

PREFERENCES FOR LOCAL, WILD-HARVESTED SHRIMP AMONG COASTAL TOURISTS IN SOUTH CAROLINA

Laura Jodice, Clemson University, jodice@clemson.edu
William C. Norman, Clemson University, wnorman@clemson.edu
Sajna Shenoy, c/o Clemson University, wnorman@clemson.edu
Kyle M. Woosnam, Clemson University, woosnam@clemson.edu

ABSTRACT

In 2004, United States (U.S.) shrimp landings comprised 11% of shrimp available to the domestic market. Asian and South America shrimp imports to the U.S. began reaching record levels in 2001, following European Union tariffs on Asian shrimp. The increased import supply resulted in drastic decline of ex-vessel and wholesale prices for domestic shrimp in the Southeast U.S. Consequently, the profitability and number of participating vessels throughout the Southeast U.S. have decreased. At the same time, U.S. per capita shrimp consumption has reached a record high. Despite new tariffs on imports from six countries and recently imposed limited entry to improve efficiency, the shrimp industry in the Southeast U.S. must become more competitive. In response, the Southeast U.S. states have formed a regional trade association and have been working to establish domestic, wild-harvested shrimp as a premium, higher-priced brand for the U.S. marketplace. One potential target market is coastal tourists. Tourism is a significant industry in South Carolina and the four largest coastal counties generate 56% of the state's total domestic travel expenditures. Successfully marketing premium shrimp to tourists depends upon quality certification, building linkages between local fishermen, restaurants, retailers, and tourism organizations, and probably, educating consumers who are visiting the region. While studies have explored seafood preferences of consumers, few have focused on tourists. The 2004 South Carolina Coastal Tourism survey was designed to identify regional tourist market segments and examine tourist preferences, subjective knowledge, beliefs, and consumption behavior regarding South Carolina shrimp. This paper explores selected results, focusing on the influence of tourists' subjective knowledge about the shrimp fishery and shrimp preparation on their preferences for shrimp attributes (e.g., origin, freshness, reputation) and the influence of these preferences on their shrimp purchasing behavior at the coastal destination. The results demonstrate that South Carolina coastal tourists have a low level of subjective knowledge about shrimp. Therefore, the ability of coastal tourists to discriminate among shrimp attributes (especially related to origin) may be limited. Recommendations suggest that the tourism and seafood industries, retailers and restaurants on the South Carolina coast should engage in a collaborative marketing strategy focused on educating South Carolina coastal tourists about local, wild-caught shrimp product.

Keywords: shrimp, tourism, knowledge, preferences, behavior, collaborative marketing

INTRODUCTION

Shrimp consumption in the United States (U.S.) has reached a record high (NMFS, 2005), a demand which far exceeds domestic harvest. Despite this trend, in the last five years, the shrimp fishery in the Southeast U.S. has been facing significant challenges affecting both its short-term and long-term economic sustainability. Suppressed prices due to increased competition with foreign producers of farmed shrimp in Asia and South America and changes in the world food distribution systems have forced commercial shrimp fishermen to seek out new methods and strategies to increase their return on investment. Currently, only 11% of fresh/frozen shrimp available on the U.S. market is domestically harvested, and U.S. South Atlantic region (excluding Gulf of Mexico) landings represent less than 1% of fresh/frozen shrimp available on the U.S. market. Furthermore, the decline in processing and storage facilities and concentration of remaining facilities in the Gulf of Mexico region makes the industry vulnerable to catastrophic hurricane destruction and limits potential for regional branding and niche marketing efforts for domestic, wild-caught shrimp. This makes competition with imports difficult.

As a means to obtain a better price for local, wild-caught domestic product, the Southeastern U.S. shrimp industry has been exploring marketing niches based on premium quality, domestic branding, source identification, safety, fishery sustainability and target marketing. A prominent solution has been the idea of marketing "wild-caught" shrimp as a specialty or quality product as a means to increase profit potential to the domestic shrimp industry. The

industry has developed a shrimp certification program for harvesters, retailers and restaurants, under the brand name, *Wild American*TM.

Tourists are an important shrimp consumer group that may be willing to pay premium prices for certified quality wild-caught shrimp while traveling on the coast. While eating seafood where seafood is landed is intuitively a part of the coastal tourism experience, little is known about whether coastal tourists are a valuable target market for local, wild-caught seafood. In addition, competitively marketing a seafood destination to tourists depends on integration of tourism and seafood industries through collaborative strategies, including informing tourists, restaurants and retailers in coastal communities about the local fishery. However, there is typically little integration between the tourism and seafood industries in coastal regions.

In South Carolina (S.C.), coastal tourism contributes significantly to the state's economy. In this setting, education, outreach and promotion about wild-caught shrimp may be best facilitated by a collaborative partnership involving local and regional destination marketing organizations (DMOs), seafood retailers and restaurants, and the S.C. commercial shrimp industry. Information about the S.C. shrimp industry and heritage could also be incorporated into outreach and education efforts (e.g., tourist brochures, interpretive displays, chef training) targeting tourists and the culinary industry.

Several studies have explored general consumer seafood preferences, purchasing, and consumption behavior (e.g., Donath, Wessells, Johnston, and Asche, 2000; Wessells, Donath, and Johnston, 1999; Verbeke and Pieniak, 2006a). However, market information specific to shrimp is limited (Wirth and Davis, 2001). Available information indicates that most shrimp is consumed in restaurants (Wirth and Davis, 2001) and that shrimp is the top choice at quick service chain restaurants (34%) and casual chain restaurants (71%) (Hale Group, 2005). Also, among shrimp consumers who vary their consumption by season, summer is the most common season for shrimp consumption at restaurants (Wirth and Davis, 2001). A few studies have also examined differences between coastal and inland resident populations with respect to seafood consumption (e.g., Mann 2004; Nauman, Gempesaw, Bacon and Manalo, 1995; Bose and Brown, 2000).

This paper is unique in two ways—1) it examines coastal tourists as a subpopulation of seafood consumers, and 2) it evaluates results in the context of integrating seafood and tourism marketing. This paper first reviews background on the S.C. Shrimp fishery challenges and issues and the status of S.C. tourism as the dominant industry in the state. It then presents selected results from the 2004 S.C. Coastal Tourism survey, designed to identify regional tourist market segments and examine tourist preferences, subjective knowledge, beliefs, and consumption behavior regarding S.C. local, wild-caught shrimp. The analysis focuses on the influence of tourists' subjective knowledge about shrimp on their preferences for shrimp attributes (e.g., origin, freshness, reputation), and the influence of these preferences on their shrimp purchasing behavior while visiting the coastal destination. The objective of this exploratory analysis is to help the S.C. shrimp and tourism industries understand whether education of coastal tourists may be important to marketing local, wild-caught shrimp as a premium product at the coastal destination.

BACKGROUND

South Carolina shrimp fishery

South Carolina is located on the Atlantic coast in the Southeastern region of the U.S. Scattered pockets of small shrimp fleets are located along the S.C. coast and enhance the scenery of many harbors. The S.C. shrimp fishery began in the mid 1920's. After WWII, many new trawlers were built, and the industry expanded significantly. During this period, the industry began trucking fresh shrimp on ice from the docks to restaurants and retailers throughout the region. These days, the S.C. shrimp industry is still primarily family businesses.

The state has two important commercial species, white shrimp (*Penaeus setiferus*) and brown shrimp (*Penaeus aztecus*). Neither of these species is overfished, however annual supply and timing of harvest depends on environmental conditions (e.g., winter rainfall or water temperature) which affect shrimp migration from coastal estuaries to the open ocean (SCDNR, 2006a). Fishermen may also fish for deep water rock shrimp (*Sicyonia brevirostri*) in U.S. Exclusive Economic Zone (EEZ) waters but must have a limited access permit. South Carolina

shrimp are usually “in season” from spring (May/June) through early winter (December/January). There are “three” seasonal varieties of shrimp available in South Carolina—1) roe shrimp or adult white shrimp from previous year spawn (May or June), 2) brown shrimp (June through August; sometimes as late as October); 3) white shrimp from the spring spawn (August through October) (SCDNR, 2006a). The white shrimp are the largest. The primary commercial harvest method is trawling. Some harvesters use cast nets and drop nets in the coastal zone.

Like many fisheries, the S.C. shrimp fishery is facing numerous challenges: globalization of seafood trade, fleet overcapacity, rising fuel costs, gear costs (particularly related to bycatch reduction), limited processing and storage facilities in the state, and a strong culture of independence among the fishermen and families involved. Currently, the most significant challenge is suppressed prices due to globalization of seafood trade and increased competition from foreign producers. In the Southeast U.S., shrimp import prices decreased as much as 28 percent from 2000 to 2002 (Southern Shrimp Alliance, 2003).

Gear costs include state and federal requirements that trawl nets be equipped with a turtle exclusion device (TED) and a finfish bycatch reduction device (BRD). Although this effort has significantly reduced bycatch, the current discard to landings ratio for the South Atlantic shrimp fishery has been estimated at 2.95 and is the second highest in the U.S. (i.e., Gulf of Mexico shrimp fishery is the highest at 4.56) (Harrington, Myers, and Rosenberg, 2005). Given the current level of sustainability for the U.S. South Atlantic shrimp fishery, *Seafood Watch* has placed domestic wild-harvested shrimp on the “good alternative” category on the *US Southeastern Region Seafood Watch* card (see: www.mbayaq.org/cr/seafoodwatch.asp).

Shrimp processing capacity on the S.C. coast consists of only a few scattered small to medium sized docks capable of limited freezer storage. Processing at these facilities is limited primarily to icing shrimp in preparation for transportation to large processing facilities in the U.S. Gulf of Mexico region (primarily Louisiana and Mississippi), the capacity of which was severely impacted by Hurricane Katrina in August, 2005. Some heading, peeling, icing and storage do occur for local distribution. In addition, the existing docks are located in areas of coastal development pressure and the few remaining dock owners are nearing retirement.

These combined pressures have resulted in significant downsizing of the S.C. shrimp fleet. For example, in 2002, there were 730 boats registered to shrimp in S.C. waters and this number declined to 535 in 2003 (Barkley, Henry, and Gantt, 2004). In 2003 the United States Congress appropriated approximately \$5.6 million in disaster assistance to the South Carolina shrimp industry. The majority of this funding provided direct economic assistance to shrimp fishermen, but \$500,000 was designated to subsidize seafood marketing. In December 2003, the Southern Shrimp Alliance (representing eight states—Texas, Louisiana, Mississippi, Alabama, Florida, Georgia, South Carolina and North Carolina) also began an anti-dumping action against shrimp producers in China, Vietnam, India, Thailand, Ecuador and Brazil. In December 2004, The U.S. Department of Commerce found evidence of dumping and tariffs were imposed. However, the domestic shrimp industry has not seen sufficient change in prices.

In the last decade, the Southeast U.S. shrimp fishermen were able to work independently and retain a relatively significant income. They are now forced to seek out new methods and strategies to increase the return on their investment and compete with a farmed product in a global market (Trunk, 2005). One option is to develop collaborative marketing strategies. As a member of the Southern Shrimp Alliance, the S.C. shrimp industry has begun collaborating with other states to develop a premium quality brand (*Wild AmericianTM*) for marketing their wild-caught shrimp. In addition to certifying harvesters, restaurants and retailers, this program works to “educate the trade and consumers about the advantages of choosing seafood that grows naturally” (see: www.wildamericanshrimp.com).

Seafood and tourists

Rather than competing with global suppliers, South Carolina shrimp harvesters may want to develop an in-season, local, quality shrimp market niche by collaborating with the state’s vibrant coastal travel and tourism industries and heritage and culinary tourism development and marketing efforts. Tension between the tourism and commercial fishing industry and dominance of recreational interests has been well-documented for Key West and other coastal regions (Schittone, 2000). Baum (1999: 47) suggests that tourism needs to be established before or early in the fishery decline period and “in a manner that is complementary to existing activities rather than solely instead of

them.” Grant (2004: 234) argues that sustainable tourism may require that participants, “aligned to a traditional tourism business stance,” be re-orientated from the view that “tourism is a beneficial economic force in any form” to a view that “tourism’s key role is as a driver for cultural and environmental betterment and local economic resilience.” Demonstrating the importance of coastal seafood products and experiences in the decision to visit a coastal destination could be useful toward aligning local seafood harvest, settings and experiences with coastal tourism in effort to enhance coastal community sustainability.

South Carolina is a good place to explore collaboration between the shrimp and tourism industry. The travel and tourism industry is a top employer in South Carolina and generates more state income than any other industry (SCPRT, 2003). In terms of domestic travel expenditures, the state received \$7.8 billion in 2004, and the top three counties were the coastal counties of Horry County (\$2.4 billion), Charleston County (\$1.2 billion), and Beaufort County (\$823 million) (TIA, 2005). In comparison, the total estimated value of South Carolina shrimp landings (heads-off) in 2004 was only \$8.4 million (SCDNR, 2006b). Also, while SC travel and tourism generated employment for 109,700 in 2004 (TIA, 2005), the 2000 census indicates that only 20,788 were employed in agriculture (including fishing) and mining industries in the state (South Carolina Budget & Control Board, 2005).

Although tourism has resulted in a notable increase in coastal gentrification (Orbach and Johnson, 1989) and a decline in availability of commercial dock space (Barkley et al., 2004), the relevance of tourism to the seafood industry is apparent in that eating at restaurants is a frequent activity for coastal tourists. In South Carolina, over 30% of the money spent by domestic travelers is on foodservice (i.e., restaurants, grocery stores and other eating and drinking establishments), and almost 50 percent of travel generated employment is in the foodservice sector (TIA, 2005).

In general, commercial fishing appears to be important to regional identity, local distinctiveness, culture, and history (Rogelja, 2002). This is relevant to S.C. because some of the fastest growing tourism segments in the state include heritage tourism, nature-based tourism, agritourism, and culinary or food tourism. Also, S.C. travel and tourism related industries regularly use shrimp fishing imagery in their marketing. For example, restaurants and seafood retailers use shrimp boat images in signage or locate near shrimp vessels. This practice does not necessarily represent a strategic business partnership between the fishing and tourism sectors. For example, the town of Mount Pleasant, S.C. featured a commercial shrimp boat on the cover of their local tourist map without the prior knowledge of the vessel owner (W. Magwood, personal communication).

CONSUMER KNOWLEDGE AND SEAFOOD PREFERENCES

Promotion of the *Wild American*_{TM} brand in by the South Carolina and other Southeast U.S. shrimp industry members will rely on training of fishermen, restaurants and retailers who wish to obtain this certification. While branding may provide information about quality and origin, consumers may still need to appreciate the value of the brand before they are willing to pay a premium price. The cover of the June/July 2006 issue of *Wild Catch* magazine (www.wildcatchmagazine.com) suggests “Smart retailers educate their customers.” Restaurants may also want to educate their customers. However, the success of educating customers relies on the shrimp industry’s ability to educate retailers and restaurants. This assumption that education is important to successful marketing of wild-caught seafood suggests an investigation of the influence of knowledge on seafood preferences and behaviors could be informative.

Subjective Knowledge

A consumer’s subjective knowledge is their perceived or self-assessed knowledge (Radecki and Jaccard 1995; Moorman, Diehl, Brinberg and Kidwell 2004; Park, Mothersbaugh, and Feick, 1994). Subjective knowledge is distinguished from objective knowledge which measures what an individual actually knows. Assessing subjective knowledge involves asking study participants to rank their level of knowledge about specific issues or subjects. Subjective knowledge influences information search behavior and decision-making confidence (Radecki and Jaccard 1995). Subjective knowledge has been demonstrated as having low correspondence with actual knowledge and having a negative relationship with information search behavior (Radecki and Jaccard 1995; Park, Mothersbaugh, and Feick 1994). That is, the more confidence consumers have in their perceived knowledge about a product, the less likely they are to search for additional information. Furthermore, failure to retrieve information from memory

can result in an “I don’t know” response (Radecki and Jaccard 1995), causing a consumer to become frustrated and resort to more familiar products. However, consumers may increase information acquisition efforts when a product is more personally relevant (Radecki and Jaccard 1995). Subjective knowledge can also positively influence consumers’ between category information search selectivity (e.g., choosing products to examine) and the quality of their decision (Moorman, Diehl, Brinberg and Kidwell 2004).

This paper is concerned with consumer preferences for certain shrimp attributes (especially origin). In this context, subjective knowledge has implications for consumer decision-making and attribute discrimination based on labeling or other information. Verbeke and Pieniak (2006a) examined subjective and objective knowledge among European seafood consumers as part of the *Seafoodplus* project and discovered a low correlation between perceived knowledge and actual knowledge. They also determined that consumers’ subjective knowledge about seafood was a stronger predictor of total fish consumption frequency and seafood attribute preferences. For example, subjective knowledge correlated more strongly than objective knowledge with interest in traceability, quality marks, safety guarantee and information about health benefits from fish consumption (Verbeke and Pieniak, 2006b).

Situation specific knowledge

Situated learning is learning that occurs specific to a situation. Researchers have demonstrated that seafood related experience or situational factors that influence seafood consumption or demand can include—participation in recreational harvest (Wessells, Kline and Anderson, 1996; Burger 1998), taste, convenience or availability, package attributes (materials, labeling), versatility, previous buying and eating experience, and social setting (Wessells 2002; Leek, Maddock and Foxall, 2000). In addition, personal relevance of a consumer product can influence the effort that individuals expend in learning about the product (Radecki and Jaccard, 1995). Also, Park, Mothersbaugh and Feick, (1994: 79) indicate that knowledge self-assessment is based “more on product-related experience memory in the form of information search, product usage, and/or ownership than on the memory for product-class information”.

Coastal travel experience may also influence subjective knowledge and information search about coastal subjects. Steel, Lovrich, Lach, and Fomenko (2005) differentiate between trans-situational (e.g., demographics, education level) and situational (e.g., trips to coast, business on coast) variables. They examined the influence of these variables on knowledge and the relationship between knowledge and policy perception. They found a positive significant relationship between frequency of coastal visits with knowledge as well as the perception that ocean fisheries are in decline or in serious decline.

Therefore, personal relevance or situation specific experience may influence subjective knowledge about wild-caught shrimp on the South Carolina coast. In this case, measuring subjective knowledge specific to shrimp (rather than seafood in general) is important. In other words, for S.C. coastal tourists, knowing about commercial shrimp fishing methods may be more personally relevant than knowing about commercial fishing methods. Also, frequency of visits to the South Carolina coast may influence familiarity with the local, wild-caught shrimp product and increase subjective knowledge about shrimp quality. For example, frequent visitors may be more familiar with the quality of water off the South Carolina coast and use that information to judge the “safety” of local wild-caught shrimp. Frequent visitors may also develop greater attachment to the region and the local shrimp industry, and therefore seek out personally relevant information.

Origin as a seafood attribute

Understanding whether origin matters to tourists eating shrimp is important because the S.C. shrimp industry is focused on marketing their locally harvested wild-caught shrimp under the *Wild-American_{TM}* branding program, Skuras and Dimara (2004) suggest that consumers may value products associated with specific places or regions particularly if they are residents or spend their holiday or own a second home in the product’s region of origin. Consumers may also draw conclusions about a product based on origin in the absence of attribute information. For example, consumers associate “Alaska Seafood” with positive images and descriptors (The Hale Group, 2005). Skuras and Dimara (2004) describe three sets of factors that contribute to regional image—1) nature and the environment, 2) history tradition and heritage, and 3) amenity experiential factors. Because frequent visitors to the S.C. coast might be expected to be more familiar with the local shrimp, as well as the industry and culture, in the places they visit, shrimp originating from these places may be an important attribute. In contrast, less frequent

visitors or less frequent shrimp eaters may be less likely to construct a regional image regarding shrimp, and this may weaken their preference for local product relative to other preferred shrimp attributes, such as price.

Research questions

A potential collaborative marketing strategy for tourism and shrimp industries may be to engage restaurants and retailers at the destination in education of S.C. coastal tourists. Therefore, it is important to explore the influence of subjective knowledge on shrimp attribute preferences. The following research questions guide this exploration:

1. Do situational (i.e., trip frequency to S.C. coast, shrimp eating frequency at home, heard shrimp advertising during trip) and trans-situational (i.e., education level) variables influence South Carolina coastal tourists' subjective knowledge about shrimp?
2. Does S.C. coastal tourists' subjective knowledge influence their perceived importance of shrimp attributes while traveling on the S.C. coast?
3. Does S.C. coastal tourists' perceived importance of shrimp attributes influence their shrimp purchasing behavior while traveling on the S.C. coast?

METHODS

Data collection involved the 2004 S.C. Coastal Tourism Survey. South Carolina coastal visitors were intercepted from July through October, 2004 in four (i.e., Horry, Georgetown, Charleston and Beaufort) of the six counties of coastal South Carolina. Sampling proportion was based on 2001-2002 visitor expenditures by county (TIA, 2003). Addresses (n=831) were collected at 27 tourist venues (e.g., beach, waterfront boardwalk, golf course, botanical garden, state park, amusement park, shopping area), and participants were sent a ten page mail-back survey within two weeks after their trip. The mail-back survey was administered using a modified Dillman (2000) approach consisting of an initial mailing, reminder postcard and follow-up mailing. Of the 803 good addresses, 356 returned surveys were usable, for a response rate of 44.3%. The survey included several questions related to food preferences (Shenoy, 2005), characteristics of most recent trip to S.C. coast, shrimp attribute importance, beliefs about shrimp and shrimp purchasing, interest in shrimp related tourism experiences, self-assessed (subjective) knowledge about shrimp, at home seafood consumption behavior, and demographics (age, gender, education, income).

This paper reports analysis of selected survey variables that are relevant to the research questions (Table 1). Analysis included only respondents who eat shrimp (n=308).

Table 1: Selected analysis variables for exploring South Carolina tourists' knowledge and preferences regarding shrimp.

VARIABLES	SCALE
Situation specific experience	
Trip frequency to SC coast (last 2 yrs)	first trip, 2-5 trips, 6 or more trips
Shrimp eating frequency at home	once/week, once/2weeks, once/month
Heard shrimp advertising during trip	yes, no
Trans-situational	
General level of education	high school, college, post-graduate
Subjective knowledge	1 to 5, 1=totally uninformed, 5=extremely knowledgeable
Attribute importance (28 items)	1 to 5, 1=not important, 5=extremely important
Behavior during last trip	
# times ate shrimp	self estimate, no scale
\$ spent on shrimp at restaurants	self estimate, no scale
\$ spent on shrimp to take home	self-estimate, no scale
Intention to return to SC coast to eat shrimp	yes or no

RESULTS

Subjective knowledge

The subjective knowledge scale included eleven items related to commercial shrimp fishery management and selection and preparation of shrimp as a food item. Exploratory factor analysis (EFA) (principal axis factoring with Varimax rotation) was used to group the knowledge scale items into similar conceptual categories. Although the scale items were originally developed to represent knowledge about specific issues with regard to shrimp, conceptual and empirical overlap remains and data reduction was preferable as a means to simplify the analysis of the influence of subjective knowledge on preferences. The EFA procedure yielded two domains or categories of subjective knowledge that accounted for 64.0% of the variance in the data (see Table 2).

Table 2. Exploratory factor analysis for self assessed (subjective) knowledge about management and preparation/selection related issues regarding shrimp (Extraction method: principal axis factoring using Varimax rotation with Kaiser normalization).

DIMENSION	N	M*	SD	Factor loading	Comunality	Eigenvalue	% Variance explained
MANAGEMENT ($\alpha = .88$)	289	1.45	0.64			4.09	36.80
Commercial shrimp fishing		1.67	0.84	0.65	0.53		
Shrimp farming		1.37	0.69	0.85	0.77		
Marine environmental sustainability issues re shrimp		1.45	0.78	0.80	0.77		
Shrimp regulations/management		1.32	0.67	0.75	0.64		
FOOD ($\alpha = .81$)	284	2.51	0.87			1.10	27.27
Cooking & preparation of shrimp		2.82	0.99	0.74	0.60		
Nutritional benefits of shrimp		2.38	1.01	0.63	0.49		
Selecting quality shrimp for purchase		2.32	1.08	0.78	0.69		

*Items measured on a scale of 1=Not at all knowledgeable; 5=Extremely knowledgeable

Based on this factor solution, we constructed new variables (MANAGEMENT and FOOD), representing each dimension of knowledge, using their endogenous indicators. Reliability testing (Chronbach's alpha) for items within each dimension demonstrated a strong reliability. The results also suggest that South Carolina coastal tourists assess their shrimp management knowledge as low (MANAGEMENT; mean = 1.45) and their knowledge related to cooking and eating shrimp as somewhat low (FOOD; mean = 2.51).

Shrimp importance attributes

The shrimp attribute scale asked "How important is each factor in your selection of shrimp while visiting the coast?" and included 28 attributes. Exploratory factor analysis (principal axis with Varimax rotation) was used to group the attribute scale items into similar conceptual categories. Although the scale items were originally developed to represent a range of attributes explored by other seafood consumer studies, conceptual and empirical overlap remains and data reduction was preferable as a means to simplify the analysis of the influence of subjective knowledge on attribute preferences. The EFA procedure yielded five domains or categories of attributes that accounted for 64.6% of the variance in the data (see Table 3). Seven of the 28 attributes were not included in the analysis because the factor analysis extraction process resulted in double loading. These attributes were—where the shrimp was caught, storage temperature since caught, health safety-pollution, supports local fishermen, premium quality, appearance, and nutritional value.

Table 3. Exploratory factor analysis for perceived importance of shrimp attributes while visiting the coast (Extraction Method: principal axis factoring using Varimax rotation with Kaiser normalization).

DIMENSIONS	N	M	SD	Factor loadings	Communality	Eigenvalue	% Variance explained
ORIGIN ($\alpha = .91$)	264	2.99	1.03			8.87	22.45
who caught the shrimp		2.15	1.26	0.62	0.48		
environmentally sustainable		3.11	1.42	0.56	0.51		
certified organic		2.78	1.45	0.72	0.65		
USA caught		3.48	1.38	0.66	0.57		
state of origin		3.06	1.45	0.78	0.68		
local wild caught		3.06	1.35	0.74	0.69		
local farm raised		2.68	1.32	0.75	0.65		
recommended by locals		3.58	1.23	0.58	0.57		
a regional shrimp brand name		2.99	1.32	0.53	0.50		
INSPECTION ($\alpha = .86$)	273	3.88	1.09			2.21	11.31
government inspected		3.78	1.29	0.86	0.85		
industry inspected		3.79	1.23	0.87	0.86		
health safety- additives		4.08	1.16	0.51	0.53		
FRESH ($\alpha = .79$)	281	3.62	1.09			1.66	10.74
when the shrimp was caught		3.74	1.35	0.45	0.39		
fresh, never frozen		3.52	1.24	0.81	0.76		
in-season		3.60	1.29	0.79	0.79		
PRICE ($\alpha = .83$)	285	3.60	0.81			1.28	10.34
low price		3.40	1.00	0.86	0.83		
good value for the money		3.74	0.94	0.80	0.75		
size		3.67	0.89	0.57	0.54		
REPUTATION ($\alpha = .80$)	281	4.26	0.79			1.05	9.72
tastes good		4.65	0.70	0.50	0.45		
reputation of a restaurant		4.17	0.94	0.80	0.76		
reputation of vendor/retailer		3.96	1.10	0.72	0.74		

Based on this factor solution, we constructed new variables (ORIGIN, INSPECTION, FRESH, PRICE, AND REPUTATION) representing each attribute dimension using their endogenous indicators. Reliability testing (Chronbach's alpha) for items within each dimension demonstrated a good reliability. The means for each dimension suggest that South Carolina coastal tourists feel REPUTATION is the most important attribute (mean=4.26) and that ORIGIN is the least important (mean=2.99).

RQ1: Influence of situational and trans-situational variables on subjective knowledge

Analysis of variance was conducted to examine the influence of situational (i.e., trip frequency to S.C. coast, shrimp eating frequency at home, heard shrimp advertising during trip and trans-situational (i.e., education) variables on subjective knowledge (MANAGEMENT and FOOD). Each analysis included the four main (independent) variables and all two-way interactions. None of the two-way interactions were significant ($p \leq 0.05$) and the analysis was rerun with only the main effects. Results (Table 4) demonstrated that both frequency of shrimp eating and whether the respondent heard advertising about local shrimp positively influenced subjective knowledge of shrimp management issues (MANAGEMENT). Also, both trip frequency to the S.C. coast in the last two years and general education level positively influenced subjective knowledge about selection and preparation of shrimp (FOOD). Results were generally consistent when analyses were performed on raw data and rank-transformed data. The R^2 for each model is $\leq 10\%$, suggesting this combination of situational and trans-situational variables explains relatively little of the variance in subjective knowledge.

Table 4. Influence of situational and trans-situational variables on South Carolina coastal tourists' subjective knowledge about shrimp.

Independent variables	Dependent variables	
	MGT ¹	FOOD ¹
Shrimp eating freq at home	p=0.03	p=0.12
Heard shrimp advertising during trip	p=0.02	p=0.15
Trip freq to SC coast in last 2 years	p=0.27	p<0.01
Education	p=0.09	p=0.02
Model R ²	0.07	0.10

¹ Model is significant at $p \leq 0.01$

RQ2: Influence of subjective knowledge on shrimp attribute importance

A multiple linear regression model was used to assess influence of the independent variables, MANAGEMENT and FOOD, on respondent preferences for shrimp attributes—i.e., ORIGIN, INSPECTION, FRESH, PRICE, AND REPUTATION. Each model represented a specific question—e.g., Does subjective knowledge (MANAGEMENT and FOOD) influence importance of ORIGIN as a shrimp attribute while visiting the coast? Results are presented in Table 5.

Table 5. Influence of South Carolina coastal tourists' subjective knowledge on shrimp attribute importance while visiting the coast.

Independent variables	Dependent variables				
	Origin ¹	Fresh ¹	Inspection	Price ¹	Reputation ¹
Kmgt	p=0.03	p=0.80	p=0.51	p=0.381	p=0.34
Kfood	p=0.007	p<0.001	p=0.04	p<0.001	p<0.001
Model R ²	0.10	0.13	0.02	0.05	0.09

¹ Model is significant at $p \leq 0.01$

All models were significant ($p \leq 0.01$) except for INSPECTION. Subjective knowledge about shrimp preparation and selection (FOOD) positively influences importance of all attributes. Subjective knowledge about management (MANAGEMENT) positively influences only the importance of ORIGIN. This suggests that knowledge of preparation and selection of shrimp (FOOD) may have a greater influence than knowledge of shrimp management issues (MANAGEMENT) on coastal tourists' preferences for shrimp attributes. It is possible that low subjective knowledge about management makes it more difficult for consumers to discriminate among attributes, whereas greater familiarity with shrimp preparation and selection (influenced by trip frequency to the coast) may make attribute discrimination easier. As with the previous results, the R² for each model is $\leq 10\%$, suggesting subjective knowledge, as measured in this study, explains only a small portion of the variance in tourists' preferences for shrimp attributes while visiting the coast.

RQ3: Influence of shrimp attribute importance on tourist behavior

A multiple linear regression model was used to assess whether attribute importance influenced three dependent variables related to trip behavior during respondents' last SC coastal visit—i.e., # times ate shrimp, \$ spent at restaurant, \$ spent on shrimp to take home. Logistic regression was used to assess whether attribute importance influenced respondents' intention to return to the S.C. coast to eat shrimp. Results are presented in Table 6. Each model included the five shrimp attributes as independent variables and represented a specific question—e.g., Does importance of the five attributes influence the number of times the respondent ate shrimp during their most recent visit to the S.C. coast?

Table 6. Influence of South Carolina coastal tourists' shrimp attribute preferences while visiting the coast on purchasing behavior during their last coastal visit and intention to return to the region to eat shrimp.

Independent variables	Dependent variables			
	# times ate shrimp ^{1,2} (n=159)	\$ restaurant ¹ (n=199)	\$ take home ³ (n=68)	Return to S.C. Coast (n>264)
Origin	p=0.93	p=0.29	p=0.03	p=0.58
Fresh	p=0.02	p=0.40	p=0.98	p<0.01
Inspect	p=0.15	p=0.82	p=-0.05⁴	p=0.57
Price	p=1.00	p=0.76	p=0.01	p=0.16
Reputation	p=0.20	p=0.76	p=0.47	p=0.39
Model R2	0.07	0.03	0.22	0.06

¹Analysis included only respondents whose trip length was ≤ 2 weeks, ²Model is significant at p<0.05. ³Model is significant at p<0.01; ⁴Negative significant relationship.

Results suggest that the FRESH attribute was a significant predictor of the number of times respondents ate shrimp during their last visit to the S.C. coast and of their intention to return to the S.C. coast for shrimp. ORIGIN and PRICE were positively significant for the likelihood that respondents purchased shrimp to take home at the end of their last visit to the S.C. coast. INSPECTION was negatively related to that likelihood that respondents' purchased shrimp to take home. More variance was explained by attribute preferences for the purchasing shrimp to take home model, but this could be due to the smaller sample size (i.e., only 22% of respondents purchased shrimp to take home). While the REPUTATION attribute dimension had the highest mean (see Table 3), it does not appear to have a significant influence on the consumer behavior variables that were measured.

CONCLUSIONS AND RECOMMENDATIONS

Subjective knowledge about shrimp, especially regarding shrimp management issues, is relatively low. This suggests retailers and restaurants interested in promoting local wild-caught shrimp in the coastal tourist destination should educate their consumers. Also, results of this analysis suggest that situation specific experiences (e.g., familiarity with shrimp preparation, shrimp eating frequency) may influence subjective knowledge about shrimp. The study also found that subjective knowledge, especially knowledge of preparation and selection of shrimp (FOOD) may improve consumers' ability to discriminate among shrimp attributes. Therefore, S.C. shrimp and tourism industries may want to collaborate in providing experiences at the destination that focus on improving subjective knowledge of shrimp selection and preparation. Possible experiences include cooking demonstrations at various tourist venues, cooking classes, shrimp specials on menus, and shrimp festivals.

It is also possible that if knowledge of shrimp management improves among consumers, selection based on origin may become more important. Therefore, the shrimp and tourism industries may want to collaborate on providing educational information and experiences that focus on shrimp fishery heritage, culture, and management. Fishery relevant education could also be a valuable strategy for enhancing information search by S.C. coastal tourists about shrimp fishery management issues at the travel destination. Marine ecotourism is considered a vehicle for education and interpretation that enables delivery of environmental messages (Garrod and Wilson, 2003). While there is some indication that tourists do want to be educated while engaging in marine ecotourism (e.g., Luck 2003), fishery specific education may also be appropriate. Interesting examples include Viking Village Dock Tours in New Jersey (see: http://www.vikingvillage.net/dock_tours.htm) and featuring local harvesters in restaurant and retail information at Local Ocean Seafoods in Newport, Oregon (see www.localocean.net).

Finally, importance of the ORIGIN, FRESH and PRICE attributes positively influenced shrimp consumption and purchasing behavior on the coast. However, consumers who placed higher importance on INSPECTION were less likely to purchase shrimp to take home. Consumers focused on inspection may become more attracted to purchasing shrimp to take home once retailers and direct marketers provide some form of quality certification, such as *Wild American*TM.

Tourism marketing strategy typically considers all phases of the travel experience—trip planning at home, travel to the destination, experience at the destination, travel home from the destination and trip recollection. Collaborative marketing strategies should involve promotion and education during these five phases. For example, our project has included placing educational brochures focused on the S.C. shrimp industry and how to find local, wild-caught shrimp at all S.C. Welcome Centers. In addition, the tourism and shrimp industries have managed to persuade magazines (e.g., *Coastal Living*) targeted at coastal tourists and second home owners to include local shrimp recipes and local restaurants serving shrimp specialties in features on South Carolina coastal destinations.

Future research should examine purchasing behavior by tourists on vacation versus at home, support of fishing industry among Coastal visitors and residents, the costs and benefits of certification strategies (such as the *Wild AmericanTM* program) aimed at the consumer. In addition, future research is needed on the effectiveness of different education messages on information search and purchasing intent. It is also important to explore other variables influencing subjective knowledge—e.g., influence of information sources such as television, newspaper or internet.

REFERENCES

- Barkley, D.L., M.S. Henry, & B.P. Gantt. (2004). The South Carolina Shrimp Trawling Industry 2003 Survey Results. [Accessed July 26, 2006; http://cherokee.agecon.clemson.edu/redrl_rpt12.pdf]
- Baum, T. (1999). The decline of the traditional North Atlantic fisheries and tourism's response: the cases of Iceland and Newfoundland. *Current Issues in Tourism*, 2(1): 47-67).
- Bose, S., & Brown, N. (2000). A preliminary investigation of factors affecting seafood consumption behaviour in the inland and coastal regions of Victoria, Australia. *Journal of Consumer Studies & Home Economics*, 24(4), 257-262.
- Burger, J. (1998). Gender differences in attitudes about fish safety in a coastal population. *Journal of Toxicology and Environmental Health, Part A*, 53, 181-192.
- Dillman, D. A. (2000). *Mail and internet surveys: The tailored design method*. New York: Wiley.
- Donath, H., Wessells, C. R., Johnston, R. J., & Asche, F. (2000). *Consumer preferences for ecolabeled seafood in the United States and Norway: a comparison*. Paper presented at the IIFET 2000: Microbehavior and Macroresults: Proceedings of the Tenth Biennial Conference of the International Institute of Fisheries Economics and Trade, Corvallis, Oregon.
- Garrod, B. & J.C. Wilson. (2003). *Marine Ecotourism: Issues and Experiences (Aspects of Tourism Vol. 7)*. Clevedon, Canada: Channel View Publications.
- Grant, M. (2004). Innovation in tourism planning processes: action learning to support a coalition of stakeholders for sustainability. *Tourism and Hospitality Planning & Development*, 1(3), 219-237.
- Harrington, J. M., Myers, R. A., & Rosenberg, A. A. (2005). Wasted fishery resources: discarded by-catch in the USA. *Fish and Fisheries*, 6, 350-361.
- Luck, M. (2003). Education on marine mammal tours as agent for conservation—but do tourists want to be educated? *Ocean & Coastal Management*, 46, 943-956.
- Moorman, C., Diehl, K., Brineberg, D., & Blair, K. (2004). Subjective knowledge, search locations, and consumer choice. *Journal of Consumer Research*, 31, 673-680.
- Mann, H. Munro (2004). Newport Fishermen's Market Initiative: Feasibility Study – Final Report. Prepared for the Newport Fishermen's Wives Association. (unpublished report).
- Nauman, F.A., CM. Gempeasaw, J.R. Bacon & A. Manalo. (1995). Consumer choice for fresh fish: factors affecting purchase decisions. *Marine Resource Economics*, 10, 117-142.
- National Marine Fisheries Service (NMFS), NOAA. (2005). Fisheries of the United States – 2004. [Accessed July 26, 2006; <http://www.st.nmfs.gov/st1/fus/fus04/index.html>]
- Orbach M. K. & Johnson, J. C. (1989). *The transformation of fishing communities: a public policy perspective in Marine Resource Utilization: A Conference on Social Science Issues* (MASGC-W-88-001).
- Park, C. W., Mothersbaugh, D. L., & Feick, L. (1994). Consumer knowledge assessment. *Journal of Consumer Research*, 21, 71-82.
- Radecki, C., & Jaccard, J. (1995). Perceptions of knowledge, actual knowledge, and information search behavior. *Journal of Experimental Social Psychology*, 31, 107-138.
- Rogelja, N. (2002). The ethnography of local tourism: connections between fishery and tourism in Izola. *Maritime Studies (MAST)*, 1(1), 85-102.

- Shenoy, S. (2005). Food tourism and the culinary tourist. Dissertation completed for PhD in Department of Parks, Recreation and Tourism Management, Clemson University
- Schittone, J. (2000). Tourism vs. commercial fishing: changing use of Key West and Stock Island. In *Coasts at the Millennium, Proceedings of the 17th International Conference of The Coastal Society, Portland, OR*.
- Skuras, D., & Dimara, E. (2004). Regional image and the consumption of regionally denominated products. *Urban Studies*, 41(4), 801-815.
- South Carolina Department of Natural Resources (SCDNR). (2006a). Shrimp in South Carolina. [accessed July 5, 2006; www.dnr.state.sc.us/marine/pub/seascience/shrimp.html]
- South Carolina Department of Natural Resources (SCDNR). (2006b). 2005-06 Commercial shrimp season total appears down. [Accessed July 24, 2006; http://www.clemson.edu/scshrimp/News/SCDNR05_06Summary.pdf]
- South Carolina Department of Parks, Recreation & Tourism (SCPRT). (2003). The contribution of travel & tourism to South Carolina's Economy. [Accessed July 6, 2004; www.discoversouthcarolina.com/documents/Travel,%20Tourism%20&%20SC%20Economy.pdf]
- South Carolina Budget & Control Board. (2005). South Carolina Statistical Abstract. [Accessed July 24, 2006; www.ors2.state.sc.us/abstract/index.asp]
- Southern Shrimp Alliance. (2003). Shrimp Petitions Fact Sheet. [Accessed July 26, 2006; www.shrimpalliance.com/Press%20Releases/Filing%20Fact%20Sheet.pdf]
- Steel, B. S., Lovrich, N., Lach, D., & Fomenko, V. (2005). Correlates and consequences of public knowledge concerning ocean fisheries management. *Coastal Management*, 33, 37-51.
- The Hale Group. (2005). Alaska Seafood Marketing Institute 2005 Consumer Seafood Study Executive Summary and Key Findings. [Accessed July 26, 2006; www.alaskaseafood.org/information/consumer_research.html]
- Travel Industry Association of America (TIA). (2005). The Economic Impact of Domestic Travel Expenditures on South Carolina Counties 2004. Prepared for South Carolina Department of Parks, Recreation & Tourism (SCPRT). [Accessed July 7, 2006; <http://www.scpert.com/files/Research/2004%20SC%20Report.pdf>]
- Travel Industry Association of America (TIA). (2003). Domestic Visitor Expenditures by County, 2000 to 2003. [Accessed May 15, 2004; www.discoversouthcarolina.com/documents/Vis%20Exp%202000%20-%202003_3.htm]
- Trunk, D. (2005). Shrimpers win battle for tariffs. *National Fisherman*, 85 (12): 20-22.
- Verbeke, W., & Pieniak, Z. (2006). *How much do European consumers know and believe to know about fish?* [Accessed March 2, 2006; www.seafoodplus.org/index.php?id=412&type=98]
- Verbeke, W., & Pieniak, Z. (2006). *European consumer interest in seafood information and traceability*. [Accessed March 2, 2006; www.seafoodplus.org/index.php?id=453&type=98]
- Wessells, C. R. (2002). The economics of information: markets for seafood attributes. *Marine Resource Economics*, 17, 153-162.
- Wessells, C. R., Donath, H., & Johnston, R. J. (1999). *US consumer preferences for ecolabeled seafood*. [Accessed July 7, 2006; <http://www.uri.edu/cels/enre/ecolabel.pdf>]
- Wessells, C. R., Kline, J. and Anderson, J.G. (1996). "Seafood safety perceptions and their effects on anticipated consumption under varying information treatments." *Agricultural and Resource Economics Review* 25(1): 12-21.
- Wirth, F.F. and Davis, K.J. (2001). Assessing Potential Direct Consumer Markets for Farm-Raised Shrimp. Staff Paper SP 01-13, September 2001, University of Florida, Institute of Food and Agricultural Sciences.