

# Introductory Guide to Scuba Diver Species

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## Introductory Guide to Scuba Diver Species

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### ABSTRACT

*Scuba studies primarily focused on physiological aspects of the sport. A few studies about consumer dive behavior have surfaced in the tourism and leisure literature since the 1980s. The recreational scuba market is not homogeneous. Hence the purpose of this study was to gain an understanding of scuba diver characteristics and to conduct an exploratory examination of scuba specific values and involvement. The study sought to identify differences between local scuba divers and visitors, and classify subgroups of divers based on scuba specific values. Data (N=377) was collected in the Florida Keys. Results showed that visitors had less years of certification experience but spent more on scuba, compared to local resident divers. Cluster analysis identified four groups of scuba divers - 'fun-seeking belongsers', 'actualizers', 'inner-circles' and 'moderates'. Group characteristics and scuba specific values were presented. Results may be useful to scuba stakeholders such as marketers and tourism administrators.*

**Keywords:** *scuba, values, involvement, cluster analysis, segmentation.*

### INTRODUCTION

#### **Scuba overview and adventure tourism**

Martin (1997) reviewed the history of diving and reported that the use of Self-Contained Underwater Breathing Apparatus (SCUBA) began with military and industrial-commercial applications. Prior to the 1950s, it was impractical for the general public to dive for two primary reasons. It was extremely costly and involved great inherent physiological risks. The introduction of the Aqua Lung breathing apparatus, designed by Jacques-Yves Cousteau and Emily Gagnon in 1943, facilitated access to much safer and cheaper diving for the mass consumer. It revolutionized the diving industry and fueled the growth of scuba as a leisure pursuit. The sport of scuba has grown considerably in the United States from when the Young Man's Christian Association (YMCA) began the first nationally recognized course for scuba certification in 1959. To date there are many national and international scuba certification agencies and they include the Professional Association of Diving Instructors (PADI), Confederation Mondiale des Activites Subaquatiques, and International Association of Nitrox and Technical Divers, to name a few. In 1988, a Leisure Trends Group research commissioned by the Diving Equipment and Marketing Association (DEMA), a non-profit membership-based trade association created to help businesses in the scuba and action water sports industries, reported that 8% of the United States adult populations were considered scuba participants. That approximates the number of enthusiastic scuba participants, defined in the study as those who had tried the sport or would try

it again, to be in excess of 19 million, back then in the 1980s. In terms of the scuba divers who keep current and maintain a continuous recreational scuba lifestyle, King (2007) suggested that estimates of the number of active divers in the United States ranged from 1.6 to 2.9 million, based on studies by Mediamark Research and Intelligence, Sporting Goods Manufacturers Association, and other trade organizations. PADI, which claims to certify 60% of all the divers in the world, estimates that there are more than 10 million active divers worldwide (PADI, 2007). Hence it is becoming increasingly important to recognize recreational scuba as a growing consumer market with possible distinct market segments.

Sung, Alastair and O'Leary (1997) reviewed definitions of adventure travel by many researchers, such as Hall (1989), Ewert (1989), and Darst and Armstrong (1980). Sung et al conceptualized adventure travel as "a trip or travel with the specific purpose of activity participation to explore a new experience, often involving perceived risk or controlled danger associated with personal challenges, in a natural environment or exotic outdoor setting". They investigated 48 adventure travel activities and reported 6 classifications of adventure travel via factor analysis. Scuba qualifies as a form of adventure travel within the tourism sector and was closely associated with snowmobiling, four wheel drive trips, hunting and motorcycling. Tabata (1992) reported that dive travel was a significant part of domestic and international travel and that snorkeling and scuba rated as the most popular activities for tourists who traveled to the tropics. In a World Tourism Organization (WTO) global forecast report, adventure tourism was identified as a potential growth sector, and that adventure travels included the underwater environment (WTO, 2001). In addition it was estimated that one in three divers would take an international holiday every year. A trade show consultant to Fortune 500 companies (Buttner, 2007) reported annual dive equipment sales at \$1 billion and dive related travel was between \$18 and \$20 billion. Hence the information suggests that scuba is as a growing trend in adventure tourism and economic impact figures will increase. There is a need to better understand scuba related sporting and travel trends.

### **Licere aquatic ignotus**

Latin-like terms were used in the sub-heading as a pun to mimic the taxonomic rank of the obscure aquatic species known as scuba divers. Studies about scuba divers in many research databases are skewed, and primarily focus on the physiological and biophysical aspects of the science of diving. There is deep understanding of divers in the industrial-commercial, military and medical rehabilitation setting. The social-psychological aspects of recreational dive behavior has not been intensely scrutinized nor has there been a coherent research effort to understand the leisure activity from the consumer's perspective. Some information about diver behavior, preferences, and satisfaction have sporadically surfaced in the leisure and tourism literature since the 1980s, and are presented in the later section. Traditionally, marketing researchers used demographic data to segment markets and predict diver choice and behavior. However, analyses based solely on non-human dimensions can erroneously stereotype consumers who may have diverse interests and lifestyles. Two middle aged, married, male divers, each with a personal annual income of \$80,000 may be poles apart in their scuba behavior and preferences.

The recreational scuba market may not necessarily consist of one homogeneous set of consumers, and this exploratory study provided preliminary information about scuba specific diver types and values. It is important to understand the leisure behavior and the potential socio economic ramifications of the actions of various diver types. The results of the study could be

valuable to scuba stakeholders ranging from industry suppliers and service providers to dive destination policy makers.

## **LITERATURE REVIEW**

### **Values and means end theory**

Values, distinct from motivations, have a hierarchical framework and can best be understood as a nested model. It is not the intent of this study to review the philosophical underpinnings of values research against motivation research. In short, values can be viewed as higher order motivations. Rokeach (1968, p.160) defined a value as “an enduring belief that a specific mode of conduct or end-state of existence is personally or socially preferable to alternative modes of conduct or end-states of existence.” Typical examples of values include, but are not limited to, sense of belonging, warm relationships with others, social recognition, freedom, security, and sense of accomplishment. Values research is extensive. Pitts and Woodside (1991) cited that the three most academically cited and empirically applied value scales were Khale’s (1983) List of Values (LOV), Rokeach’s (1973) Value Survey (RVS), and the Values And Lifestyles (VALS) system (Mitchell, 1983). The RVS alone has been used in more than 300 studies examining value hierarchies and the VALS is often used as a standard employee assessment in Fortune 500 firms.

On a parallel note, Gutman (1982) explained how a product or service facilitated the achievement of desired consumer end states, called values, and termed his conceptual framework as means end theory. He offered a practical method to assess consumers’ product knowledge and meaning structures. Since his seminal paper, more than 100 studies have been conducted based on means-end theory and values research. The myriad of research range from identifying factors that influence the purchase of organic wine in Greece (Fotopoulos, Krystallis, & Ness, 2003) and French fair trade coffee purchases (De Ferran & Grunert, 2007), to understanding resistance to internet banking (Kuisma, Laukkanen, & Hiltunen, 2007) and entrepreneur motivation toward private equity financing (Morandin, Bergami, & Bagozzi, 2006). Specifically within leisure and tourism literature, studies based on values and/or means end theory included investigations about host attitudes to tourism (Nunkoo & Ramkissoon, 2009), choice of leisure activities (Beatty, Kahle, Homer, & Mirsa, 1985), purchase of organic products in Greece (Chryssohoidis & Krystallis, 2005), vacation activity preferences (Mardrigal & Khale, 1994), types of heritage tourism visitors (Chandler, 1998), hotel choice (Zins, 1998), viewing of Olympic Games coverage (McDaniel, 2002), Canadian cultural event motivations, greenway use (Frauman & Cunningham, 2001) and Japanese tourism behavior (Leah & Gnoth, 2005). Values based research in scuba is limited. King (2005) used means end theory in a qualitative study and developed a hierarchical value map consisting of scuba specific attributes, consequences and values. The seven terminal values were challenge, social recognition, excitement, self esteem, fun, social integration, and sense of belonging. A quantitative application of the scuba specific terminal values was thus used in this exploratory study to investigate if divers could be differentiated.

### **Scuba studies**

Some scuba consumer studies have been done and variables associated with dive motivations, preferences, and satisfaction, have been identified mostly through descriptive or inferential statistical analyses. Yarwasky (1996) investigated motivation to participate in scuba diving and reported that “gives me a chance to be with friends” ranked as a higher motivation for

able bodied divers when compared against disabled divers. Saayman, Slabbert and Van Der Merwe (2009) compared two South African destinations and reported that while there were many overlapping motivational factors, each destination also had unique factors that the other did not have. For example, leisure activities and novelty was only associated with Jeffreys Bay. Tabata (1992) reported that factors such as diveable wreck or plane, drift dive, caves or lava tubes or arches, boat dives, were important factors for site attractiveness. Musa (2002) reported that divers in Sipadan, Indonesia, were satisfied by factors such as marine biodiversity and social opportunities with other divers and staff. MacCarthy, O'Neill and William (2006) did a qualitative study by investigating diver customer satisfaction in select cities in Australia and Thailand. They found that satisfaction was in part gained from perceptions of the dive itself and could be ascertained from water clarity, cave swim-throughs, presence of rare species, etc. Other peripheral experiences such as social interaction with other divers also affected diver satisfaction.

In light of the growth of adventure tourism as well as the increase in scuba participation, investigating diver characteristics and behavior could yield new information to help scuba stakeholders, such as service providers, better customize dive packages. Scuba studies have investigated why people scuba dive and the findings run the gamut from external factors such as water quality to internal motivations such as being with friends. One study specifically addressed the hierarchical nature of end-state or terminal values. Hence the purpose of this study was to gain an understanding of scuba diver characteristics and to conduct an exploratory examination of scuba specific values and involvement. Specifically, the study sought to identify if differences existed between local scuba divers and visitors, and classify unique subgroups of scuba divers based on scuba specific values.

## **METHODOLOGY**

### **Instrumentation**

Seven scuba specific values identified in a qualitative study by King (2005) were used as the basis for the development of the ScubaVals scale – a 43 item instrument that measures scuba specific values. The seven values specific to scuba were Social Integration (SI), Fun (F), Excitement (E), Sense of Belonging (SB), Challenge (C), Social Recognition (SR), and Self-Esteem (SE). A list of statements was generated for each of the seven constructs and a 6-point Likert scale was used to elicit discrete levels of agreement ranging from strongly disagree to strongly agree. Statements such as “I go on dive trips with family members” and “making new friends is part of the scuba experience” represented the SI construct. F was represented by statements such as “diving is an enjoyable sport”, and E was represented by statements such as “encountering the rare while diving is an adventure”. “Platform for connecting with people like myself” and “feel a common bond with divers” are some statements represented by the SB construct. C was represented by statements such as “abilities are tested” and examples of SR statements included “enhance my public image” and “raised my profile”. The last construct, SE was represented by statements such as “self esteem can be enhanced” and “affect my self-image”. A draft of ScubaVals was reviewed for content validity by a panel of experts, comprised of five academics and practitioners, and further refined through a usability test. Twenty divers were asked to participate in an online pilot study and 16 participants completed the ScubaVals instrument. The overall alpha coefficient was .86 and internal consistency was deemed acceptable for the small pilot study. Shortly thereafter a large scale quantitative survey was conducted over 6 weeks in 2007.

Scuba involvement was measured by identifying the number of months dived, number of one-tank dives completed, and scuba related expenditure (e.g., certification, vacation, equipment, magazines, etc.). Number of months dived and one-tank dives were assessed using open-ended questions. Respondents were asked to choose one of the six categories to report scuba related expenditure within a two year period - \$500 or less, \$501-\$1,000, \$1,001-\$1,500, \$1,501-\$2,000, \$2,001-\$2,500, and \$2,501 or more.

### **Administration**

Key Largo, Florida, home to both state and national managed marine protected areas, was chosen because it is a popular year round scuba destination that attracts divers from all over the country. Dive charter stores and scuba shops in the Key Largo vicinity were selected as data collection points due to high diver traffic. The sampling frame consisted of active adult leisure divers who maintained an average of 4 tank dives a year since obtaining their open water certification. Participants were approached at the pre-determined convenience sampling sites and asked to complete the survey. Participants were recruited at different times of the day and at various sites to increase the probability of more diverse representation of various types of divers. A total of 377 completed surveys were computed.

## **RESULTS AND DISCUSSION**

Table 1 reports the descriptive statistics of socio demographic information for all the respondents. Of the total respondents, 65% (n = 244) were male. Overall the divers ranged from 21 to 71 years old, and the average age was 42. In addition, 55% (n = 205) of the divers were married. With respect to educational qualifications, 62% (n = 232) of the divers had a bachelor's degree or higher. A total of 89% (n = 333) of the respondents were employed. Forty seven percent (n = 179) reported annual household income of \$100,001 or more while 7% (n = 26) reported annual household income of \$25,000 or less.

The respondent characteristics seem to augment findings from previous studies. The sport of scuba is generally male-dominated, and participants are mature in age, well educated and have high income. O'Neill, Williams, MacCarthy, and Groves (2000) reported that approximately 70% of the divers in Western Australia were males. Musa (2003) also found that 65% of the study sample was male divers, and the average age of the tourist diver in Sipadan, Malaysia, was 34.9 years. The average age of the tourist diver in Layang Layang, Malaysia, in Musa's subsequent study increased to 38.5 (Musa, Kadir, & Lee, 2006). In a study by Mundet and Ribera (2001), 56% of the divers in Medes Islands, Spain were 31-45 years. Thailing and Ditton (2003) studied US divers in the Texas Flower Gardens National Marine Sanctuary and reported that divers had an average of 16 years of schooling while Musa et al. (2006) reported 66.3% of the diving tourists had had a university degree or post graduate qualification. Perhaps not surprisingly, better educated participants would have higher annual incomes. The nature of scuba is somewhat cost prohibitive when compared to other leisure activities such as mountain biking, playing basketball, hiking, canoeing, etc. Hence the sport seems to attract participants who have more financial means to maintain that lifestyle.

**Table 1**  
**Socio Demographic Profile of Respondents**

Variable	Local Residents		Visitors	
	<i>n</i>	%	<i>n</i>	%
Gender				
Male	72	64.9	172	64.7
Female	39	35.1	94	35.3
Age				
21-30	21	18.9	43	16.2
31-40	34	30.6	72	27.2
41-50	25	22.5	97	36.6
51-60	22	19.8	46	17.4
61-	6	5.4	7	2.6
Marital status				
Married	58	52.3	147	55.3
Single/Divorced/Widowed	52	46.8	118	44.4
Education				
High school/technical training	43	38.7	96	36.5
College	34	30.6	92	35.0
Advanced	33	29.7	73	27.8
Employment				
Employed	92	82.9	241	90.6
Retired	10	9.0	6	2.3
Level of income				
Less than \$10,000	4	3.6	3	1.1
\$10,001-\$25,000	6	5.4	13	4.9
\$25,001-\$50,000	13	11.7	29	10.9
\$50,001-\$75,000	20	18.0	25	9.4
\$75,001-\$100,000	16	14.4	42	15.8
\$100,001 or more	46	41.4	133	50.0

Table 1 also provides comparisons between local residents and visitors. Many operational definitions of visitors and tourists exist and they include reasons for travel, overnight stays, distances travelled, etc. For example, Mill and Morrison (2009) reported that the spatial nature of tourist definitions used in Canada and the United States were 50 and 100 miles respectively. The National Travel survey (as cited by Masberg 1998) defined a tourist as someone who makes a trip where the distance travelled each way is 100 miles or more. For purposes of this study, a visitor is one who travelled at least 100 miles each way. The sample consisted of 111 local residents and 266 visitors.

As shown, distributions of socio demographic factors between the two groups are similar to that of overall sample except for two age groups and annual household income. With regard to age, those who are 31-40 were the largest group of local residents whereas visitors were most

represented by 41-50. In general, visitors were more affluent than local residents. Fifty percent of visitors reported annual household income of \$100,001 or more, while 41% of the local residents accounted for the same category.

On average, visitors reported higher annual household incomes than local residents. The industries associated with the Upper Keys vicinity are primarily marine tourism, agriculture, and commercial fishing; all of which are relatively low paying job sectors. In addition, the percentage of visitors with income of \$100,001 and above were much greater compared to locals residents. Although the Keys is home to multi-million real estates, it was not that time of the year when snow birds invaded the locale. In addition, data collection spanned over a long holiday weekend and divers with more discretionary income could have driven, sailed or flown in for a short vacation. With regards to age distribution, visitors were more likely to be between the ages of 31 to 50. The 20-somethings, and 50 plus residents were more likely to dive when compared to their similar age group visitors. Perhaps lack of alternative outdoor leisure pursuits is a contributing factor for the local community.

The descriptive statistics of several variables related to behavioral involvement and the differences of the behavioral involvement indicators between local residents and visitors are reported in Table 2. A significant mean difference was found between local residents and visitors regarding scuba related expenditure ( $t = -2.91, p < .01$ ). A significant mean difference was also found between local residents and visitors regarding diving experience ( $t = 3.07, p < .01$ ). Local residents had on average dived for approximately 10.5 years while visitors had an average of 7.5 years of dive experience. With regards to diving experience, local residents have proximate and easy access to dive sites that are conducive to diving year round. They can obtain certification more easily or conveniently, and that may explain the significant difference in the approximately 3 year differential in certification experience. With regards to the significantly lower scuba related expenditure of local residents, the results should be interpreted with caution. A key difference in the expenditure disparity may be due the fact that local residents are more knowledgeable about competitive price points. The Florida Keys is considered a world class dive site and is home to the renowned Florida Keys National Marine Sanctuary Shipwreck Trail. A large concentration of dive businesses, both in terms of scope and scale, has resulted in industry level economies of scale. Prices in the region would naturally be more competitive and locals may be more alert and acute to deals offered by Upper Keys dive operators, both for local and international dive packages. Hence local residents could have a savings advantage over visitors, due in part to more current and informed pricing knowledge. In addition, divers who primarily scuba in their home area would spend proportionately less on dive travel related costs such as hotels and transportation.

**Table 2**  
**Comparison of Scuba Involvement Variables between Local Residents and Visitors**

Variable	Local Residents		Visitors		<i>t</i>
	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>	
Diving experience (months)	127.59	116.02	90.06	104.9	3.07**
Number of one-tank dives completed	335.63	444.83	212.35	594.71	1.97
Scuba related expenditure <sup>1</sup>	3.85	1.86	4.42	1.7	-2.91**

Note: <sup>1</sup>Expenditure was measured in ranges. \*\*  $p < .01$



To segment the visitors based on their ScubaVals, *K*-Means cluster analysis was conducted (Table 3). The results of the cluster analysis suggested a four-cluster solution to be the most tenable option. The first and the fourth cluster each amounted to 30.8% ( $n = 82$ ). The second cluster represented 19.9% ( $n = 53$ ), and the third cluster comprised of 18.4% ( $n = 49$ ). These four clusters were named: (a) ‘fun-seeking belongers’, (b) ‘actualizers’, (c) ‘inner-circles’, and, (d) ‘moderates’.

**Table 3**  
**Summary Statistics of Clusters**

Cluster	Cluster Size	Social Integration	Fun	Excitement	Sense of Belonging	Challenge	Social Recognition	Self Esteem
1	82	4.23	5.90	5.50	4.99	4.34	4.38	4.81
2	53	4.33	5.74	5.27	4.40	4.84	4.65	4.91
3	49	5.03	5.77	5.23	4.02	4.47	3.77	4.02
4	82	4.18	5.65	5.11	4.32	4.39	4.14	4.37

Table 4 illustrates the socio demographic variables by cluster membership. While age was consistent across the groups, the other variables differed on relevant dimensions, across the groups. The ‘fun-seeking belongers’ are best described by fun and excitement value seeking divers with a strong affiliation for group belonging. They seemed to enjoy diving in various locations, appreciated stimulating encounters, and placed emphasis on bonding with other divers. ‘Fun-seeking belongers’ identified themselves as part of the scuba community, and sought to affiliate with other divers who wore similar psychological scuba badges. They were primarily males (77.1%), and the number of married respondents in this cluster was the lowest (48.7%). ‘Fun-seeking belongers’ had most diving experiences (105 months), and spent the most on scuba activities (66.6% spent over \$2,000).

The ‘actualizers’ cluster weighed heavily on challenge, self-recognition, and self-esteem values. They are likely to emphasize the importance of scuba certification, acknowledge that scuba can make them feel special, and overcome the challenges they face during the activity. This group is uniquely represented by more females (50.9%) when compared with the other 3 groups. Fourteen percent of ‘actualizers’ reported annual household income of \$25,000 or less, which may be an indication that some of the married female ‘actualizers’ may be housewives. Accordingly, they spent the least on scuba activities (43.3% spent over \$2,000). They also had the least diving experiences (79 months), and the lowest number of one-tank dives completed (131 dives). Their relatively poor economic situation may be linked to their need for validation in terms of wanting to triumph over challenges. Scuba may be an outlet for them to raise self-esteem and attain social recognition.

The ‘inner-circles’ perceived diving as central opportunity to make new friends, and spend time with family and friends. Of all the groups, the utility of scuba as a means of raising their image as a diver, was the lowest. The ‘inner-circles’ were least driven to be part of the scuba diver community. A representative profile of this type of diver would be married (65.3%), well-educated (72.3% received at least college education), affluent (highest percentages of people with annual household income of \$100,001 or more was 70%), and male (71.5%). Their diving experiences (85 months) and number of one-tank dives (189 dives) tend to be lower than average visitors.

The ‘moderates’ group is distinct from all other clusters in that these visitors seemed to be relatively moderate on all dimensions of ScubaVals. They are likely to be married (58%) males (68.3%). With regard to level of education, this group had the lowest number of people who received college education (53%). Forty seven percent of the ‘moderates’ indicated that they have annual household income of \$100,001 or more. They completed more one-tank dives (261 dives) than any other cluster (188-230 dives).

**Table 4**  
**Socio Demographic Segmentation of Visitors by Clusters**

Characteristic	Fun-seeking belongers	Actualizers	Inner- circles	Moderates
Age	42	41	42	42
% female	32.9	50.9	28.5	31.7
% received at least college education	66.6	65.3	72.3	53.0
% married	48.7	52.8	65.3	58.0
% with income <\$10,000	1.3	3.9	0	0
% with income \$10,001-\$25,000	4.1	9.8	0	6.6
% with income \$25,001-\$50,000	9.7	13.7	10.6	13.3
% with income \$50,001-\$75,000	12.5	3.9	2.1	13.3
% with income \$75,001-\$100,000	13.8	17.6	17.0	20.0
% with income >\$100,001	58.3	45.0	70.0	46.6
Diving experience (months)	104.7	78.9	85.4	85.3
Number of one-tank dives completed	230.1	131.2	188.5	261.1
% spent over \$2,000 on scuba	66.6	43.3	55.1	57.3

### CONCLUSION

A heterogeneous diver market that has been segmented would benefit both private and public sector stakeholders. Scuba equipment and service providers could refine their product and service mix to cost effectively satisfy the needs of niche markets. For example, tour promoters could use differentiated marketing plans to efficiently reach out to divers with common preferences and/or attitudes. From a management perspective, consumption patterns and demand trends could be better understood, and counter measures could more effectively be planned for. Policy makers and other social marketers concerned about the environment and limited non-renewable natural resources could custom intervention programs and promote leisure consumption that minimizes negative ecological impact.

Kruer and Causey (1992) reported that artificial reefs were an effective resource management tool that was used to divert stress from natural reefs. If there was evidence that a significant number of divers at a popular coral reef site were also interested in artificial reef diving, marine sanctuary administrators could divert underwater traffic to nearby artificial submerged cultural resource sites (e.g. shipwrecks) to better complement the needs of those divers. One example of an application of the study findings is described. “Actualizers” identified in this study could be one such group to target. Promoting artificial reefs to “actualizers”, instead

of “moderates” or non-differentiated divers, could result in win-win situations for both divers and proponents of sustainable tourism. Artificial reefs, such as the United States Ship Spiegel Grove and United States Coast Guard Cutter Duane, are generally found in deeper and more challenging environments. They would appeal more to “actualizers” who seek to test their abilities, possibly in deep and low light conditions, as opposed to Molasses reef, which is a shallow sandy bottom dive site. Channeling “actualizers” away from over visited natural reefs will help alleviate resource depletion of the natural reefs.

In summation, results showed that that visitors had less years of certification experience but spent more on scuba related expenses in the last 2 years when compared to local resident divers. Cluster analysis, based on scuba values and behavioral involvement variables identified four groups of Upper Keys scuba divers - ‘fun-seeking belongers’, ‘actualizers’, ‘inner-circles’ and ‘moderates’. More cluster analysis can be done on other dive related variables such as certification levels, equipment used, environmental attitudes and other psychographics.

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