Rating of Business' Safety Record	S	44	Number of Participants interested in Safety Training for Employees	S
33	Number of Participants who found the Incentive variable Most Influential	S	45	Number of Participants who would be interested in Professional Safety Inspections	S
34	Number of Participants who found the Graphic Data variable Most Influential	S			

Note. A = ARMSIF; S = Survey

Procedures

Consent

Upon obtaining approval from the board of directors of ARMSIF to use their

membership list, consent forms were mailed to member companies. After a few weeks,

consent forms were faxed to companies who had not replied.

Information Package

The information package was distributed to the 29 owners who returned signed

consent forms. The packages were delivered in two ways: (1) Sixteen of the packages

were handed out at the Auto Recyclers of Michigan Conference held at Novi, MI on

March 11th, 2005; (2) The remaining 13 packages were delivered via mail between the

dates of March 14th and May 9th, 2005, according to when each owner returned his or her

consent document.

Structured Telephone Surveys

Following distribution of the information package, survey data were obtained

through structured phone interviews. The survey was used to gather information related

to the dependent variables indicated in Table 1. In addition, owners who had not already

placed an order for the power train lift were prompted to consider purchasing the tool,

were asked if they wanted to place an order, and, if undecided about purchase at that

time, were advised to contact the administrator of ARMSIF once they had made a

decision. Phone surveys were conducted over a two-month period. Upon completion of

the phone surveys, a group purchase order was placed by the administrator of ARMSIF

through the local distributor.

Results

Independent t-tests were calculated for each dependent variable. The results of

these tests along with descriptive statistics for each dependent variable are summarized in

Table 2. One out of the 45 dependent variables yielded a significant result: the number of

participants that purchased other lifts or carts over the last three years (variable 39).

Participants who purchased the lift were significantly more likely to have made another

shop-related purchase as compared to owners who did not purchase the lift ($M = 0.36$, SD

$= 0.50$), t(13) $= 4.84$, $p = 0.00$ (two-tailed), $d = 1.56$. All of the owners who purchased

the lift reported having purchased lifts or carts for their shops specifically last year.

These past purchases included (a) large hydraulic or electric fixed hoists for lifting entire

vehicles, (b) forklift trucks, (c) wheeled carts for transporting auto parts, and/or (d)

immobile work benches.

Although computational comparisons of between group data failed to show

significant differences between the Purchase (n = 7) and No Purchase (n = 14) groups

within the other sets of contextual variables, visual inspection of these data illuminated

interesting differentiation between groups. Examining differences in business

demographics, the No Purchase group had an average product volume of 336 autos per

year ($SD = 178$) whereas the Purchase group had 623 autos per year ($SD = 333$). In other

words, the Purchase group had a product volume 1.85 times greater on average than the

No Purchase group. Similar findings were discovered for differences in the number of

employees between groups. Specifically, the No Purchase group employed 5 people on

average ($SD = 2.5$) whereas the Purchase group employed 14 people on average ($SD =

10.2$). In this case, the Purchase group employed 2.8 times the number of employees than

Table 2

Means and Standard Deviations for Dependent Variables

#	Dependent Variable Description	No Purchase (n = 14) Mean	SD	Purchase (n = 7) Mean	SD	Difference	p Value	Significant at .001 level
1	Product Volume (autos/year)	336.00	178.00	623.00	333.00	287.00	0.070	No
2	Number of Employees	4.57	2.50	14.30	10.20	9.73	0.048	No
3	Member of ARMSIF Board of Directors	0.00	0.00	0.57	0.53	0.57	0.030	No
4	Number of Years in ARMSIF	5.71	2.81	7.07	2.46	1.36	0.276	No
5	Number of Years in Business	24.10	13.10	40.40	20.60	16.30	0.091	No
6	Total Insurance Premium Paid in 2005 ($)	5,234.00	6,496.00	13,094.00	10,566.00	7,860.00	0.109	No
7	Average Incurred Cost of Injuries per Year	786.00	2,083.00	2,735.00	6,310.00	1,949.00	0.886	No
8	Total Number of Injuries while in ARMSIF	1.86	3.16	2.86	2.54	1.00	0.448	No
9	Total Lost Work-Time while in ARMSIF	3.40	11.50	26.90	33.90	23.50	0.126	No
10	Total Number of Strain Injuries while in ARMSIF	0.36	0.75	0.71	1.25	0.35	0.507	No
11	Total Number of Back/Shoulder Injuries while in ARMSIF	0.14	0.36	0.43	0.79	0.29	0.391	No

Table 2—Continued

Means and Standard Deviations for Dependent Variables

#	Dependent Variable Description	No Purchase (n = 14) Mean	SD	Purchase (n = 7) Mean	SD	Difference	p Value	Significant at .001 level
12	Total Number of Lifting Injuries while in ARMSIF	0.07	0.27	0.50	0.84	0.43	0.274	No
13	Total Number of Material Handling Injuries while in ARMSIF	0.50	1.16	0.43	0.54	-0.07	0.849	No
14	Gender	0.79	0.43	0.86	0.38	0.07	0.702	No
15	Number of Businesses that were Family Started	0.29	0.47	0.71	0.49	0.43	0.081	No
16	Number of Participants with History as an Auto Dismantler	0.79	0.43	0.71	0.49	-0.07	0.749	No
17	Number of Participants who have been Injured while at Work	0.21	0.43	0.43	0.54	0.22	0.380	No
18	Number of Businesses with Email Access	0.86	0.36	1.00	0.00	0.14	0.165	No
19	Number of Businesses with Internet Access	0.93	0.27	1.00	0.00	0.07	0.336	No
20	Number of Businesses with Access to a VCR	0.07	0.27	0.71	0.49	0.64	0.014	No
21	Number of Businesses with Access to a DVD Player	0.21	0.43	0.43	0.54	0.22	0.380	No
22	Number of Participants who Attended the 2005 ARM Conference	0.50	0.52	0.71	0.49	0.21	0.371	No
23	Number of Participants who Rated ARM as Influential for Education	0.93	0.27	0.86	0.38	-0.07	0.665	No
24	Number of Participants who Rated ARM as Influential for their Business Growth	0.79	0.43	0.86	0.38	0.07	0.702	No

Table 2—Continued

Means and Standard Deviations for Dependent Variables

#	Dependent Variable Description	No Purchase (n = 14) Mean	SD	Purchase (n = 7) Mean	SD	Difference	p Value	Significant at .001 level
25	Number of Participants who Conduct Safety Inspections	0.57	0.51	1.00	0.00	0.43	--	No
26	Number of Safety Inspections Conducted per Year	7.60	14.30	51.70	91.70	44.10	0.253	No
27	Number of Participants with a Written Safety Policy in Place	0.36	0.50	0.57	0.54	0.21	0.395	No
28	Number of Participants who Talk to their Employees about Written Safety Policy	0.93	0.27	1.00	0.00	0.07	0.336	No
29	Number of Participants who Review their Quarterly Safety Summary Report	0.79	0.43	0.71	0.49	-0.07	0.749	No
30	Number of Businesses that have been Visited by OSHA	0.21	0.43	0.29	0.49	0.07	0.749	No
31	Number of Businesses that have been Fined by OSHA	0.00	0.00	0.14	0.38	0.14	--	No
32	Subjective Self-Rating of Business' Safety Record	1.64	0.63	1.29	0.49	-0.36	0.174	No
33	Number of Participants who found the Incentive variable Most Influential	0.00	0.00	0.14	0.38	0.14	0.356	No
34	Number of Participants who found the Graphic Data variable Most Influential	0.00	0.00	0.00	0.00	0.00	--	No
35	Number of Participants who found the Video variable Most Influential	0.07	0.27	0.57	0.53	0.50	0.030	No
36	Number of Participants who found an Other variable Most Influential	0.07	0.27	0.29	0.49	0.22	0.172	No
37	Number of Participants who Purchased PPE yearly	1.00	0.00	1.00	0.00	0.00	--	No

Table 2—Continued

Means and Standard Deviations for Dependent Variables

#	Dependent Variable Description	No Purchase (n = 14) Mean	SD	Purchase (n = 7) Mean	SD	Difference	p Value	Significant at .001 level
38	Number of Participants who Purchased Fire Extinguishers Yearly	1.00	0.00	1.00	0.00	0.00	--	No
39	Number of Participants who Purchased other Lifts or Carts	0.36	0.50	1.00	0.00	0.64	0.000	Yes
40	Number of Participants who have Purchased Safety-related Signage	0.21	0.43	0.71	0.49	0.50	0.044	No
41	Number of Participants who viewed the Video variable	0.50	0.52	0.86	0.38	0.36	0.092	No
42	Number of Participants who read the Graphic Data variable	0.36	0.50	0.29	0.49	-0.07	0.759	No
43	Number of Participants who would be interested in attending Safety-related Workshops	0.71	0.47	0.86	0.38	0.14	0.465	No
44	Number of Participants who would be interested in Safety Training for Employees	0.57	0.51	0.86	0.38	0.29	0.170	No
45	Number of Participants who would be interested in Professional Safety Inspections	0.79	0.43	1.00	0.00	0.21	0.082	No

the No Purchase group employed. These descriptive statistics identify an interesting

group difference and a potentially interesting trend within the category of business

demographics: larger companies in the SIG were more likely to purchase safety tools.

Further examination of the resultant data, this time related to worker's

compensation history, revealed that on average the No Purchase group paid $5,234 ($SD =$

$6,496; $1,046.80 per employee) in insurance premium in 2005 as compared to $13,094

($SD = $10,566; $935.29 per employee) paid by the Purchase group. This equates to

double the total cost of premium being paid by the Purchase group. Further, the Purchase

group incurred on average 3.48 times more costs due to injuries per year ($M = $2,735, SD

$= $6,310; $195.36 per employee) as compared to the No Purchase group ($M = $786, SD

$= $2,083; $157.20 per employee). These figures highlight the fact that there was a

difference between groups with respect to *average size* of the companies. In other words,

the Purchase contains larger companies on average and this is reflected in what they pay

yearly in insurance premium and incurred cost due to injuries as compared to the No

Purchase group. It is clear that there is a negligible difference when comparing rates for

insurance premium and for incurred cost based on a *per employee* figure (i.e., $1,047 vs.

$935 premium per employee). Whereas it is typically useful to examine costs per

employee, in this case it is insightful to examine total cost per group such that it supports

the claim made earlier: larger companies in the SIG were more likely to purchase safety

tools.

My initial assumption was that all of the participating ARMSIF members were

owners of small businesses when compared to the automotive recycling industry as a

whole. After further reflection, the category of "small business" may benefit from further

refinement such that some businesses may be considered "small-sized" among small businesses and others may be considered "medium-sized" among small businesses. We may then logically expect results such as those discussed in the prior two paragraphs if businesses belong to either a group of medium-sized companies ($M = 623$ autos/year) or a group of small-sized companies ($M = 336$ autos/year). In other words, medium-sized companies in SIGs may be probabilistically more likely to purchase safety tools as compared to small-sized companies in SIGs. The implications of this analysis will be discussed in the next section.

A few personal history variables also provided interesting results. For example, 57% of the Purchase group were members of the ARMSIF board of directors whereas none of the No Purchase group belonged to the board. In addition, 71% of the businesses in the Purchase group were family business (i.e., started and managed by biological and/or legal relatives) whereas only 29% of the No Purchase group were family businesses. Finally, 43% of the participants in the Purchase group stated that they themselves have in the past been injured while at work as compared to 21% in the No Purchase group.

Another variable, access to technology at work, is of major interest due to the nature of the information package designed for this study. The package included a VHS tape containing an informational video created by the research team. If the businesses targeted in this study did not have access to a video cassette recorder (VCR) at their place of business, this could potentially affect the implementation of the video variable. In fact this was the case: 71% of the Purchase group had access to a VCR at work as compared to only 7% of the No Purchase group. Within the No Purchase group, many of the

participants stated that they viewed the video at home. The number of participants that viewed the video at home was not measured but it is known that 50% of the No Purchase viewed the video. For the Purchase group, 86% viewed the video.

Finally, the survey of safety management practices among participants yielded an interesting difference between groups. For the number of safety inspections conducted per year by managers or owners at each place of business, the Purchase group performed an average of 52 inspections per year ($SD = 92$) whereas the No Purchase group performed an average of 8 safety inspections per year ($SD = 14$). These findings in addition to the significance of the results regarding other safety products purchased in the past by participants (as described earlier, 100% of the participants in the Purchase group reported having purchased lifts or carts for their shops last year) may illuminate a potential motivational variable that would predict and influence future purchases of safety-related equipment.

Regarding measures of information packet effectiveness, within group inspection of the resultant data from the Purchase group showed that 57% stated that the video was the most influential variable as compared to 14% who stated the incentive was most influential. None of the Purchase group participants stated that the graphic data were influential in their decision to purchase the tool. It is important to note, at this point, that 86% of the Purchase group participants viewed the video as opposed to only 29% who looked at the graphic data. As mentioned earlier, within the No Purchase group only 50% of the participants viewed the video and, further, only 36% looked at the graphic data. The potential importance of these findings in terms of marketing packet design and

the findings discussed earlier regarding variables that may predict and influence

purchasing behavior are examined further in the *Discussion* section.

Figure 2 illustrates the distribution of standardized effect size for each dependent

variable. A standardized effect size, denoted as *d*, examines the difference in number of

standard deviation units that exists between the two groups. This value is obtained by

dividing the difference between the means of the two groups by the pooled standard

deviation, such that,

(4) $d = (M_1 - M_2)/SD_p,$

where M_1 is the mean score for group 1, M_2 is the mean score for group 2, and SD_p is the

pooled standard deviation. The pooled standard deviation is the square root of the

average of the squared standard deviations for the groups. According to Cohen (1988),

effect sizes may be defined as small when $d = 0.2$, medium when $d = 0.5$, and large when

$d = 0.8$. This ratio is useful when comparing effect sizes for variables that are measured

on different scales (e.g., number of employees and total premium paid in 2005).

In summary, even though only one variable (number of participants who

purchased lifts or carts during the last three years) was found to significantly differentiate

between the Purchase and No Purchase groups, *d* was 0.8 or above for 15 variables.

Furthermore, *d* was between 0.79 and 0.5 for 8 variables, and below 0.49 for 22

variables. The implications of these data will be discussed in the *Discussion* section.
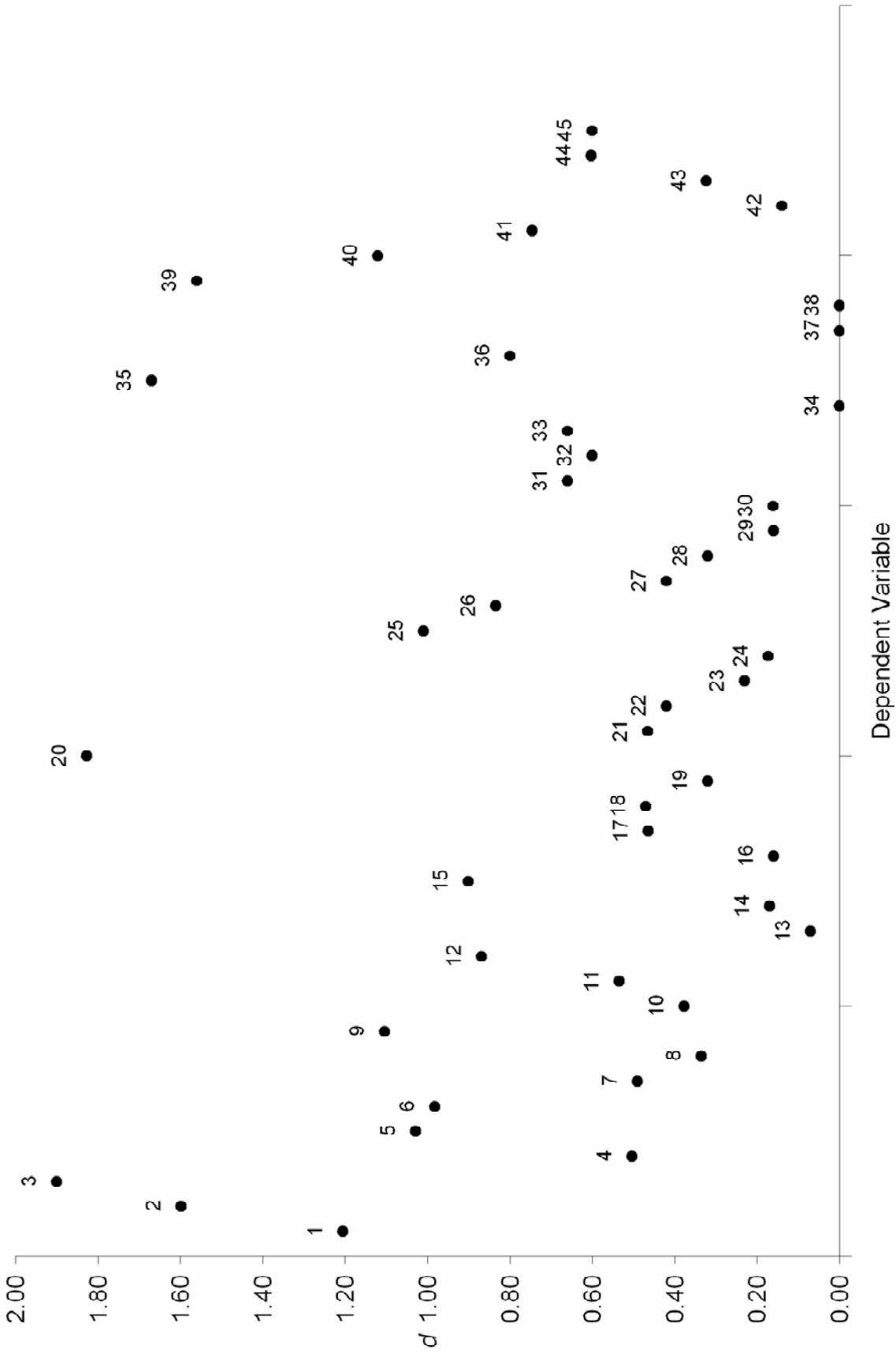
Figure 2. Standardized effect size (*d*) by dependent variable.

Discussion

This study is important in that it was the first to examine the environmental and contextual variables that influence the purchase of safety equipment by members of SIGs. The participants were small business owners in the auto recycling industry, a very high risk industry. Of the 45 variables examined only one, whether business owners had purchased a cart or lift the previous year, statistically differentiated owners who purchased the power train lift from those who did not. Nonetheless, the results suggest fruitful areas for further study. These will be discussed after some of the limitations of the study are discussed.

If the sample size would have been larger, the study would have provided stronger evidence regarding the variables that influenced purchasing and those that did not. In addition, due to the large number of variables examined in the study (i.e., 45), the *p*-value required to attain statistical significance was heavily weighted. Future research should either focus on fewer variables or have a larger sample of participants in order to better isolate the influence of each variable on purchasing behavior.

Another limitation relates to the use of verbal reports to measure many of the dependent variables. It is unclear how well the verbal reports correlate with the actual variables. Thus, the use of verbal report data adds further uncertainty to the results obtained.

A fourth limitation was the use of quasi-experimental procedures to assess the effects of the marketing package on purchasing behavior. The same marketing package was sent to all business owners. Instead, business owners in a SIG could be randomly assigned to an experimental or control group. Those in the experimental group could be

sent the marketing package and their purchasing behavior compared to those in the control group who did not receive the marketing package. Additionally, to isolate the effects of the components of the marketing package (the video, graphic safety data, and price discount), different marketing packages could be developed and randomly sent to different groups of business owners in the SIG.

The results of the current study are nevertheless useful because they identify a small number of variables that might influence purchase behavior. Moreover, most of the variables can be objectively measured. Thus, these variables could be examined in future research absent the above-mentioned limitations. For example, in the current study, the variables that appeared to be most related to purchasing behavior were (1) number of employees ($d = 1.60$), (2) past purchase behavior ($d = 1.56$), (3) product volume ($d = 1.20$), (4) number of years in business ($d = 1.03$), and (5) safety inspection practices ($d = 0.83$). Focusing on these five variables would strengthen the statistical power of analyses and minimize the number of variables that rely on verbal reports.

After having considered these issues and the logic of this study, several tentative inferences follow. First, the size of the company, as determined by the number employed and product volume, may predict purchasing behavior. Therefore, this variable should be the focus of additional empirical work. Second, it appears that the participant's purchasing history with respect to products is also important. Therefore, researchers should adopt procedures that can accurately track purchasing behaviors over long periods of time.

The same case may be made for the safety management practices of the participants, considering that purchasers reported conducting safety inspections

considerably more times per year than non-purchasers (52 vs. 8, respectively). Given the above, it would be interesting to determine if general "safety consciousness" relates to purchasing practices. In other words, do those who purchase an expensive safety product allocate a greater amount of resources (i.e., time and capital) towards their safety management procedures in proportion to all other business management practices as compared to those who do not purchase the product? Talking a great deal about the importance of safe work practices and spending a great deal of resources implementing and managing such systems may act as motivational variables that consequently increase the value of other innovations or products that also enhance safety in the workplace. This, in turn, may influence the likelihood of purchasing a safety-enhancing product. Further empirical work is called for along these lines.

On another note, it is surprising that the video component of the information package did not yield significant results. It is clear that a larger percentage of the Purchase group viewed the video (86%) as opposed to the graphic data (29%). What is not clear is whether the difference in videos viewed between the Purchase and No Purchase group, 86% and 50% respectively, influenced the purchase of the product. It may well be that other variables influenced the purchase and that these same variables also influenced the participant spending time watching the video. In other words, video viewing may have been the result of the same variables that influenced purchasing behavior and, therefore, may not in itself have influenced purchasing behavior.

On the other hand, a larger percentage of purchasers stated that the video was more influential in their decision to purchase the product than the graphic data and incentive. Specifically, 57% stated the video was the most influential variable whereas

only 14% said that the incentive influenced the purchase. Interestingly, no purchaser reported that the graphic data influenced purchase. Some of the data depicted graphically on paper were also presented in the video. Due to the lack of interest and engagement with the graphic data (only 29% said they actually looked at the data) it may be more practical to present these data as information in a video format, and thus save costs in paper printing.

Twenty-nine percent of purchasers said that a variable other than the video, graphic data, and incentive most influenced their purchase. "Improving safety" was the most frequently cited reason for participants selecting this "other" option. This is anecdotal information because respondents were not specifically asked to specify what the "other" option referred to. Regardless, this again hints at "safety consciousness" as a possible motivational variable for predicting relevant purchasing behavior. As mentioned before, more rigorous experimental methods are required to resolve these issues.

It is clear in the literature review presented earlier and in the completion of the current study that behavior science may be used to examine and describe variables which potentially influence consumer-related practices. The current study has contributed to this literature in a small but important way. The strength of this study was the opportunity to examine a population that has not been the target of behavioral marketing studies. The goal of the study was to identify the variables that affected consumer behavior of members of ARMSIF that could then be validated with auto recyclers nationwide, auto recyclers who were members of SIGs, and/or members of SIGs from other industries. In essence, this project was the first to examine purchasing behavior in this innovative and growing consumer market.

A strength of this project was its emphasis on exploring variables that potentially influence *increasing* consumption of products. With a few exceptions (Foxall & Schrezenmaier, 2003; Smith & Hantula, 2003), this is an area that has so far received little attention from consumer behavior researchers. As mentioned in the *Introduction*, most of the behavioral consumer research has focused on de-consumption (Geller et al., 1982), disposition of goods (Lindsley, 1962), and resource conservation (Austin et al., 1993; Witmer & Geller, 1976). Specifically, this study identified many potential variables to begin examining in targeted research, such as video-based marketing tools, business demographics (especially when related to company size, i.e., number of employees or product volume), purchasing history related to some class of product, and, with respect to safety products, worker's compensation history (specifically associating insurance premium totals, lost work-time totals, and particular injuries totals to target products or practices).

As a result of this focus, this study adds information regarding methods for marketing technologies to businesses, or more specifically safety technologies, and more generally, behavioral technologies. In essence, the analysis of markets and communication systems is a critical aspect of the continued maturation of consumer behavior research in the behavior sciences. This study is an example of consumer behavior research applied in a novel and exploratory manner.

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Appendix A

Information Package Cover Letter

Principal Investigator: Dr. Mark P. Alavosius

Student Investigators: Bismarck J. Manes and Grisel M. Puertos

Hello! The package you have just received is part of the project designed by the research team at Western Michigan University. The project is interested in learning about the influences that lead business owners to buy safety equipment for their shops.

By participating in this project you agree to review the promotional materials included in this package. Once you have reviewed the promotional materials, *you are not required to do anything else*. This study will end after four months. *There are no risks to you or your business*. You will not be required to purchase anything, and any information gained by the researchers during this project will remain strictly confidential.

The package includes: (1) a promotional video that describes a safety product and a few safety tips and (2) a graph that shows information about your business' safety performance. In addition, all ARMSIF members who decide to purchase the safety product described in the video are eligible for a *rebate* from ARMSIF. The amount of the rebate will be determined by the board of directors of ARMSIF. At the end of the project, a group order will be placed with a local distributor of the product through the administrator of ARMSIF.

If you would like to purchase the product described in the materials you have just received, please contact the administrator of ARMSIF.

Thank you for your participation! We are honored that you have agreed to help make ARMSIF and all of its members safer! Your involvement is essential to our goal of learning about and promoting safety in ARMSIF!

Appendix B

Video Release Form

I hereby authorize the Agility Group* to use my video image(s), still photo(s) and/or audio recording in the present experiment. I understand that these images will be viewed only by researchers affiliated with the Agility Lab for experimentation.

I understand my personal information, such as my name or any contact information will not be made publicly available in any of the above mentioned uses.

I hereby release and discharge the Agility Group (the videographers, the photographers, their offices, and members) from any and all liability, personal or proprietary right I may have in connection with, or arising out of, the use of my images.

I understand that I will not receive any compensation for this now or at any time in the future, and I understand that I have no claim on the finished product.

I further certify that I am over the age of 18 years.

Print name (Participant) _____

Signature _____

Date _____

Agility Media Team Leader:_____

*The Agility Group develops and evaluates behavioral technologies to improve worthy performances within work and community settings. The group is comprised of undergraduate and graduate students of psychology at Western Michigan University and is led by Mark Alavosius, Ph.D., Assistant Professor of Psychology.

Contact Information:

Mark Alavosius, Ph.D.
Psychology Department
Western Michigan University
Kalamazoo, MI   49008

(269) 387-4424
Email: mark.alavosius@wmich.edu

Appendix C

HSIRB Approval Letter

HSIRB Approval Letter on file at Graduate College.

Appendix D

Survey Instrument

Date:

Participant Name:
Company Name:
Subject #:

Introduction

☐ Hello, may I speak to Mr.⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯ .
   My name is ⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯ and I
   am working with the team of researchers from Western Michigan University that are
   interested in learning about what influences business owners to buy safety equipment.

☐ The purpose of this call is to collect information about your business, as agreed upon
   in the consent form we sent you. Any information that you provide me will remain
   strictly confidential.

☐ Do you have any questions before we proceed with this survey?

Questions

1. BUSINESS DEMOGRAPHICS

- ***Product volume (automobiles/yr):*** How many automobiles do you dismantler per
  year?

2. PERSONAL HISTORY

- ***Board member:*** Are you a member of the board of directors for ARMSIF?

  (1=Yes, 0=No)

- ***Years in business:*** How many years have you been in business?

- ***Family owned:*** Was your business started by a family member? (1=Yes, 0=No)

- *Self-started:* Was the business started by the current owner/manager? (1=Yes, 0=No)

- *History as dismantler:* Were you at one time a dismantler/mechanic? (1=Yes, 0=No)

- *Injured at work:* Have you ever had an injury while at work? (1=Yes, 0=No)

TECHNOLOGIES & COMMUNITY FACTORS

Which of the following technologies does you have access to at work?

- *Email:* (1=Yes, 0=No)

- *Internet:* (1=Yes, 0=No)

- *VHS:* (1=Yes, 0=No)

- *DVD:* (1=Yes, 0=No)

- *Attend ARM 3/11:* Did you attend the annual Auto Recyclers of Michigan conference? (1=Yes, 0=No)

Did you find the ARM conference useful as related to:

- *Education/information dissemination:* (1=Yes, 0=No)

- *Business growth:* (1=Yes, 0=No)

3. SAFETY MANAGEMENT PRACTICES

- *Safety inspections:* Do you conduct safety inspections? (1=Yes, 0=No)

- *Frequency:* If Yes, how often?

- *Safety policy:* Do you have a safety policy in place? (1=Yes, 0=No)

  What is it?

- *Talk with employees:* Do you talk to your employees about safety

  practices/safety policy? (1=Yes, 0=No)

- *Review Cambridge safety recommendations:* Do you review the safety

  materials/reports generated by Cambridge Integrated Services (the third party

  administrator for the SIG)? (1=Yes, 0=No)

- *OSHA visits over 3 yrs:* Have you been visited by OSHA over the last 3 years?

  (1=Yes, 0=No)

- *Fines over 3 yrs:* Have you been fined by OSHA over the last 3 years? (1=Yes,

  0=No)

- *Self-rate safety record:* How do you rate your business' safety performance?

  (1=Exceptional, 2=Good, 3=Unknown, 4=Bad, 5=Hideous)

SAFETY PRODUCTS PURCHASED OVER LAST 3 YEARS

Have you purchased any of the following safety products over the last 3 years:

- *PPE (eye, ear, hand, back, feet, head):* (1=Yes, 0=No)

- *Fire prevention:* (1=Yes, 0=No)

- *Lifts/carts:* (1=Yes, 0=No)

- *Safety signs:* (1=Yes, 0=No)

4. PRODUCT ANALYSIS

- ***Viewed video:*** Have you viewed the video? (1=Yes, 0=No)

- ***Seen report:*** Have you read the report card? (1=Yes, 0=No)

- ***Most influential factor:*** (1=Incentive, 2=Data, 3=Video, 4=Other, 5=Not Infl)

- ***Convinced:*** Are you planning on purchasing a lift? (1=Yes, 0=No)

ADDITIONAL SERVICES OFFERED BY ARMSIF

What other services would you be interested in if offered to you through ARMSIF:

- ***Workshops:*** (1=Yes, 0=No)

- ***Training:*** (1=Yes, 0=No)

- ***Safety inspections:*** (1=Yes, 0=No)

Do you have any questions or comments?