# PREDICTORS OF PERSONAL RESPONSIBILITY TO PROTECT THE MARINE ENVIRONMENT AMONG SCUBA DIVERS[1]

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**Abstract:** This paper examines predictors of personal responsibility for the protection of the marine environment among scuba divers (n=300, 97% response rate) in the Florida Keys, summer 2002. A predictive framework of personal responsibility was used as a guide for this investigation. A diver personal responsibility index was created from four measures of feelings of personal responsibility for appropriate diving behavior. Eighteen independent variables categorized, as diver background, environmental attitudes and specific issue variables comprised those indicators hypothesized to predict personal diver responsibility. Regression analysis found five predictors of personal diver responsibility accounting for 38% of the total variance. No diver background variables predicted personal diver responsibility. Perceived knowledge about marine environmental issues was the strongest predictor, followed by motivation, environmental beliefs, and attitude about enforcement and dive expectations. Results imply that belief in a balance between humans and nature, certain experience preferences pertinent to the recreational activity, positive attitudes toward enforcement and perceived knowledge of environmental issues are socio-psychological factors that may influence personal responsibility to act pro-environmentally while engaged in diving as a leisure activity.

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## Introduction

Personal responsibility refers to the quality or state of being responsible such as moral, legal, or mental accountability; something for which one is responsible (Stubbs, 2003 online). In psychology and in mental health circles, buzzwords are used; personal responsibility is one such buzzword for the 1990s. What does personal responsibility mean and how does one become responsible? Personal responsibility is something that all individuals have for their actions, whether conscious of that fact or not. Consequently, feelings or attitudes toward responsible behavior vary in context and degree. All societies consist of people that have difficulty being accountable for their actions. "It wasn't me; or it was my alter ego." "My actions are not a major problem and I can't control what others do." Those are just a few of the many reasons given. Whatever actions or behaviors we do, we are still accountable and personally responsible for those actions. More importantly whether we own the responsibility or not, it exists and belongs to each of us respectively.

As it pertains to the pro-environmental behavior literature, personal responsibility refers to perceived feelings of duty or obligation of the respondent toward the environment (e.g., personal responsibility felt for reducing water pollution) (Hines, Hungerford, & Tomera, 1987). Hines et al. argues that people who feel some degree of personal responsibility toward the environment are more likely to engage in appropriate behavior than people with no such feelings of responsibility. For example, if a person understands that taking a piece of coral from the reef could result in further damage to the vary resource that he/she came to see, then they might take a personal interest or responsibility to not partake in that behavior.

Schwartz (1968) implies that for an action to occur, some degree of ascription of responsibility (AR) is necessary. Along with AR he argues that an awareness of the consequences (AC) of the action as it affects the welfare of others is also necessary. It is only when awareness of interpersonal consequences and acceptance of responsibility occur together that norms governing these consequences are likely to influence behavior, except insofar as other pressures supporting them are brought to bear. He argues that the opinions of others (peer influence) about an individual's

actions will greatly increase an ascription to responsibility, which, in turn, will significantly influence actual behavior. For example, compliance with regulations regarding appropriate diving behavior may depend to a significant degree on whether divers are aware of the impacts their actions may have on the environment and on the health and safety of other divers, and whether they are willing to accept responsibility for those impacts.

Given the varying strength of AC and AR in explaining environmental behaviors, researchers have explored other variables that might influence a behavioral model's predictive power (Stern, Dietz, & Kalof, 1993; Tarrant & Cordell, 1997). For example, in situations where individuals feel committed to resolving impact problems, they are likely to engage in responsible behavior (Hines et al., 1987; Hungerford & Volk, 1990; Sivek & Hungerford, 1989/90). Individuals who are aware of the consequences of their actions and feel some level of responsibility are likely to identify with the issues and develop a personal interest in helping to solve the problem. Thus, behavioral commitment (sub-dimension of personal responsibility) refers to an action strategy that might be reflected in financial donations to help resolve a problem situation, or specific actions designed to reduce impacts on the environment.

*Personal (behavioral) Commitment*

Once some level of personal responsibility develops towards an object, it is more likely an individual will personally commit to that object. According to Hungerford and Volk (1990) and Hines et al. (1987), personal commitment to an issue or an action strategy refers to the degree to which individuals identify with issues, thereby depicting a feeling of ownership or personal interest in the issue. What generates or empowers individuals to acquire a feeling of ownership? Bardwell (1991) argues that people are not inherently apathetic towards getting involved and that people are, indeed, eager to understand and interact with their surroundings. She states "people's active participation, however, depends on several factors: concern-how one understands and responds to the issue; competence-whether one feels capable of addressing the issue; imagery-what ideas or alternatives one has for what to do" (p. 6). People are more apt to respond to an object or situation that encompasses some degree of familiarity to them. Thus, they are more likely to develop an interest in something if the information touches on their past experience, leading to concern. However, Bardwell (1991) argues that action is based on more than concern. She states "knowledge of action strategies leads to feelings of competence which influences participation" (p. 7). The lack of any one of these factors could lead to a feeling of helplessness or apathy. Personal commitment is treated in this study as an underlying dimension of personal diver responsibility with one commitment item loading on the personal diver responsibility factor (e.g., I make an effort to enhance my skills with practice before diving to have better control when diving).

*Locus of Control*

According to Marcinkowski (1988, p. 114)), "a review of the social learning theory, expectancy theory, and locus of control literature ... indicates that locus of control has been shown to correlate with, as well as have a substantial effect on, intention and behavior" as well as on responsible environmental behavior. Locus of Control, both external and internal, "...refers to an individual's belief in being reinforced for a certain behavior" (Hungerford & Volk, 1990, p. 12) and "...to an individual's perception of their ability to bring about change in a particular situation" (Marcinkowski, 1988, p. 60). Internal locus of control refers to someone's belief that what he or she does will make a difference. External locus of control alludes to a persons' belief that his or her action(s) will not make a difference (p. 12). Hines et al. (1887, p. 5) state that "those individuals who have an internal locus of control were more likely to have reported engaging in REB than were individuals exhibiting a more external locus of control." Although not directly used as a variable in this study, some indicators of locus of control are used in the operationalization of personal diver responsibility (e.g., I feel I can influence through my behavior and effort the solution to the protection of the marine environment).

In conclusion, developing attitudes about an issue depends upon the strength of those variables within the cognitive component. In essence, attitudes portray one's beliefs. The stronger the belief tendency the greater the level of personal responsibility will be to an issue (e.g., I feel

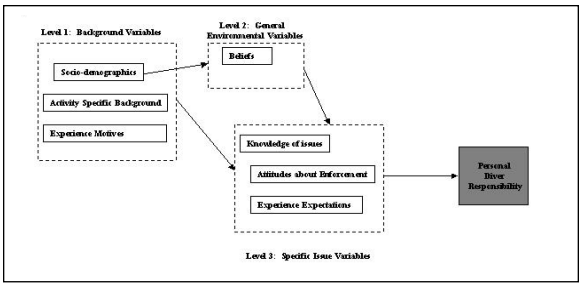


Figure 1. Predictive Framework of Personal Diver Responsible (adapted from Cottrell, 2002)

responsible for the consequences of my behavior while diving). As level of personal ownership evolves for an issue, one will be more likely to display personal or verbal commitment to that issue.

## Purpose of the study

The purpose of this paper is to examine predictors of diver personal responsibility for the protection of the marine environment. A predictive framework of personal responsibility (Figure 1), adapted from prior predictive models of responsible behavior (Cottrell & Graefe, 1997; Hungerford and Volk, 1990; Hines et al., 1987), was used as a guide for this investigation. The background variables (Level 1) and environmental beliefs (Level 2) are hypothesized to precede and interrelate with more specific attitudinal variables (Level 3) while combined in the prediction of personal diver responsibility (see Figure 1). In the model of responsible environmental behavior tested by Cottrell & Graefe (1997), personal responsibility was shown as a level 2 general environmental attitudinal variable which would serve to predict general responsible behavior. We use it as the dependent variable and add two new variables to the predictive model, motives for diving (Level 1) and expectation of dive experience outcomes (Level 3). Expectancy-value theory (Fishbein & Ajzen, 1975) indicates that people have a variety of motives for participating in a leisure activity. Further, motivations are determined by the attractiveness of outcomes and that expected outcomes would be a result of participation (Todd et al., 2001). According to Fishbein and Ajzen (in Todd et al., 2001) the belief that achieving desirable outcomes leads to a positive attitude and intention to perform a specific behavior. To test these propositions, we placed diver motivations as a level one variable assuming that motivations preclude beliefs and expectations.

**Table 1. — Diver profile.**

| | | Frequency | Percent |
|---|---|---|---|
| Age Categories | | | |
| 13-19 | | 72 | 24 |
| 20-35 | | 74 | 25 |
| 36-44 | | 78 | 26 |
| 45-64 | | 71 | 24 |
| | Total | 295 | 100 |
| Gender | | | |
| Female | | 63 | 21 |
| Male | | 236 | 79 |
| | Total | 299 | 100 |
| Level of Education | | | |
| Currently in HS | | 57 | 19 |
| HS graduate | | 17 | 6 |
| Some College education | | 66 | 22 |
| BS degree | | 84 | 28 |
| MS degree | | 43 | 15 |
| Ph.D. or professional degree | | 29 | 10 |
| | Total | 296 | 100 |
| Dive group type | | | |
| Regular US divers | | 206 | 69 |
| Boy Scouts | | 78 | 26 |
| International divers | | 16 | 5 |
| | Total | 300 | 100 |
| Diving Experience Rating | | | |
| Beginner | | 75 | 25 |
| Intermediate | | 117 | 39 |
| Advanced | | 69 | 23 |
| Expert | | 28 | 9 |
| Post expert | | 10 | 3 |
| | Total | 299 | 100 |
| Years Diving | | | |
| Less than one year | | 31 | 12 |
| One-two years | | 94 | 35 |
| Four to six years | | 50 | 19 |
| Seven to 10 years | | 33 | 12 |
| 11 to 15 years | | 18 | 7 |
| 16 to 40 years | | 40 | 15 |
| | Total | 266 | 100 |
| Number of dives logged | | | |
| No Dives | | 8 | 3 |
| One to 10 dives | | 95 | 33 |
| 11 to 25 dives | | 60 | 21 |
| 26 to 50 dives | | 40 | 14 |
| 51 to 100 | | 30 | 10 |
| 100+ dives | | 54 | 19 |
| | Total | 287 | 100 |

Meanwhile, diver experience expectations have been placed as a level 3 specific issue variable as an indicator of personal responsibility.

**Table 2. — Factor Analysis results of Environmental Attitudinal Items**

| Rotated Component Matrix | Balance of Nature | Personal Diver Responsibility | Factor 3 | Factor 4 |
|---|---|---|---|---|
| 13.4 Mankind is severely abusing the environment | **.729** | | | |
| 13.5 Humans must live in harmony with nature in order to survive | **.723** | | | |
| 13.6 Plants and animals exist to be primarily used by humans | **.698** | | | |
| 13.7 Humans have the right to modify the natural environment to suit their needs | **.682** | | | |
| 13.9 I make an effort to enhance my skills and practice before to have better control when diving | | **.792** | | |
| 13.8 My personal buoyancy control and control of fins, gauges and other equipment are all ways to prevent damage to the coral reef. | | **.749** | | |
| 13.2 I feel responsible for the consequences of my behavior while diving. | | **.513** | | |
| 13.3 I feel I can influence through my behavior and effort the solution to the protection of the marine environment | | **.441** | | |
| 13.10 If I don't take an artifact as a souvenir someone else will someone else will | | | .771 | |
| **13.1 I am informed about marine environmental issues and reef protection** | | | .626 | |
| 13.12 Information about shipwreck locations should be made easily accessible to the public | | | | .828 |
| **13.11 There should be stiff penalties for people who take valuable historical artifacts** | | | | .402 |
| *Eigenvalue* | 2.19 | 1.90 | 1.33 | 1.27 |
| *% Variance Explained* | 18 | 16 | 11 | 11 |
| *Reliability* | .69 | .65 | .26 | .19 |
| *Scale Mean* | 3.88 | 4.49 | | |

Factor loadings in bold used to compute factor indexes for Factors 1 & 2.
Items measured on a five-point Likert agreement scale 1=strongly disagree and 5=strongly agree.

The dependent variable, personal diver responsibility index, was the sum of four items measuring feelings of personal responsibility for appropriate diving behavior. Eighteen independent variables categorized as diver background variables (age, education, skill level, # dives logged, years diving experience), six diver motivation indices (based on indicators from Todd et al., 2001 adapted from Driver et al.'s (1991) Recreation Experience Preference scales - REP), environmental attitudinal variables (belief in the balance of nature), and specific issue variables (perceived knowledge of marine environmental issues, attitude towards penalty enforcement, diving experience expectations) comprised those indicators hypothesized to predict personal diver responsibility.

## Methods

During summer 2002, 300 divers ranging from beginner to post-expert completed a pre and post dive survey while enroute to and from the dive site (97% response rate) on a dive boat in the Florida Keys. The purposive sample (nonrandom) included boy scouts participating in the Florida Sea Base diving program, US and international divers on vacation in the Florida Keys. Members of the Boy Scouts of America participating in the Florida High Adventure Sea Base scuba program formed one group. This group represents a homogeneous sample of white middle class youth between the ages of 13-18 attending Sea Base in groups of eight for one week diving in the Florida Keys. Their diving schedule was very structured and organized under the guidance of dive masters and instructors in the context of a diver educational training program. Divers visiting the Keys either on a packaged dive trip or on an individual dive vacation make up the other two groups who were diving with one of four dive operators in Key West, Key Largo, or Islamorada, Florida. The Florida Keys was the location selected for the study since the area plays host to the third largest reef system in the world and the BSA Florida Sea Base was interested in sponsoring a study of diver motivations and expectations for diving.

For the purposes of this study, divers were asked to respond to diver participation (Todd et al., 2001), environmental attitudes (Cottrell, 1993), motivations, and expectation items (Fluker & Turner, 2000) in a two-part survey while on a dive boat. A secondary analysis of data collected for a

**Table 3. — Factor Analysis results of Diving Motivation Items**

| Rotated Component Matrix | Diver Experience | Skill | Escape | Interest | Social | Personal Challenge |
|---|---|---|---|---|---|---|
| M20 To gain an experience I can look back on | **.701** | | | | | |
| M18 To look at underwater animal and plant life | **.690** | | | | | |
| M5 Because it is stimulating & exciting | **.681** | | | | | |
| M16 To explore things | **.679** | | | | | |
| M19 For the adventure of it | **.678** | | | | | |
| M17 Because of the sense of discovery involved | **.655** | | | | | |
| M25 For fun | **.564** | | | | | |
| M15 To learn more about the underwater environment* | .531 | | | | .413 | |
| M4 Because I think it will be a challenge | | **.777** | | | | |
| M1 To show myself that I can do it | | **.739** | | | | |
| M3 To develop my diving skills and abilities | | **.671** | | | | |
| M2 Because it's sort of an impressive thing to do* | | .552 | | | | .491 |
| M27 To forget the pressures of my daily work for a while | | | **.732** | | | |
| M26 To experience the tranquility here | | | **.697** | | | |
| M28 For a change from everyday life | | | **.598** | | | |
| M7 For relaxation | | | **.578** | | | |
| M23 To study underwater geological formations | | | | **.753** | | |
| M22 To see shipwrecks | | | | **.681** | | |
| M21 So I can do something creative such as take pictures or videos | | | | **.568** | | |
| M24 To help keep myself physically fit* | | | .485 | .532 | | |
| M13 To be with others who enjoy the same things I do | | | | | **.776** | |
| M12 So I can be with my friends & family | | | | | **.765** | |
| M14 To meet new people | | | | | **.649** | |
| M9 To share my diving skills and knowledge | | | | | | |
| M8 For a chance to control things | | | | | | **.741** |
| M10 Because of the risk involved | | | | | | **.673** |
| M6 Because I think there is a lot of action here* | .480 | | | | | .498 |
| M11 To use my equipment | | | | | .408 | .469 |
| Eigenvalue | 4.24 | 2.79 | 2.50 | 2.45 | 2.44 | 2.34 |
| % of Variance Explained | 15 | 10 | 9 | 9 | 9 | 8 |
| Reliability | .83 | .76 | .74 | .68 | .72 | .60 |
| Scale Mean | 4.26 | 3.02 | 3.89 | 3.24 | 3.52 | 1.95 |

Items in bold used to compute factor indexes.

Items measured on a five-point importance scale.

*Items loading on two factors >.40 were not included in index computation.

MSc thesis (Meisel, 2003) was conducted to assess predictors of diver responsibility. SPSS software was used for the analysis of data, which included descriptive statistics to determine a diver profile, factor analysis to operationalize motivation, expectation, and personal responsibility indices, and stepwise multiple regression to determine which of 18 independent variables were the strongest predictors of personal diver responsibility. Diver profile items included years diving, number of dives logged, diver skill level, age and education. Diver motivation items were based on a 5-point importance scale; environmental items and expectations were based on a 5-point Likert agreement scale.

## Results

*Descriptive profile*

Of the 300 divers surveyed, 26% were boy scouts, 69% national and five percent international divers. A majority of divers were male (79%) with 24% age 13-19, 25% 20 to 35, and 51% 36 years or older. This group was relatively well educated with more than 50% having a BS degree or greater. Twenty-three percent were beginner followed by 32% intermediate, 30% advanced, 9% expert, and

6% post expert divers. More than 60% have been diving for four or more years. Nineteen percent have been diving 100+ times, 10% 51 to 100 times, 14% between 26 and 50 dives, and 54% between 1 and 25 dives, and three were diving for the first time (Table 1). An examination of relationships among diver profile variables and motivation, importance, and expectation items were presented in another paper at the NERR 2003 conference (see Meisel & Cottrell, 2003).

*Factor analysis*

Principal components factor analysis was conducted to operationalize indices for beliefs in the balance of nature (Table 2), personal diver responsibility (Table 2), diver motivation (Table 3), and diver expectations of the experience (Table 4). Reliability analysis of factor items per factor was used to determine internal consistency of various items used in index computation. First, a factor analysis of 12 environmental attitude statements were used to assess various aspects of an attitudinal construct including environmental beliefs (Dunlap & van Liere, 1978), locus of control, personal responsibility (Cottrell, 1993), professed knowledge of environmental issues (Cottrell & Graefe, 1997), and diver specific attitudes (Todd, Graefe, and Mann, 2001). Of the four factors determined, items loading .40> on factors 1 and 2 were used to create two variables for further analysis. Factor one with four items represents one dimension of Dunlap & Van Liere's (1978) New Environmental Paradigm, Balance of Nature (Scale Mean=3.88, Reliability alpha=.69). Factor 2, the dependent variable, diver personal responsibility index, was the sum of four items measuring feelings of personal responsibility for appropriate diving behavior (Scale Mean = 4.49, Reliability alpha = .65). Items loading on factors three and four were not interpretable as a domain and the internal consistency of each was very low, thus two of the items identified as specific issue variables (level 3 in Figure 1) similar to the Cottrell and Graefe (1997) model were used as single item measures for further analysis: knowledge of marine issues (Item 13.1) and attitudes about enforcement (Item 13.11).

Next, a factor analysis was conducted on 28 items drawn from Driver et al.s (1991) recreation experience preference items and motivation items from Todd et al.'s (2001). Similar to Todd et al. (2001) six factors resulted accounting for 60% of the variance; however, how the items loaded and the order of strength of factors was quite different than Todd et al. Factor 1 includes seven measures we refer to as diver experience motives (15% of variance, reliability=.83) as compared to Todd's Personal Challenge factor (29% variance, reliability=.81). Factor 2 with three items grouped together as diver skills motives (Reliability=.78) (Todd et al. was stature). Factor 3 representing escape and change from daily life and Factor 4 (Interest) to learn, see and do marine specific activities were similar to Todd et al. Factor 5 diving for social interaction was the 6th factor in the Todd paper. Factor 6 was the weakest of all the factors including two measures of Personal Challenge. From an exploratory perspective, all six motivation domains were computed as the sum of the items loading on each factor to include as independent variables in a regression equation. Reliability alphas for the factors ranged from .78 to .60 indicating an acceptable level of internal consistency per factor (Table 3). Items loading on more than one factor with a factor loading greater than .40 was not included in an index. Other than diver experience factor explaining 15% of the variance with the highest scale mean (4.3), the % explained variance for the other factors ranged from 10% to 8%. The weakest and least important factor was personal challenge (8% variance, reliability=.60, Mean=1.9) for these divers.

Next, a factor analysis (Table 4) was conducted on 18 items drawn from Fluker and Turner's (2000) expectancy valuation study of white water rafters resulting in four factors accounting for 60% of the variance. Factor 1 includes eight measures we refer to as service expectations (Reliability=.86). Factor 2 has three items grouped together as safety expectations (Reliability=.84). Factor 3 represents dive experience expectations with three items and factor 4 we labeled as personal challenge expectations. Four expectation indices were computed as the sum of the items loading on each factor to include on an exploratory basis as independent variables in a regression equation. Reliability alphas for the factors ranged from .86 to .63 indicating an acceptable level of internal consistency per factor. The most important diver expectation was dive experience expectations (Mean=4.6) followed by dive safety (Mean=4.4) and service (Mean=4.36).

**Table 4. — Factor analysis results of diver expectation items**

| Rotated component matrix | Service | Dive Safety | Dive Experience | Personal Challenge |
|---|---|---|---|---|
| 14.2 staff will be competent | .756 | | | |
| 14.4 trip will be well organized | .701 | | | |
| 14.9 staff will be friendly | .675 | | | |
| 14.11 will learn new skills | .659 | | | |
| 14.3 will be informed | .655 | | | |
| 14.1 will get value for money | .641 | | | |
| 14.10 will get to know nice people | .592 | | | |
| 14.8 equipment will be good | .468 | | | |
| 14.7 will not get injured | | .787 | | |
| 14.5 will feel safe | | .767 | | |
| 14.6 will be comfortable | | .759 | | |
| 14.14 will see nice fish | | | .855 | |
| 14.15 will see coral | | | .831 | |
| 14.13 will have fun | | | .583 | |
| 14.17 will be physically challenged | | | | .845 |
| 14.16 will take risks | | | | .778 |
| 14.18 will get scared | | | | .625 |
| 14.12 will get cold | | | | .418 |
| Eigenvalue | 3.9 | 2.5 | 2.1 | 2.1 |
| % of Variance Explained | 22 | 14 | 12 | 12 |
| Reliability | .863 | .839 | .785 | .633 |
| Scale Mean | 4.36 | 4.43 | 4.56 | 2.46 |

Items measured on a five-point Likert agreement scale – 1=strongly disagree and 5=strongly agree.

Personal challenge was the lowest expectation (Mean=2.46) domain similar to its importance as a motivation preference.

*Variables in regression model*

To test the model (Figure 1), a stepwise multiple regression analysis including 18 independent variables was used to assess the predictive strength of personal diver responsibility (Table 5). It is hypothesized that more attitude specific variables (Figure 1 - level 3) will be stronger predictors of personal responsibility than demographic, diver participation (level 1), or belief in the balance of nature (level 2). Table 5 presents the descriptive statistics of all the variables in the regression model, bivariate correlations, and standardized Beta coefficients of the significant predictors of personal responsibility. Of the 18 independent variables, 12 were positive correlates including two dive experience variables (skill level and total dives logged), four motivation indices (in decreasing order of strength - experience, social interaction, change, and interest in environment), balance of nature, knowledge of marine issues and stiff penalties, and three of the diver expectation indices (service, dive experience, and safety expectations) were found. Interestingly, personal challenge expectations was a negative correlate of personal diver responsibility; however, note (see Table 4) that two index items "will get scared and cold" were negative personal comfort items which might have influenced the negative direction with an overall scale mean of 2.4. Surprisingly, age, education, nor total dives logged was a correlate.

Results of the multiple regression found five predictors of personal responsibility accounting for 38 percent of the total variance ($R^2$=.382; F-value=25.8, p=.001) (Table 5). Perceived knowledge about marine environmental issues was the strongest predictor (B=.350, p<.001, 21% of variance explained). Belief in the balance of representing one dimension of Dunlap & van Liere's (1978) New Environmental Paradigm) was the second most significant predictor nature (B=.215, p<.001, 9% of variance) followed by the diver experience motivation index (B=.194, p<.001, 5% of variance), attitudes towards stiff penalties for taking marine artifacts (B=.138, p<.05, 2% of variance), and diver service

**Table 5. — Variables in stepwise regression model predictive model of personal diver responsibility (n=215)**

| | | Mean | Std | Correlation r-value[1] | Beta Coefficient | $R^2$ Change |
|---|---|---|---|---|---|---|
| **Level 1 variables** | **Socio demographic variables** | | | | | |
| Age | | 33.17 | 12.97 | .017 | | |
| Level of Education | | 3.45 | 1.57 | -.058 | | |
| | **Dive Experience variables** | | | | | |
| Diving Skill Level* | | 2.27 | 1.03 | .185** | | |
| Total dives logged | | 164 | 616 | .116* | | |
| Year since scuba diving | | 6.64 | 8.11 | .054 | | |
| | **Diver motivation indices** | | | | | |
| Diving Experience Motives | | 4.26 | 0.60 | .358*** | **.194**** | **.048** |
| Specific Interest in environment motives | | 3.00 | 1.04 | .203*** | | |
| Skill/Status Motives | | 2.75 | 0.97 | .107 | | |
| Change from everyday reality motives | | 3.87 | 0.86 | .253*** | | |
| Social Interaction | | 3.54 | 0.98 | .319*** | | |
| Seeking Action/Challenge motives | | 1.94 | 0.94 | -.061 | | |
| **Level 2 variables** | | | | | | |
| Balance of nature belief** | | 3.83 | 0.73 | .336*** | **.215***** | **.085** |
| **Level 3 variables** | | | | | | |
| Informed about marine environmental issues/reef protection | | 4.20 | 0.79 | .464*** | **.350***** | **.215** |
| Stiff penalties for people who take valuable historical artifacts | | 4.08 | 1.10 | .212** | **.138*** | **.020** |
| | **Diver expectations indices** | | | | | |
| Service expectations | | 4.34 | 0.51 | .358*** | **.136*** | **.014** |
| Safety expectations | | 4.44 | 0.55 | .202*** | | |
| Experience expectations | | 4.56 | 0.52 | .229*** | | |
| Challenge expectations | | 2.42 | 0.82 | -.213*** | | |
| **Dependent variable** | | | | | | |
| Personal diver responsibility | | 4.48 | 0.50 | | | |

*Significant at .05, **Significant at .01, ***Significant at .001 [1] One-tail test of significance

Standardized Beta coefficients in bold represent significant predictors ($R^2$=.382; F-value=25.8, p=.001)

Note - 75 cases missing due to missing values

expectations (B=.136, p<.05, 1% of variance). Surprisingly, none of the diver background variables predicted diver personal responsibility. Results imply that perceived knowledge of environmental issues, belief in a balance between humans and nature, certain experience preferences pertinent to the recreational activity, positive attitudes towards enforcement, and diver expectations of good service are socio-psychological factors that may influence personal responsibility to act pro-environmentally while engaged in a leisure activity.

## Conclusions and Discussion

The overall goal of this paper was to examine predictors of personal diver responsibility adapted from Cottrell & Graefe (1997). Six motivation to participate in the specific leisure activity indices as background variables (Level 1) and four expectations for goal attainment indices as specific issue variables (Level 3) were introduced to the model (Figure 1). Model placement of these variables was based on theoretical implications drawn from expectancy value theory (Fishbein and Ajzen, 1975 reviewed by Todd et al., 2001). Four motivation indices were correlates of personal responsibility, which moderately supports Fishbein and Ajzen's (1975) notion that motives for a leisure activity will relate to expected outcomes, likewise to certain attitudinal intentions to perform a specific behavior. Recall that the personal responsibility index includes both personal commitment and locus of control, items-both which are considered as indicators or sub-elements of behavioral intentions (Ajzen, 1991; Ajzen & Fishbein, 1973, Fishbein & Ajzen, 1974/75). Meanwhile, all four of the diver expectation indices were correlates supporting claims given in the expectancy-value theory (Fishbein & Ajzen, 1975)

that beliefs in achieving desirable outcomes leads to a positive attitude and intention to perform a specific behavior (in Todd et al. 2001). Furthermore, one motivation scale (dive experience) and one expectation scale (service expectation) were moderate predictors, justifying inclusion in a predictive model. However, diver motivation was a slightly stronger predictor than expectations, thus not supporting assumptions that expectations will be stronger indicators of personal responsibility than motivations.

As it pertains to the model presented in Figure 1, assumptions were that specific issue variables (Level 3) would be stronger predictors of the dependent variable. This assumption was weakly supported in that knowledge about marine pollution/reef protection issues was the strongest predictor. However, belief in the balance of nature as a level 2 variable was the second strongest predictor prior to both attitudes toward stiff penalties and diver expectations of level 3. Perhaps motivations should be moved forward in the model to level 3 since the items are activity specific or move it to a level of its own. These findings lend credence to further examination of relationships among these variables; thus, structural equation modeling is recommended for further testing. In this case, a recursive model with two or more dependent variables is suggested such as diver motivations and personal diver responsibility. In retrospect, 75 cases were omitted in the regression equation due to missing values, which alludes to some caution or generalization of results due to a small sample (n=215) with a proportionally large number of independent variables (18) in the analysis.

Reasons to continue this line of research is to find interventions to help encourage a change in behavior - referred by Geller (2002) as behavior-based intervention. Geller raises a practical point - "internal person dimensions like attitudes, perceptions, and cognition's are all difficult to define objectively and change directly. So stop trying!"(p. 528). Geller (p. 529) argues that "We don't have the time, education, training, or experience to do so effectively. Why not focus on the more manageable actions that we can actually observe and look for external factors that influence behavior independent of feelings, attitudes and perceptions." What people say and what people do are different as evidenced in prior research showing verbal commitment scores higher than actual behavior scores (Cottrell, 1993 & 1997). Personal responsibility is a measure of a construct that comes closer to an actual behavior than perceptions or attitudes. Schwartz (1968) and others (Todd et al., 2000) refer to this variable as ascription to responsibility. In this study, several indicators were predictors of the construct including the wish for stricter fines, motivations for diving, knowledge of marine environmental issues and expectations of expected outcomes.

In conclusion, personal responsibility is something every human being must take for his or her actions and choices. It is not something someone gives to us. Each individual must choose to see their responsibilities and live up to them. It isn't easy, and isn't always fun. In the long run, it can make the difference between a greater depletion in environmental quality or a move forward. None of us are responsible for the direct actions of others, however, our example and influence might influence appropriate decisions of others, especially in leisure behavior. In reality, we are responsible for our children and ourselves, and for breaking our old behavior patterns. Some of us may live up to that responsibility and some may not.

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