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Hemp on the Horizon: Understanding the Influences on Industrial Hemp Purchases

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Abstract

The industrial hemp market is expected to grow in upcoming years due to increased use in food, paper, and personal care products, opening new opportunities for farmers across the United States. An increase in hemp products provides an opportunity to better understand consumer preferences and to educate consumers on hemp. The purpose of this research was to understand what influences consumers' purchases of hemp products. This study was guided by the spiral of silence theory, which proposed that people will conform their attitudes and behaviors to match the perceived majority's opinion. Students in college-level introductory science courses were surveyed and their attitude toward industrial hemp, perceptions of others' attitude toward industrial hemp, and knowledge on hemp were measured. Data were analyzed using means, frequencies, and logistic regression. Most respondents reported not having purchased a hemp product in the past six months. The only predictors of hemp purchases were gender and attitude. When accounting for spiral of silence variables and personal characteristics, females were more likely than males to purchase hemp products. Extension educators should partner with hemp growers and processors to discuss how people are commonly using hemp products and to communicate to producers how consumers are using the products.

Keywords

agricultural production, consumer choices, spiral of silence

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Introduction and Problem Statement

The 2018 United States Farm Bill removed industrial hemp from its list of federally controlled substances (United States Department of Agriculture [USDA], n.d.), and opened opportunities for farmers and consumers across the country. The industrial hemp industry made $1.1 billion in 2018 and is anticipated to double by 2022 (Woods, 2019). Globally, industrial hemp markets are projected to continue to grow as hemp use in skincare, food, paper, beverage, and even automotive products continues to increase (Global Market Insight, 2022), thus opening new opportunities for farmers across the country.

Nebraska is one of the many states allowing growers to apply for licenses to grow hemp (Nebraska Department of Agriculture, 2019). While hemp is grown to have no more than 0.3% of the psychoactive compound, tetrahydrocannabinol (THC), it is often grown to have high levels of cannabidiol (CBD), a non-psychoactive compound (Grinspoon, 2019). Despite hemp products containing minimal levels of THC (Chandra et al., 2019), some lawmakers were against the legalization of hemp. For example, a Nebraska state senator said, “the hemp bill's a Trojan horse bill for marijuana. If you don't want your children or grandchildren getting easy access to drugs…don't vote for this bill” (Young, 2019, para. 6). Nebraska lawmakers’ vocal opposition and association of hemp and marijuana may have led to a social stigma associated with hemp production and use. This stigma and a general lack of knowledge related to hemp may impede sales of hemp products in Nebraska, and growers may find it difficult to successfully market their product despite the current global demand (Global Cannabinoids, 2019). Past research has determined Extension agents possess positive attitudes toward communicating contentious topics (Leal et al., 2020), but for agents to best help the industry and growers succeed, they will need to know the social influences on consumers’ decisions to purchase industrial hemp products.

Theoretical and Conceptual Framework

This study was guided by the spiral of silence theory, which proposed that people will conform their attitudes and behaviors to match the perceived majority’s opinion (Noelle-Neumann, 1974). A person’s fear of isolation from the group can cause them to change their opinion or remain silent when their opinion is incongruent from the group’s opinion (Noelle-Neumann, 1974). Their likeliness to share their opinion to the group is reliant on the a) strength of their attitude, b) perceived majority opinion toward the topic, and c) perceptions of future trends in attitude toward the topic (Noelle-Neumann, 1974). When people have weak attitudes toward a topic and believe the public to hold opposite attitudes, they will typically remain silent. However, if they perceive the future trends in attitude to align closely with their own, they will be more likely to speak out on the issue (Noelle-Neumann, 1974).

The spiral of silence theory was applied to the concept of industrial hemp due to the polarized opinions around the commodity (Cherney & Small, 2016). Unfortunately, relevant, peer-reviewed literature related to public opinion and use of industrial hemp has been limited, likely

due to its only recent declassification as a controlled substance (USDA, n.d.). Hiller Connell (2010) conducted a study to understand the barriers to purchasing eco-conscious apparel made from hemp fibers and concluded that lack of knowledge and negative attitude were the major internal barriers to purchasing apparel made from hemp. Other studies have determined that only 14% of Americans have tried CBD oil and mostly use it for pain, anxiety, or insomnia (Brenan, 2019). Researchers in Poland also concluded that consumers had limited knowledge toward hemp, yet they possessed positive attitudes toward the medicinal properties of hemp (Borkowska & Bialkowska, 2019). The positive perceptions of hemp appeared to be the result of association with marijuana (Borkowska & Bialkowska, 2019).

While public opinion research related to industrial hemp has been limited, there has been plenty of research related to the support or opposition to legalizing/decriminalizing marijuana in the US that may provide insight for this study. Galston and Dionne (2013) concluded attitude toward marijuana legalization was mostly ambivalent, and while support for legalization is growing, opposition to legalization has been intense. Researchers also found support for marijuana legalization from liberals but concluded conservatives were not as vocal in neither their support nor opposition (Cruz et al., 2016; Galston & Dionne, 2013). Additionally, gender and age have been found to influence support for marijuana legalization, with men and younger people being the most supportive of the issue (Galston & Dionne, 2013).

There is a clear gap in the literature for understanding how people decide to purchase industrial hemp. Concepts from the spiral of silence may provide a baseline understanding for how societal and peer pressures (Cruz et al., 2016; Noelle- Neumann, 1974) could inform industrial hemp purchases. For the purpose of this research, public support of industrial hemp has been operationalized as the purchase and use of industrial hemp products. In addition to the spiral of silence variables (attitude toward industrial hemp production, perceptions of others' attitudes, and future trends in attitudes toward industrial hemp), knowledge (Brenan, 2019; Hiller Connell, 2010), political ideology (Cruz et al., 2016; Galston & Dionne, 2013), gender (Galston & Dionne, 2013), and rural hometown were included in the conceptual model. Whether or not the respondents lived in a rural hometown was included in the model because these respondents were from areas that could possibly grow industrial hemp in the near future. Personal characteristics, spiral of silence variables, and industrial hemp knowledge were expected to have an influence on industrial hemp purchases.

Purpose

Developing a better understanding of consumers' preferences and perception of industrial hemp products will provide practical information that can be used to help educate people on industrial hemp production and products. The purpose of this research was to understand what influences consumers' industrial hemp products purchases. The following objectives guided this study:

1. Identify respondents' hemp purchasing behaviors in the past six months.
2. Identify respondents' knowledge of industrial hemp.

3. Identify respondents' attitude, perceptions of others' attitudes, and perceived future trends of attitudes toward industrial hemp.
4. Analyze how personal characteristics, knowledge, attitude, perceptions of others' attitudes, and perceived future trends of attitudes toward industrial hemp predict industrial hemp purchases.

Methods

Quantitative methods were used to fulfill the purpose of this study. This research was part of a larger industrial hemp project to educate Doane University students about hemp production. The population consisted of students in introductory science courses (n = 139), and 111 students (n = 111, 79.9%) completed the 25-question paper survey prior to the educational presentations. Approximately half of the respondents were female (56.3%, n = 63), and most students identified as white (85.8%, n = 95), and a minority as Hispanic, Latino, or Spanish origin (5.4%, n = 6). Political beliefs consisted of very liberal (3.6%, n = 4), liberal (9.8%, n = 11), moderate (48.3%, n = 54), conservative (27.7%, n = 31), very conservative (7.1 %, n = 8), and unknown (3.6%, n = 4). The respondents consisted of freshmen (77.7%, n = 87), sophomores (13.4%, n = 15), juniors (7.1%, n = 8), and seniors (1.8%, n= 2). Additionally, some of the respondents indicated they were from a rural hometown (42.0%, n =47) and the rest of the respondents indicated they were from an urban/suburban area (58.0%, n = 65).

Hemp use was measured with a check-all-that apply question. Respondents were asked to select all industrial hemp products they had purchased in the past six months. For objective four, this variable was transformed into a dichotomous variable where the respondent had either purchased at least one industrial hemp product or had not purchased an industrial hemp product in the six months before the study.

Attitude toward industrial hemp and *perceptions of others' attitude toward industrial hemp* were measured on the same 8-item, 5-point, bipolar semantic differential scales that were adapted from prior research (Ruth et al., 2019), and included statements like "good/bad" and "beneficial/not beneficial." Statements were coded so that positive adjectives were a five and negative adjectives were a one. The statement stem for attitude toward industrial hemp was, "I believe growing industrial hemp in the US is…" and the statement stem for the perceptions of others' attitudes variable was, "I believe the majority of Americans think growing industrial hemp is…" Both indexes were averaged, and attitude toward industrial hemp (Cronbach's α = .94) and perceptions of others' attitudes toward industrial hemp (Cronbach's α = .97) were found to be reliable (Field, 2013). *Perceptions of future trends in attitudes* were measured with a 7-item, 5-point Likert-type scale adapted from Ruth et al. (2019), with labels ranging from 1 = *strongly disagree* to 5 = *strongly agree*. The average of the items was calculated to create the construct (Cronbach's α = .80).

Knowledge of industrial hemp was measured with 20 true/false statements, which have been reported in a prior study by item (Colclasure et al., 2021). Respondents were also given the option

to select "I do not know." These statements were adapted from US government documents about industrial hemp (Congressional Research Service, 2019; USDA, n.d.). The knowledge construct was found to be reliable with a KR20 of .84 (Kuder & Richardson, 1937). Prior to distribution, the survey was reviewed by a panel of experts to address the validity (Ary et al., 2010) and was piloted with 20 students in a soil science class. Panel members included a professor of chemistry and co-founder of a hemp processing company, an associate professor of biology with a focus in crop genetics, an assistant professor of environmental science with a focus in agriculture, and an assistant professor of agricultural communications.

All data were analyzed using SPSS version 25. Objectives one through three were answered using means, frequencies, and standard deviations. A logistic regression was used for objective four. The dichotomous variable for industrial hemp use was treated as the dependent variable; use of industrial hemp was coded as a 1 and no use was coded as a 0. Attitude, perceptions of others' attitudes, perceptions of future trends in attitudes, knowledge, and political ideology were all treated as continuous predictor variables. The continuous variables in the model were normally distributed and had a skewness and kurtosis between +/- 2 after the removal of two outliers. Categorical variables were dummy coded so the category with the largest frequency was treated as the control (Gender – Men, Hometown – Urban/Suburban; Field, 2013).

Findings

Hemp Purchasing Behaviors

Respondents were asked to select how many hemp products they had purchased in the past six months, and the range was between 0 and 5, with a mean of .53 (*SD* = .93). The majority of respondents in the study reported not having purchased an industrial hemp product in the past six months (64.9%, *n* = 72), while 35.1% (*n* = 39) had purchased at least one industrial hemp product in the past six months. The most frequently purchased hemp product was makeup or cosmetics (18.0%, *n* = 20), followed by CDB oil (14.4%, *n* = 16), consumables (6.3%, *n* = 7), and pet products (5.4%, *n* = 6) (see Table 1). Less than 5% of the sample had used the remaining hemp products.

Table 1

Hemp Products Purchased in The Past Six Months

Product	*n*	*%*
Makeup or Cosmetic Products (Skin Cream)	20	18.0
Cannabidiol (CBD) Oil	16	14.4
Consumables (e.g. Gummies)	7	6.3
Pet Products Made from Hemp	6	5.4
Hemp Fiber	4	3.6
Hemp Protein (e.g. Powder Supplements)	4	3.6
Hemp Seed Oil	1	0.9
Hemp Milk or Juice	0	0.0
Hempcrete	0	0.0

Hemp Knowledge

Respondents answered a total of 20 true or false knowledge questions, and the range for correct answers was zero to 18. On average, students answered 8.15 questions correctly (M = 8.15, SD = 4.28). Individual item responses can be found in Table 2. The majority of respondents knew hemp crops could be harvested for oils and fiber (84.7%, n = 94), that cannabinoids found in hemp could have medical benefits (77.5%, n = 86), and that hemp contained CBD (64.0%, n = 71). However, respondents were unable to correctly answer questions about federal regulation of hemp, how hemp is grown/processed, and whether or not hemp contained THC.

Table 2

Knowledge Related to Hemp

		Correct		Incorrect/ Don't Know	
	Answer	*%*	*n*	*%*	*n*
Hemp crops can be harvested for oils and fiber.	T	84.7	94	15.3	17
Cannabinoids found in hemp can have medical benefits.	T	77.5	86	22.5	25
Hemp contains cannabinoids, such as CBD.	T	64.0	71	36.0	30
The plant parts used in hemp production include fiber, grain, ...	T	55.9	62	44.1	49
Hemp is a federally illegal crop in the United States.	F	53.2	59	46.8	52
The level of THC in hemp is similar to the level of THC in marijuana.	F	53.2	59	46.8	52
Similar to marijuana, hemp can be smoked to get a "high" or "buzz".	F	51.4	57	48.6	54
There are no genetic differences between hemp and marijuana.	F	50.5	56	49.5	55
Hemp and marijuana are both classified as Cannabis.	T	49.5	55	50.5	56
Hemp contains 0.3% or less THC.	T	40.5	45	59.5	66
CBD from hemp is federally legal.	T	40.5	45	59.5	66
Hemp is a legal crop in Nebraska.	T	37.8	42	62.2	69
Hemp is significantly different from marijuana at a genome-wide level.	T	32.4	36	67.6	75
The products from hemp and marijuana crops are used similarly.	F	28.8	32	71.2	79
Prior to the late 1950s, hemp in the United States was considered an agricultural commodity...	F	27.9	31	72.1	80
Cannabis processing is the same for both hemp and marijuana.	F	21.6	24	78.4	87
Current federal law classifies hemp as a scheduled I controlled substance...	F	18.9	21	81.1	90
Hemp is characterized by plants that are high in delta-9 THC, the dominant psychotropic compound...	F	16.2	18	83.8	93
Hemp must be grown in carefully controlled, warm, and humid cond...	F	8.1	9	91.9	102
The U.S. Drug Enforcement Administration (DEA) currently has regulatory oversight over hemp...	F	2.7	3	97.3	108

Hemp Perceptions

On average, respondents in the study reported slightly positive attitudes toward growing industrial hemp in the US (*M* = 3.52, S*D* = .80) but perceived others to have neutral attitudes toward the production of hemp (*M* = 2.79, *SD* = .92). Item responses can be found in Table 3. Respondents agreed they perceived hemp to be "beneficial" (*M* = 3.95; *SD* = 0.91), "positive" (*M* = 3.81; *SD* = 0.99), and "acceptable" (*M* = 3.79; *SD* = 0.99) but reported more neutral responses to believing hemp was "essential" (*M* = 3.15; *SD* = 1.00) and "crucial" (*M* = 2.96; *SD* = 0.78) Respondents' perceptions of U.S. attitudes was neutral across all adjective pairs.

Table 3

Attitude Toward Hemp and Perceptions of U.S. Attitudes Toward Hemp

	Attitudes toward Growing Hemp		Perceptions of U.S. Attitudes toward Growing Hemp	
	M	*SD*	*M*	*SD*
Beneficial/Not Beneficial	3.95	0.91	2.97	1.10
Positive/Negative	3.81	0.99	2.85	1.05
Acceptable/Unacceptable	3.79	1.00	2.83	1.08
Good/ Bad	3.79	1.07	2.78	1.12
Important/Unimportant	3.44	1.02	2.81	1.02
Necessary/Unnecessary	3.22	1.01	2.61	1.05
Essential/Not Essential	3.15	1.00	2.72	1.12
Crucial/Trivial	2.96	0.78	2.72	0.93

Note. Items coded so that negative adjectives were a *1* and positive adjectives were a *5.*

When asked how they believed others would feel about the growth of industrial hemp in the US in the future, respondents agreed attitudes would be favorable (*M* = 3.67, *SD* = .52). Respondents agreed or strongly agreed that people would become more accepting of hemp in the future (83.8%, *n* = 93) and that people will be more supportive of hemp in the future (73.0%, *n* = 81; Table 4). However, only 45.0% (*n* = 50) of respondents agreed or strongly agreed people will not worry about hemp in the future.

Table 4

Perceptions of Future Trends in Attitudes Toward Hemp

		Strongly Disagree/Disagree		Neither Agree nor Disagree		Agree/ Strongly Agree	
In the future…	*n*	*f*	*%*	*f*	*%*	*f*	*%*
People will be less accepting of hemp.[a]	111	4	3.6	14	12.6	93	83.8
People will be supportive of hemp.	111	3	2.7	27	24.3	81	73.0
People will be more fearful of hemp.[a]	110	7	6.4	29	26.4	74	67.2
People will recognize the value of hemp.	111	5	4.5	36	32.5	70	63.1
People will be appreciative of hemp.	111	2	1.8	42	37.8	67	60.4
People will be less tolerant of hemp.[a]	111	11	9.9	42	41.4	58	52.2
People will not worry about hemp.	111	25	22.5	36	32.4	50	45.0

[a]Indicates statement was reverse coded for analysis

Predicting Hemp Purchases

A logistic regression was run for the final objective to predict the purchase of industrial hemp. The model was statistically significant (χ^2 (7) = 25.13, $p < .01$) and could account for approximately 30% of the variance in the likelihood to purchase industrial hemp products (*pseudo*-R^2 = 0.30). The only predictors of industrial hemp purchases were gender and attitude (see Table 5). When accounting for spiral of silence variables and personal characteristics, females were more likely than males to purchase industrial hemp products. Additionally, as attitude toward growing hemp increased by one point, the log odds of the likelihood to purchase industrial hemp products increased by 2.69.

Table 5

Likelihood of Purchasing Industrial Hemp Products

Predictor	*B*	*Odds*	*p*
Constant	-2.00	0.14	.42
Gender	-1.36	0.26	.01*
Attitude	0.99	2.69	.02*
Knowledge	0.11	2.04	.12
Rural Town	0.71	2.04	.16
Politics	-0.46	0.63	.42
Others' Attitude	-0.22	0.81	.47
Future Trends	-0.22	0.80	.71

* $p < .05$.

Conclusions, Discussion, and Recommendations

Despite the low knowledge of industrial hemp, the respondents did hold slightly positive attitudes toward it, which aligned with research on industrial hemp in Poland (Borkowska & Bialkowska, 2019). Respondents also perceived others to have neutral attitudes of industrial hemp. This neutral perception may mean Nebraska's historical stance on marijuana legalizations and vocal senators on the topic of industrial hemp (Young, 2019) were not perceived to represent the majority opinion of the state. Another explanation is the students in the sample are simply not engaged in all the political conversations in Nebraska. Younger people, like those in the sample, have been found to be the most supportive of marijuana legalization (Galston & Dionne, 2013), and the respondents in the study may hold similar views.

The logistic regression model included the variables from the spiral of silence, industrial hemp knowledge, and respondent characteristics. The model was statistically significant and accounted for a moderate amount of variance in predicting industrial hemp purchases (Cohen, 1988). Males were less likely than females to purchase industrial hemp. Galston and Dionne (2013) had concluded men were more supportive of marijuana legalization than women. However, the different contexts of marijuana and industrial hemp would likely account for this difference in findings. Additionally, the influence of gender in the model may reflect the products purchased in this study, which commonly included makeup and skincare products.

The only other predictor in the model for industrial hemp purchases was attitude, and respondents with more positive attitudes were more likely to purchase the products. Interestingly though, the other variables from the spiral of silence were not predictors of industrial hemp purchases. This finding may reflect the respondents' agreement that the public would possess positive attitudes toward industrial hemp in the future. When people believe their attitude aligns with the future trends, they are more likely to express that opinion and be less concerned with their fear of isolation (Noelle-Neumann, 1974). Although the model did not

exactly reflect the spiral of silence, the respondents' own attitudes might be the most predictive of the behavior because they perceive others to feel similar to themselves and do not feel societal pressure related to the topic of industrial hemp products (Noelle-Neumann, 1974).

Despite confusion between marijuana and industrial hemp (Cherney & Small, 2016) and a general lack of knowledge in the sample, knowledge was not a predictor of industrial hemp use. Hiller Connell (2010) concluded lack of knowledge and negative attitudes were barriers to purchasing clothing made from industrial hemp. Because the attitudes in the sample were mostly positive, the lack of knowledge may not have mattered as much when predicting industrial hemp purchases.

While the findings from this study are not generalizable past the student population, this research can serve as a starting point to understanding the influences on consumers' purchasing behaviors for industrial hemp products. The findings from this study should be considered by Extension specialists and agricultural communicators to help support this re-emerging industry. Extension educators should partner with local, industrial hemp growers and processors in their area to discuss how people are commonly using hemp products. Communicating to producers how consumers are using the products could lead to strategic decisions to help increase sales and production of certain products. Findings from this study should be used to assist hemp producers in marketing and selling their product. Thus expanding the industrial hemp industry and improving agricultural practices.

Additionally, this research should be replicated with respondents across Nebraska as well as the US to allow the findings to be generalizable to the public. Including questions about attitudes toward marijuana along with attitudes toward industrial hemp would be useful to understanding if the public holds similar or different attitudes toward the two products.

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