Hemp There it Is: Examining Consumers' Attitudes Toward the Revitalization of Hemp as an Agricultural Commodity

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Abstract

This study was conducted to examine Florida consumers' stance on legalizing the growing and processing of hemp, recently redefined as an agricultural commodity. Factors were explored that may explain their stance to provide insight into the communication needs in the early stages of the U.S. hemp industry revival. Results indicated that respondents who had more favorable attitudes toward legalizing hemp were also more likely to fall within the category of being overall "for legalizing hemp" when offered a binary choice. Further, attitude toward legalizing hemp was predicted by respondents' objective knowledge of hemp topics, attitude toward legalizing marijuana, and perceived personal relevance of legalized hemp cultivation and production. A strong association between hemp and marijuana was also observed in both the quantitative and qualitative findings, and respondents indicated some confusion regarding the mind-altering properties of marijuana compared to hemp. As such, a key recommendation is that early communication messages and strategies be tailored toward educating the public on differences in the uses and psychoactive properties of hemp and marijuana. Future research is needed to identify other key messages needed to enhance public understanding of hemp, as well as the best methods of delivering such. Future research should be conducted with other hemp stakeholders, including policymakers, hemp license-holders, and other farmers and industry members to reconcile potential differences in key stakeholder perceptions and enhance the future viability of the industrial hemp market.

Keywords

hemp, consumer buy-in, agriculture, marijuana, legalization

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Introduction

Hemp (*Cannabis sativa* L.) cultivation was initiated in the United States with an emphasis on fiber production to support naval and agricultural operations during the colonial period (Clarke & Merlin, 2013). By the turn of the 20th century, the acreage of hemp planting had greatly declined. This decline was driven by competition from alternate, synthetic fiber industries and legislative actions that taxed and imposed prohibition on the possession and cultivation of *Cannabis*. Currently, U.S. hemp cultivation (i.e., growing the plants) and production (i.e., manufacturing hemp products) are experiencing a revival in light of the relaxation of prohibition over the last decade (Fike, 2016; Small & Marcus, 2002). Driven by state and federal legislation, legal hemp cultivation and production was reintroduced in the United States in multiple stages beginning in 2014. The U.S. Agricultural Improvement Act of 2014, commonly referred to as the Farm Bill, allowed states to develop industrial hemp pilot projects aimed toward assessing the viability of modern hemp cultivation (Agricultural Improvement Act, 2014; Mark et al., 2020). The 2018 Farm Bill redefined hemp as an agricultural commodity and provided the framework for states to develop commercial hemp programs (Agricultural Improvement Act, 2018). Hemp research programs began in Florida in 2019, with commercial hemp production following in 2020.

The commercial uses of hemp are vast, and policy makers have speculated continued growth in demand for hemp-based products in the United States (Johnson, 2018). However, a critical detail impacting the practicality and perception of hemp cultivation is the historic association between hemp and marijuana (Fortenbery et al., 2014; Malone & Gomez, 2018). Botanically, hemp and marijuana are indistinguishable; they are the same plant, *Cannabis sativa*. Legally, hemp and marijuana have been distinguished by the plant concentration of delta-9-tetrahydrocannabinol (THC), the compound associated with marijuana's mind-altering effects. Hemp is defined as plants with total THC not exceeding 0.3% on a dry weight basis. As this is not a biologically relevant distinction, some hemp crops may exceed the legal threshold due to genetic, environmental, and management factors. In addition, public perception of hemp cultivation and production is a critical factor to consider as the crop is introduced widely across the country. The public will face growing interaction with the crop, whether through proximity to cultivation or consumption of hemp products, such as hemp essential oil or CBD (cannabidiol) products. However, innovations and technological advancements are not always widely among key stakeholders (National Academies of Science, Engineering, and Medicine [NASEM], 2017). The implementation of effective approaches to communicating agricultural science to the public and other stakeholders is necessary for continued developments in agriculture (NASEM, 2017).

As with other agricultural technologies and crops (Martinez & Davis, 2002), consumer buy-in is essential to the market viability of commercial hemp (Consumer Brands Association [CBA], 2019). Unfortunately, few crops in history have been as heavily impacted by socio-politics as hemp (Cherney & Small, 2016). Hemp's storied, political history and varied perceptions may pose challenges to garnering public support or consumer interest. In fact, Cherney and Small (2016) argued no other crop in history has been as heavily impacted by socio-politics as hemp. Such circumstance warrants examination of effective messaging and strategies for hemp-related communication and marketing efforts.

Communication about complex, scientific topics has historically been approached from a knowledge deficit model centered on the assumption people would be accepting of scientific innovations if they had more information (Nisbet & Scheufele, 2009). However, information alone cannot always sway people toward supporting a new crop or technology, particularly when there are political or social issues surrounding the topic (Leeuwis, 2004; Nisbet & Scheufele, 2009). People react and respond to science from their personal perspectives (Alum et al., 2008), and they may make decisions based on their values (Fischer et al., 2020), political affiliations (Nisbet, 2009), religions (Ho et al., 2008), and/or prior beliefs (Ruth & Rumble, 2019).
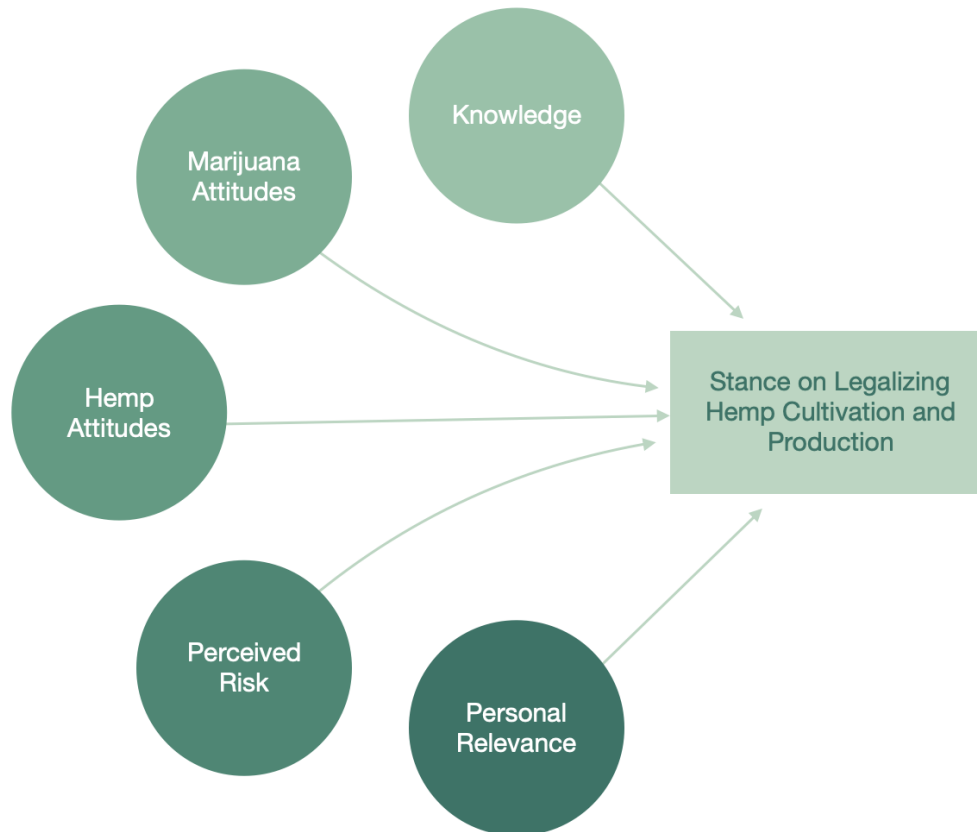
While it may be difficult to persuade someone to change their established opinion of a controversial topic, early communication before someone has made a decision can play a critical role in their willingness to accept new knowledge and make evidence-based decisions. While the public has repeatedly indicated trust in scientists (Brossard & Nisbet, 2007; National Science Board, 2008; Pew Research Center, 2009; Scheufele et al., 2007), the public's opinions or actions related to complex issues do not always appear to align with scientific evidence on the issue (Nisbet, 2009). If scientists can build public trust on a topic before opinions are formed, they may have a better opportunity to create messages that will resonate with individuals in the long term (Nisbet, 2005; Nisbet & Scheufele, 2009). Agricultural communicators can help alleviate potential concerns among consumers regarding a new agricultural technology or crop by examining consumers' existing perceptions and knowledge, and then developing communication messages accordingly to get ahead of future communication of misinformation (NAEM, 2017; Ruth & Rumble, 2019). Understanding public opinion, attitudes, and perceptions early in the introduction of a complex issue can be key to obtaining widespread support for new agricultural innovations (Ruth et al., 2019). In the context of hemp, public education efforts are needed for consumers to support the development and viability of commercial hemp production and marketing (Adams, 2019; Williams et al., 2020).

Conceptual Framework

A thorough review of the literature pertaining to consumer perceptions of hemp, as well as other agricultural crops or innovations, was conducted to develop the conceptual framework that guided the current study. Per the proposed conceptual framework, public support for legalizing hemp may be shaped by their (a) knowledge of the topic, (b) attitudes toward legalizing marijuana, (c) concerns about risks associated with hemp, and (d) perceived personal relevance (see Figure 1).

Figure 1.

Proposed Conceptual Model to Predict Public Stance on Legalizing Hemp Cultivation and Production

Knowledge

Consumer knowledge can be considered along two dimensions: familiarity and expertise (Alba & Hutchinson, 1987). Familiarity refers to consumers' product-related experiences, while expertise pertains to the cognitive structures that constitute knowledge of the attributes of a product and direct attitudes (Alba & Hutchinson, 1987). In this study knowledge focused on both objective and subjective cognitive structures. While little research has been conducted to examine the predictive nature of public knowledge on their support for legalizing hemp, research pertaining to other agricultural crops or technologies may be transferrable. In prior research, knowledge has been linked to consumers' attitudes, perceptions, and acceptance and buy-in of new crops or technologies (Vecchione et al., 2014; Luke, 2020; Yang et al., 2017). However, support for increased knowledge about a topic leading to greater acceptance remains mixed. While knowledge alone is not always sufficient in fostering public acceptance, it may be an important consideration in the context of hemp if lack of knowledge blurs operable differences between hemp and marijuana.

Hemp Association with Marijuana

Strong associations between hemp and marijuana have been observed in prior research conducted to examine public attitudes toward legalizing hemp cultivation and production (Adams, 2019; Borkowska & Bialkowska, 2019; Williams et al., 2020). Adams (2019) examined relationships between the public's political attitudes toward drug laws and interest in purchasing hemp products, and concluded drug enforcement attitudes impact consumers' purchasing

intentions. Specifically, a significant and positive relationship was observed between support for legalizing recreational drugs and interest in purchasing hemp products; significant and negative correlations were observed between interest in purchasing hemp products and (a) support for strict enforcement of drug laws, (b) support for strict enforcement of marijuana laws, and (c) support for building more prisons to house drug offenders (Adams, 2019). The association between drug use and hemp was also observed in a study by Williams et al. (2020), in which respondents associated the terms "hemp" and "industrial hemp" with the terms "recreational and medicinal marijuana." Similarly, Borkowska and Bialkowska (2019) found consumers had overall positive associations with hemp, but erroneously attributed hemp properties to those of marijuana.

Risk

An individual's degree of concern about associated risks may also influence their attitude toward legalizing hemp cultivation and production. While research explicitly focused on risk-benefit perceptions as predictors of public acceptance of legalizing hemp remains limited, research conducted in areas of food and agricultural innovations has revealed significant interactions between risk and acceptance (Bearth & Siegrist, 2016; Bryant & Barnett, 2018; Gupta et al., 2012; Moon & Balasubramanian, 2004). A review of descriptive research on perceived risks associated with hemp highlighted several areas of concern. First, the identical appearance of hemp and marijuana plants and consequential difficulty distinguishing between the two has been a key topic of concern (Cherney & Small, 2016; Cortilet, 2010; Fortenbery et al., 2014; Malone & Gomez, 2018; Moberly, 2016). While hemp legalization has largley received bipartisan support, some state lawmakers publicly expressed their skepticism about regulatory agents' abilities to identify marijuana among hemp in farmers' plots or residential yards and the implication of such (e.g., Groves, 2019). Political messaging and cues of this nature have been found to shape public perceptions of a risk to align with the political views being communicated by their affiliated party (Linde, 2020). As with other novel crops, there are claims to the ability of hemp to revitalize the U.S. economy; however, there are also reasonable concerns regarding the feasibility of long-term interest, demand, and market opportunities (Cherney & Small, 2016; Fike, 2016; Malone & Gomez, 2018; Moberly, 2016). Concern of risks associated with regulation, demand, and viability were thus included as a variable of interest in the current study.

Perceived Personal Relevance

Lastly, perceived personal relevance of legalizing hemp may shape public opinion. Bearth and Siegrist (2016) conducted a meta-analysis of the relationship between perceived risk, benefits, and acceptance of food innovation and technologies and concluded the relationship of risk and acceptance is impacted by the degree of distance between an individual and the topic of interest, including whether acceptance is an active or passive measure. Bearth and Siegrist (2016) maintained passive acceptance (e.g., attitudes or general acceptance) is related to a high degree of distance, whereas active acceptance (e.g., willingness to buy, support, etc.) is related to a low degree of distance. Personal relevance has also been identified as a predictive measure of knowledge and active information-search behaviors about a topic, which may in turn influence attitudes toward the topic (Radecki & Jaccard, 1995; Robson & Robinson, 2012). How personal

relevance specifically interacts with public acceptance of legalizing hemp has not yet been examined and was, therefore, included as an exploratory variable of interest in the current study.

Purpose & Objectives

The purpose of this study was to examine the Florida public's knowledge, attitudes, and perceptions to better understand why they may or may not support legalizing the cultivation and production of hemp. This exploratory research can aid in designing communication materials, marketing strategies, or other programming to anticipate potential pushback and foster public acceptance of this new agricultural commodity. Six objectives guided this study:

1. Describe the public's objective and subjective knowledge of hemp-related topics.
2. Describe the public's attitudes toward legalizing hemp and legalizing marijuana.
3. Describe the public's degree of concern about risks associated with legalizing hemp.
4. Identify themes in the public's rationale behind their stance on legalizing hemp.
5. Determine if a statistically significant relationship exists between respondents' attitudes toward legalizing hemp and their overall stance on legalizing hemp.
6. Explore a linear model to explain the respondents' attitudes toward legalizing hemp.

Methodology

An online survey research design was utilized to address the research objectives of this study. Through Qualtrics, respondents were recruited using traditional, actively managed market research panels and social media platforms. To help exclude duplication and ensure validity, Qualtrics also employed digital fingerprinting technology, IP address checks, and worked with panel partners that also employ such methods to obtain non-probability opt-in samples in market research (Qualtrics, 2019). Non-probability sampling is an approach commonly used to make population estimates (Baker et al., 2013). This sampling method has become more common in research examining public opinion of emerging issues due to increased access to internet, relatively low costs of online surveys, higher response rates compared to common probability-based methods (e.g., random digit dialing of landline numbers), and overall greater ease of reaching members of the population of interest (Lamm & Lamm, 2019).

Population and Sample

The population of interest was Florida residents ages 18 or older. An initial pilot test of 50 respondents was conducted, and the pilot data for the scales were analyzed to ensure reliability. All scales were found to be reliable with a Cronbach's $\alpha > .80$. Therefore, no changes were made to the instrument before resuming data collection. The online link to the questionnaire was distributed to a total of 1,440 Florida residents. Attention filters (e.g., select "strongly agree" for this answer) were used to identify respondents not paying attention. Respondents who did not complete all items of the instrument, did not select the appropriate answers to attention filters, and did not fall within the parameters of being a Florida resident 18 years of age or older were excluded from analyses. Useable responses were obtained from 524 residents for a 36% participation rate.

Limitations

Exclusion, selection, and non-participation biases can limit the use of nonprobability samples (Baker et al., 2013). To alleviate such impacts, post-stratification weighting methods were executed (Kalton & Flores-Cervantes, 2003). Specifically, demographics were used to balance results based on the 2010 Census data to ensure the sample reflected the Florida adult population and produce results intended to approximate the population. However, limitations in this study still exist regarding the online sampling procedures in that the results of the study may not be reflective of those without access to the internet. Additionally, there are limitations associated with non-probability sampling in that it is difficult to know for sure that the sample is representative of the entire population (Wisniowski, 2020).

Six sections of a researcher-developed questionnaire were used for primary data analysis in this study: (a) objective knowledge; (b) subjective knowledge; (c) attitudes toward legalizing hemp and marijuana; (d) concern of risks associated with hemp; (e) overall stance on legalizing hemp; and (f) text-entry responses to provide rationale behind stance on legalizing hemp. The questionnaire was reviewed for face and content validity by a panel of experts consisting of one faculty member in the University of Florida Department of Agronomy, and Extension specialists from four counties in the state. The questionnaire was evaluated by the panel for readability, layout and style, clarity of wording, and accuracy of scientific content (Colton & Covert, 2007). Revisions were made to correct distractor options in the multiple-choice knowledge assessment section, and the panel deemed the instrument acceptable. Post hoc reliability estimates for the instrument's constructs were calculated using Cronbach's alpha (Field, 2013).

Two sections of the questionnaire were used to assess respondents' objective and subjective knowledge of hemp-related topics. Objective knowledge (e.g., uses of hemp, chemical composition, etc.) was assessed using 12 items with multiple choice and check those that apply response options. Responses were recoded (1 = correct; 0 = incorrect), and the total number of correct answers divided by the number of possible answers was calculated to produce a single test score for this section with values ranging from 0 to 100 percent. Subjective knowledge was measured using eight items reflective of the learning objectives associated with the objective knowledge section. Respondents were asked to indicate the degree to which they agreed with statements such as, "I can describe the differences between hemp and marijuana" and "I know what *Cannabidiol* (CBD) is." Responses were collected using a five-point Likert-type scale: 1 = *strongly disagree*; 2 = *disagree*; 3 = *neither agree nor disagree;* 4 = *agree;* and 5 = *strongly agree*. The internal reliability estimate for this scale was α = .93. Respondents' attitude toward legalizing the cultivation and production of hemp in the United States was measured on a 5-point semantic differential scale between 12 sets of bipolar descriptors (e.g., good/bad, harmful/beneficial). The same scale was used to measure respondents' attitudes toward the legalization of marijuana. Responses were coded from -2 to +2, and construct means were computed for each scale (Al-Hindawe, 1996). The internal consistency reliability estimates for both scales were α = .94.

Respondents' perceived degree of concern regarding risks associated with the growing and processing of hemp was measured using five items reflective of previously reported risks of hemp production, such as "the uncertainty in long-term demand for hemp product," and "the potential of hemp escaping cultivation and becoming an invasive species." Responses were collected using a five-point Likert-type scale: 1 = *not at all concerned*; 5 = *extremely concerned*. A construct mean was computed to represent respondents overall perceived concern regarding risks. The internal consistency reliability estimate for this scale was α = .85. Personal relevance

was measured using eight items pertaining to perceived personal relevance, or buy-in, regarding legalizing the growing and processing of hemp (e.g., "the legalization of hemp is important to me personally"). Responses were collected using a 5-point Likert-type scale of agreement (1 = *strongly disagree;* 5 = *strongly agree*), and a construct mean was computed. The internal consistency reliability estimate for this scale was α = .93.

Lastly, to assess and explain respondents' overall stance on legalizing the growing and processing of hemp, respondents were first asked, if they had to pick a stance, would they say they were overall for or against legalizing hemp (0 = overall against it; 1 = overall for it). Those who indicated they were overall for it, were then asked to provide their top three reasons behind their stance. The same was done for those who indicated they were overall against it. Responses for rationales were collected using an open-ended text-entry format.

Data Analysis

Data analysis for objectives one through three consisted of descriptive statistics. For objective four, open-ended responses to the top three reasons for respondents' overall stance of being "for" or "against" the decision to legalize hemp were analyzed in NVivo® using Glaser's (1965) constant comparative method to identify emerging themes. Themes were then grouped based on frequency of response.

Exploratory analyses suggested a potential mediating effect of attitudes toward legalizing hemp between the original outcome variable of interest (i.e., stance on hemp legalization) and all other predictor variables. As such, point-biserial correlation and binary logistic regression analyses were employed for objective five to examine the relationship between attitude toward legalizing hemp and overall stance of being "for" or "against" legalizing hemp. For research objective six, multiple linear regression using standard entry method was conducted with attitude toward legalizing hemp designated as the dependent variable. Pearson product-moment correlations were used to investigate the associations among all variables intended for entry into the model. The associations were interpreted using Davis' (1971) convention with .01 to .09 indicating a negligible relationship, .10 to .29 indicating a low-level relationship, .30 to .49 indicating a moderate relationship, .50 to .69 indicating a substantial relationship, and greater than .70 indicating a very strong relationship. Histograms, scatterplots, and residual scatterplots were examined to test the assumptions of linearity, normality, and homoscedacity (Field, 2013). No assumptions were violated. Correlation coefficients were calculated to examine multicollinearity. Correlations between the outcome and predictor variables selected for entry into the model were all >.3, and no correlations between predictor variables exceeded .70, indicating the assumption of multicollinearity had not been violated (Field, 2013).

Findings

Objective One

Objective knowledge was measured by dividing the total number of questions answered correctly by the total number of questions to compute a single test score. Respondents' test scores ranged from 0 to 100%. On average, respondents answered correctly 6.04 of the 12 items of the objective assessment, for an average test score of 50%. Table 1 displays each objective knowledge question, the list of possible answer choices for each question (one correct answer,

and three distractor items), and the number of respondents who selected each answer choice. Correct answer choices are indicated with an asterisk.

Table 1

Respondents' Answers per Question on the Objective Knowledge Assessment

Question	Answers	*f*	%
Select the best answer choice.			
Which of the following best describes the <u>current</u> legal status for the growing and processing of hemp in the United States?	A. Growing and processing hemp is completely <u>illegal</u> in all states with no exceptions.	57	10.9
	B. Growing and processing hemp is only legal in states where marijuana has been legalized.	202	38.6
	C. Growing and processing hemp is legal without restrictions to organizations and farmers in states with hemp pilot projects.	84	16.0
	D. Growing and processing hemp is legal with a permit for organizations or farmers in all states.	**181**	**34.6**
Which of the following definitions best describes what *tetrahydrocannabinol (THC)* is?	A. THC is a non-psychoactive chemical compound artificially added to cannabis plants for medical use.	58	11.0
	B. THC is a non-psychoactive chemical compound naturally occurring in cannabis plants.	111	21.2
	C. THC is a psychoactive chemical compound artificially added to cannabis plants for recreational use.	39	7.5
	D. THC is a psychoactive chemical compound naturally found in cannabis plants.	**316**	**60.3**
Which of the following definitions best describes what *cannabidiol (CBD)* is?	A. CBD is a psychoactive chemical compound naturally found in cannabis plants.	136	26.0
	B. CBD is a psychoactive chemical compound artificially added to cannabis plants for recreational use.	53	10.1
	C. CBD is a non-psychoactive chemical compound naturally occurring in cannabis plants.	**289**	**55.2**
	D. CBD is a non-psychoactive chemical compound artificially added to cannabis plants for medical use.	45	8.7

Question	Answers	f	%
Indicate whether each of the characteristics below is true of hemp, marijuana, both, or neither.			
Is botanically the plant species *Cannabis sativa*	A. True only of marijuana	123	23.4
	B. True only of hemp	53	10.1
	C. True of both	**282**	**53.9**
	D. True of neither	66	12.6
Can be mind-altering if consumed	**A. True only of marijuana**	**318**	**60.7**
	B. True only of hemp	31	5.8
	C. True of both	139	26.5
	D. True of neither	37	7.0
Contains less than 0.3% THC concentration levels	A. True only of marijuana	44	8.3
	B. True only of hemp	**316**	**60.3**
	C. True of both	115	21.9
	D. True of neither	50	9.5
Is used primarily for recreation	**A. True only of marijuana**	**274**	**52.4**
	B. True only of hemp	32	6.2
	C. True of both	146	27.8
	D. True of neither	71	13.6
Is used for medical purposes	A. True only of marijuana	164	31.2
	B. True only of hemp	56	10.7
	C. True of both	**287**	**54.8**
	D. True of neither	17	3.3
Is harvested commercially for its flowers	A. True only of marijuana	109	20.8
	B. True only of hemp	86	16.5
	C. True of both	**156**	**29.7**
	D. True of neither	173	33.0
Is harvested commercially for its fibers and grain	A. True only of marijuana	27	5.1
	B. True only of hemp	**274**	**52.2**
	C. True of both	132	25.3
	D. True of neither	91	17.4
Is currently illegal in all U.S. states	A. True only of marijuana	85	16.2
	B. True only of hemp	68	13.0
	C. True of both	77	14.6
	D. True of neither	**294**	**56.2**
Is currently grown commercially in Florida	A. True only of marijuana	63	12.0
	B. True only of hemp	173	32.9
	C. True of both	**181**	**34.6**
	D. True of neither	107	20.5

*Correct answer choices are bolded.

Subjective knowledge was measured using a 5-point Likert-type scale. Respondents agreed overall they were knowledgeable of hemp topics ($M = 3.80$, $SD = 1.28$). Respondents most agreed most that they know what CBD ($M = 4.30$, $SD = 1.43$) and THC ($M = 3.87$, $SD = 1.53$)

are. They least agree that they could list at least five uses of hemp ($M = 3.55$; $SD = 1.63$) and that they could explain the general history of hemp production in the United States ($M = 2.95$; $SD = 1.60$; see Table 2).

Table 2

Respondents' Subjective Knowledge of Hemp Topics

Item	M	SD
I know what Cannabidiol (CBD) is.	4.22	1.47
I know what Tetrahydrocannabinol (THC) is.	4.08	1.69
I am aware of the current legal standing of hemp production in the United States.	3.97	1.53
I can describe the differences between marijuana and hemp.	3.89	1.59
I can describe the similarities between marijuana and hemp.	3.88	1.55
I am aware of the current legal standing of hemp production in Florida.	3.87	1.54
I can list at least five uses of hemp.	3.55	1.63
I can explain the general history of hemp production in the United States.	2.95	1.60

Note. Real limits: 1.00 to 1.49 = *strongly disagree;* 1.50 to 2.49 = *disagree*; 2.50 to 3.49 = *neither agree nor disagree;* 3.50 to 4.49 = *agree;* 4.50 to 5.00 = *agree*

Objective Two

Attitudes toward legalizing hemp and marijuana were measured using a semantic differential scale, with a range of -2 to +2. Overall, respondents held slightly positive attitudes toward both the legalization of hemp ($M = .81$, $SD = .98$) and marijuana ($M = .67$, $SD = 1.02$).

Objective Three

Concern about risks was measured using a 5-point Likert-type scale. Respondents were overall moderately concerned about the risks associated with hemp production ($M = 3.22$, $SD = 1.11$; see Table 3). Respondents were more concerned about the ability of federal, state, or local agents to distinguish between hemp and marijuana plants in the yards of local residents ($M = 3.56$, SD 1.36). They were relatively less concerned about the uncertainty in the long-term demand for hemp products ($M = 2.99$, $SD = 1.33$; see Table 3).

Table 3

Respondents' Degree of Concern about Risks Associated with Hemp Production

Item	M	SD
Ability of federal or local agents to distinguish between hemp and marijuana plants grown in the yards of local residents	3.56	1.36

Item	M	SD
Ability of federal, state, or local agents to distinguish between hemp and marijuana plants grown in farmers' fields	3.46	1.32
The potential that legalizing hemp will further the legalization of marijuana in the United States	3.07	1.49
The potential of hemp escaping cultivation and becoming an invasive species	3.03	1.47
The uncertainty in long-term demand for hemp products	2.99	1.33

Note. Real limits: 1.00 to 1.49 = *not at all concerned;* 1.50 to 2.49 = *slightly concerned*; 2.50 to 3.49 = *moderately concerned;* 3.50 to 4.49 = *very concerned;* 4.50 to 5.00 = *extremely concerned*

Objective Four

Respondents were asked, if they had to pick a stance, would they say they were overall "for" or "against" the decision to legalize the growing and processing of hemp. More respondents indicated they were for the legalization of hemp ($f = 415$; 79.2%) than against ($f = 109$; 20.8%). Respondents who indicated they were overall "for" legalizing hemp were asked to provide their top three reasons for why they chose this stance. Open-ended responses were assessed to identify key emerging themes that represent respondents' rationale for this stance. Table 4 indicates the top response categories, examples of answers, and number of responses in each category.

Table 4

Qualitative Responses for Being Overall "For" Legalizing Hemp

Reason "For"	Examples of Answers	Frequency, f (%)
Medical/health benefits	Health benefits, beneficial for cancer patients, good for people, helps with seizures, help people having pain	287 (69.1%)
Economic benefit	Help the economy, a money maker, American growth, would improve the economy, new businesses, economic stimulation, profits, positive for local economy	214 (51.6%)
Diversity of use	Produce rope, clothing, etc., can make a lot of products, great textile, versatility, hemp is a food, hemp has numerous uses for medicinal and industrial purposes	184 (44.3%)
Good for the environment	Great for environment, more sustainable, less carbon emissions, requires less water than other crops, helps the environment, less resources needed	97 (23.4%)
Safe	Safe, controlled, it is not dangerous, not bad for people, doesn't have THC, no harm to come from it, non-addictive, safer than marijuana, no high, no negative side effects	92 (22.2%)
Benefit for farmers	Good for farmers, more work for farmers, additional crop option for farmers, revenue for farmers	72 (17.3%)

Unsure	No reason, unsure, I don't know enough information, I don't know hemp well, not certain, I don't care either way	51 (12.3%)
Reduce crime	Stops illegal sellers, less illegal buying and crime, reduces crime rates, stop throwing people in jail for it	46 (11.1%)
Why not	I don't see why not, it doesn't affect me personally, why not, I don't see anything wrong with it, no reason not to	29 (7.0%)
Civil liberties, freedom	It's people's choice, freedom, inherent freedoms of citizens, government needs to get out of our business	24 (5.8%)

Respondents who indicated they were overall "against" legalizing the growing and processing of hemp (*f* = 109) were also asked to provide their top three reasons for why they chose this stance (see Table 5).

Table 5

Qualitative Responses for Being Overall "Against" Legalizing Hemp

Reason "Against"	Examples of Answers	Frequency *f* (%)
Harmful	It is dangerous, harmful to me, harmful to the society at large, not safe, just not good for you, unhealthy side effects	81 (74.3%)
Addictive or drug like	It is very addictive, it is a drug, too much like marijuana, it is habit forming, we don't need more pot heads	59 (54.1%)
Dangerous abuse or misuse	Potential misuses, abusive, bad influence, people will use it the wrong way, it is bad, abuse of product	36 (33%)
Lack of knowledge	I don't know what it is, I don't know enough about it, not sure what hemp does, I need to know more	33 (30.3%)
No strong stance	It is better to be safe than sorry, no reason specifically, not important, I don't really care enough about this topic	32 (29.4%)
General dislike	It should remain illegal, I don't like it, bad, terrible product, foolish, not necessary, few benefits, socially irresponsible	26 (23.9%)
Add to crime	It would add to crime, drug crimes, tracking marijuana will be more difficult, bring the criminals	16 (14.7%)

Objective Five

Point-biserial correlation analysis was used to investigate the nature of the relationship between stance on legalizing hemp (0 = overall against; 1 = overall for) and attitude toward legalizing hemp. Attitude toward legalizing hemp was significantly correlated with overall stance ($r = .62$; $p = <.001$). Further, the binary logistic regression model with hemp attitude as the predictor variable and stance on legalizing hemp as the outcome variable predicted 88.5% of the cases correctly, and revealed attitude toward legalizing hemp as significant predictor of overall stance on legalizing hemp (see Table 6).

Table 6

Binary Logistic Regression of Stance on Legalizing Hemp

Variable Included	B	SE	Wald	*df*	*p*	Odds ratio Exp(B)	95% CI for Exp(B)	
							Lower	Upper
Constant	0.33	.15	5.23	1	.021	1.39		
Hemp Attitude	1.88*	.18	113.89	1	.000	6.54	4.63	9.23

Note. R^2 = .37 (Hosmer & Lemeshow); .33 (Cox & Snell); .50 (Nagelkerke). Model χ^2 = 206.53, $p < .01$. *$p < .01$.

Objective Six

Attitude toward legalizing hemp was designated as the dependent variable for the next steps of data analysis to meet objective six. Bivariate correlational analyses indicated positive, significant correlations between attitude toward legalizing hemp and attitude toward legalizing marijuana, objective knowledge, subjective knowledge, and perceived personal relevance of legalizing hemp (see Table 7). The relationship between hemp attitude and risk concerns was not statistically significant and was not included in the next step of data analysis for objective six.

Table 7

Bivariate Correlation Among all Study Variables

	Hemp Attitude	Marijuana Attitude	Objective Knowledge	Risk Concerns	Subjective Knowledge	Personal Relevance
Hemp Attitude	1.00	.81**	.32**	-.06	.46**	.60**
Marijuana Attitude		1.00	.22**	-.09*	.44**	.56**
Objective Knowledge			1.00	-.27**	.28**	.09
Risk Concerns				1.00	.15**	.26**
Subjective Knowledge					1.00	.62**
Personal Relevance						1.00

**$p \leq .001$, *$p \leq 0.05$. *Note.* Strength of relationships (Davis, 1971): .01–.09 = *Negligible*, .10–.29 = *Low*, .30–.49 = *Moderate*, .50–.69 = *Substantial*, > .70 = *Very strong*.

The regression model explaining attitude toward legalizing hemp was significant (R^2 = 0.70, $F(1, 518)$ = 299.67, $p \leq .001$) and explained 70% of the variation (see Table 8). Three predictor variables were included in the accepted model: attitude toward legalizing marijuana, personal relevance of legalizing hemp, and objective knowledge of hemp. Subjective knowledge was not significant and did not contribute significant change to the predictive ability of the model.

Table 8

Best-fit Linear Regression Model of Predictors of Attitude Toward Legalizing Hemp

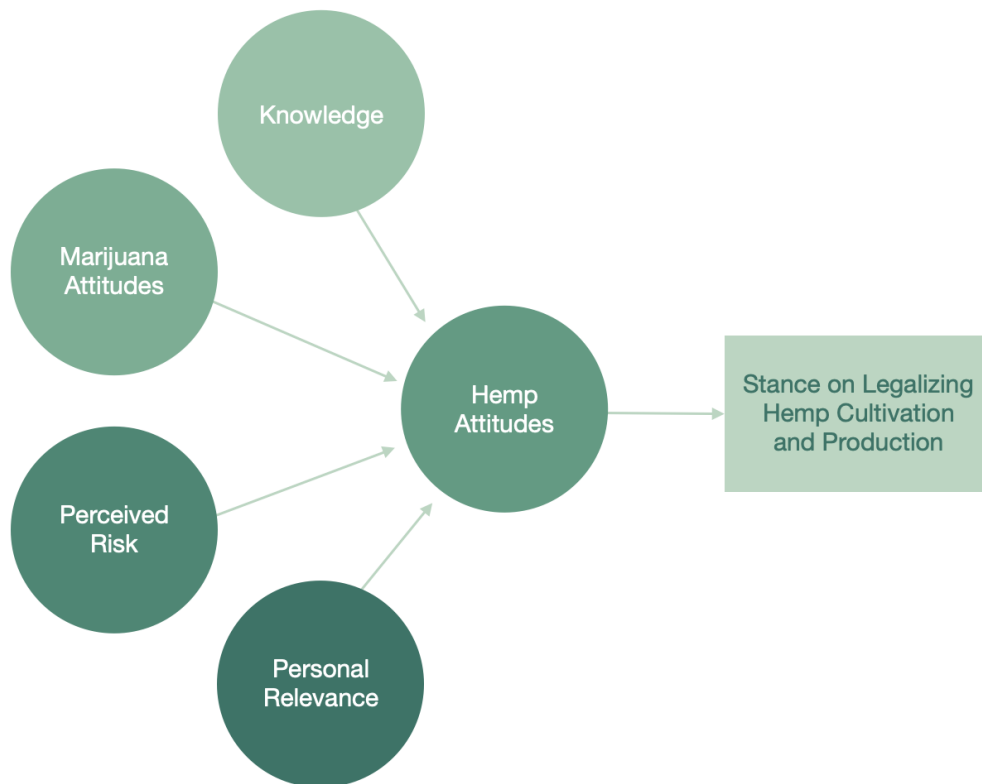| Variables in Regression Model	β	Std. Error	*t*	Std. β	*p*
Constant	-.53	.10	-5.48	--	.000
Marijuana Attitudes	.63	.03	21.35	.65	.000***
Personal Relevance	.16	.03	5.57	.19	.000***
Objective Knowledge	.78	.13	6.22	.16	.000***
Subjective Knowledge	.01	.02	.36	.01	.72

***p <.001. R^2 = .70 (F = 299.67, p < .001)

Conclusions

This study addresses the understanding of consumer perceptions related to the acceptance of hemp as an American agricultural product in the present day, which is one of the first steps in understanding how to inform public opinion on this topic (Ruth et al., 2019). The revised model tested in this study proposed a potential mediating effect of hemp attitudes between the predictor variables (knowledge, marijuana attitudes, risk, and personal relevance) and stance on legalizing the cultivation and production of hemp (see Figure 2).

Figure 2

Revised Model Examined to Predict Public Stance on Legalizing the Cultivation and Production of Hemp

Regression analysis revealed an individual's attitude toward hemp was a significant and positive predictor of their stance on legalizing hemp cultivation and production. While respondents' hemp attitudes were largely neutral, it should be noted they were slightly positive rather than negative. However, there was a considerable variance in the distribution of respondents' attitudinal scores that warrants investigation. Per the accepted multiple regression model, respondents' objective knowledge, attitudes toward legalizing marijuana, and perceived personal relevance of legalizing hemp were significant predictors of attitudes toward hemp. Specifically, respondents' attitudes toward legalizing hemp were more positive if they had more favorable attitudes toward legalizing marijuana, higher degrees of objective knowledge of hemp topics, and perceived hemp legalization as more relevant or of interest to them personally. Subjective knowledge and perceived risk were not significant predictors of attitudes toward legalizing hemp. The results of the regression model, along with the qualitative findings of this study and research reported in prior studies, provide some key implications and points of discussion regarding public support or buy-in of hemp as an agricultural commodity. Further discussion of descriptive, inferential, and qualitative findings is provided in the following sections.

Discussion and Recommendations

This research can help those involved in hemp pilot projects best target communication messages and outreach in the early stages of hemp revitalization rather than later when people's beliefs or misunderstanding become more solidified. This study is specific to the Florida population and provides valuable information for state-based practices. However, this research also contributes to the larger, national body of social science literature pertaining to agricultural hemp. As more research is conducted in other states, communicators and other practitioners will be better able to compare regional differences, as well as identify trends and commonalities across the larger United States.

General lack of objective knowledge was evident across the findings, particularly regarding differences between hemp and marijuana. For example, one-fourth of respondents incorrectly believed that CBD is a psychoactive compound found in cannabis plants, and one-fourth of respondents believed both hemp and marijuana can be "mind-altering" if consumed. This finding is consistent with prior research that found the public tends to associate hemp with marijuana properties (Borkowska & Bialkowska, 2019) and recreational drug use (Adams, 2019). However, regarding their subjective knowledge, respondents agreed they know what CBD is and can explain the differences between hemp and marijuana. Together, these findings may indicate some discrepancies between what respondents think they know and what they actually know. Knowledge is often, but not always, correlated with public attitudes toward or acceptance of a new crop or technology (Vecchione et al., 2014; Luke, 2020; Yang et al., 2017). It can also be argued that increased knowledge is alone not sufficient in garnishing public acceptance of said crop or technology. However, in the context of hemp buy-in, the findings of this study suggest increasing public knowledge and understanding of the chemical properties and uses of hemp compared to marijuana can significantly increase their likeliness to support the legalization of hemp cultivation and production. As such, it is recommended public communication campaigns include knowledge increase as a major objective of the campaign. Specifically, messages should include clear, comparative information about hemp and marijuana.

The strong association between hemp and marijuana is consistent with prior research (Adams, 2019; Borkowska & Bialkowska, 2019; Williams et al., 2020), reflects what was

observed in respondents' answers to the objective knowledge assessments, and further identifies opportunities for public education on the uses and non-psychoactive effects of hemp compared to marijuana. The association between hemp and marijuana was also observed in respondents' rationale for being overall "against" hemp, in which respondents' primary reasons for being against legalizing hemp were drug use-related concerns (e.g., harmful effects of using hemp products, an increase in the number of "pot heads," and risk of youth "getting high"). These findings again indicate highlighting the differences between hemp and marijuana may be important in building future hemp marketing efforts to reach consumers who are on the fence about hemp. As such, a key first step in future communication strategies should be to inform the public of the chemical properties and uses of hemp and how they differ from marijuana, particularly for distinguishing industrial and food applications from medical. Such communication messages should also be tailored to political leaders to help avoid future political controversy later in the stages of hemp cultivation and production in Florida and the larger United States. Having scientists at the forefront of this discussion may also be valuable (Brossard & Nisbet, 2007; National Science Board, 2008; Pew Research Center, 2009; Scheufele et al., 2007).

Perceived personal relevance was also a significant predictor of attitudes toward hemp, which may be due to the tendency to default to being anti-hemp in the case of lack of opinion. For example, in the open-ended responses, those who chose the anti-hemp stance noted not caring enough about the topic and being "better safe than sorry" as their rationale behind their stance. Personal relevance may also be tied to the familiarity dimension of consumer knowledge (Alba & Hutchinson, 1987) in that those who are more personally invested in hemp production or use hemp products would be more likely to have more product-related experiences. Future research could be conducted to examine the relationships between the familiarity dimension of knowledge and perceived personal relevance in order to better understand this dynamic. It may also be beneficial to explore whether the public's perceived personal relevance plays a moderating role between perceived risk and acceptance of hemp legalization as observed by Bearth and Siegrist (2016) with food innovation and technologies acceptance. Regarding future practice related to personal relevance, it is recommended that value-based public marketing and promotion efforts focus on the personal relevance of hemp. This values-based approach aligns with previous literature (Fischer et al., 2020).

Lastly, concern about risks associated with hemp cultivation and production was not a significant predictor of respondents' attitudes toward hemp legalization. This may be due to differences in the nature of the instrument items used to measure perceived risk (e.g., risk of becoming invasive) versus the public's concerns (e.g., psychoactive effects of hemp) that emerged in their responses to why they do or do not support legalizing hemp cultivation and production. Future research in this area is, therefore, needed to identify best methods of assessing public perceptions of risks associated with hemp cultivation and production, including risks based on science and risks that stem from public misperceptions. The descriptive findings pertaining to respondents' perceived risks of legalizing hemp were consistent with the prior research that has identified difficulty distinguishing between hemp and marijuana plants as a key topic of concern (Cherney & Small, 2016; Cortilet, 2010; Fortenbery et al., 2014; Malone & Gomez, 2018; Moberly, 2016). Public communication and outreach efforts around hemp should include clear description of the processes federal, state, and local agents use to distinguish between hemp and marijuana plants and the realistic level of the risk of them failing to do so effectively. Since prior research suggests some state lawmakers share these concerns about

regulatory agents' abilities (Groves, 2019), communication efforts described above should also be tailored for policymakers. According to Linde (2020), such efforts may further enhance public acceptance of as political cues can shape public perceptions of risks in accordance with their affiliated political party. found some state lawmakers.

Overall, the findings of this research suggest Florida residents are overall indifferent toward the legalization of hemp cultivation and production. Such indifference may stem from lack of awareness of the recent growth in interest in hemp as an agricultural commodity, general lack of knowledge needed to form opinions on the matter, or lack of personal connection to or perceived relevance of hemp production. However, the lack of strong opinion among the public may benefit communication experts involved in hemp pilot projects in that there is an opportunity to control the narrative at this stage. Hemp remains fairly new topic in the communication and research spheres. As such, there is much room for future research and outreach efforts to help identify best practices for communicating key information to stakeholders. We recommend research similar to this study be conducted to examine the knowledge, attitudes, and perceptions of other stakeholders (e.g., policymakers, hemp license holders, and other farmers and industry members). Such research should aim to reconcile differences in knowledge and attitudes among industry participants in contrast to public opinion. We also recommend agricultural communicators and Extension faculty working with hemp pilot programs in their states seek to collaborate across state lines and share results of public or other stakeholder opinion research pertaining to hemp. These results should also be collected and shared with current and potential hemp farmers to ensure they have as much information as possible moving forward in process of revamping hemp cultivation and production in the United States.

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