Consumer Views on Use and Legality of Hemp Based Products

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Selected Paper prepared for presentation at the Southern Agricultural Economics Association 2020 Annual Meeting
Louisville, KY

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Cannabis has had a complicated past in the United States. In the early 1900s, due to a multitude of reasons, popular opinion and government officials decided that Cannabis was a danger to the nation and outlawed it in the United States. Under this law, there was no distinction between Hemp and Marijuana, so Hemp was made illegal alongside Marijuana in the United States with the Marihuana Tax Act of 1937 (Little, 2018). It is important when looking at Cannabis to make the clear distinction in the differing varieties that are possible. While Cannabis is one species of plant, under federal law it can be broken down into two different categories, Marijuana and Hemp. Marijuana contains a Tetrahydrocannabinol (THC) level of 0.3% or higher. Hemp on the other hand, contains a level of THC that is lower than .03% (Congressional Research Service). THC is the active agent in Cannabis that gives the high people experience when consuming Marijuana.

In the recent years, stances on Cannabis and its legality have changed, with several states adopting measures that have legalized recreational, medical, and other uses of Marijuana while mostly ignoring Hemp. States that did so, directly violated federal law and until the Agricultural Act of 2014 went into effect, it was illegal to conduct any federally funded research on Hemp. The Hemp Farming Act of 2018 changed the classification of Hemp from a Schedule 1 drug to being just another agricultural commodity (Malone and Gomez, 2019). Since then 47 states have rushed to change their state laws to research and allow for the growth of Hemp inside their borders. Even with this momentum of hastily written laws to legalize Hemp to be grown in the individual states, there are still some states that are wary of the change (Pitt, 2019). Idaho, Mississippi, and South Dakota are the remaining states that have yet to legalize (or begin the legalization process) the growth of Hemp in their states. Not that people haven't tried in these

states. In April the state legislature of South Dakota passed regulations for growing Hemp in the state, but Governor Kristi Noem vetoed the legislation, explaining that,

> "[t]here is no question in my mind that normalizing hemp, like legalizing medical marijuana, is part of a larger strategy to undermine enforcement of the drug laws and make legalized marijuana inevitable."

She also spoke to the possibility of making the jobs of law enforcement officers harder because of the identical appearances of Hemp and Marijuana. Wyoming state Representative Bunky Loucks welcomed the veto by Gov. Noem citing the decreased competition for Wyoming farmers (Groves, 2019). Farmers share a similar concern with the identical appearance of Hemp and Marijuana. Already with the few farms that have started growing Hemp, thieves have trespassed and stolen Hemp plants, thinking they were stealing Marijuana. In Vermont, registered Hemp farmer Nick Grelich had around 15% of this crop stolen from his fields by criminals that suspected the Hemp was Marijuana. Sergeant Gonyaw of the Colchester Police Department confirmed that they have received several complaints of theft from registered farmers since they began growing Hemp. (Heady Vermont, 2018). Farmers are faced with the dilemma of losing crops due to thieves or being burdened with costs associated with adding increased security measures to prevent the theft from taking place, either way reducing revenues. Law Enforcement Officers are also seeing a difference in their ability to do their job to the fullest of their ability. Some places, such as Gwinnett County, Georgia have temporarily ended arrests for Marijuana infarctions due to the legalization of Hemp until the police department get new equipment that can test for THC levels on the spot (Terrell, 2019).

Looking at the dried product, it is impossible to tell the difference between legal Hemp and illegal Marijuana. With the legalization of The United States Department of Agriculture

(USDA) recently published guidelines for the growth and harvesting of Hemp, see USDA Interim Rules and Regulations for the most current forms of the rules (USDA-Agricultural Marketing Service, 2019). These are simply interim rules, which allow the USDA to make changes easily at any time in the two-year period the rules cover. This will allow the department to use the 2020 growing and harvesting season to serve as a test run to see what does and does not work. Secretary Sonny Perdue has encouraged farmers to speak up during this period to make things run as efficiently as possible. As the rules currently stand, once a farmer has harvested their crop, they have 15 days to get their crops tested at a Drug Enforcement Administration (DEA) registered lab, which the department has said includes 250 such labs in the nation. That has not alleviated some people's worries that a bottleneck will ensue, with concerned farmers citing that the labs are spaced equally around the nation. Iowa, for example, only has one USDA approved lab in the entire state. The USDA has already hinted that in the future they may allow private labs to be certified, allowing them to conduct testing on harvested Hemp. Plants testing higher than the legally allowed 0.3% THC levels will be destroyed (Pitt, 2019).

Even with the legalization of Hemp and a bipartisan support among lawmakers that Hemp is perfectly okay and should be allowed to be produced and processed, public stigma around Hemp still persists. It is important to understand how the public views Cannabis, Hemp, and Marijuana for a multitude of reasons. One such reason is that with lawmakers in a rush to get laws on the books, it is important that they have a clear understanding of what the public is under the assumption they are doing. It is also very important that the lawmakers know exactly what they are making legal versus not legal when writing these laws that cover Cannabis products. Just as important, it is important that the public is aware of what the terms mean when dealing

with the law. If a government legalizes one thing but the general public doesn't have a firm understanding on what exactly the law legalizes/doesn't then the ensuing confusion could lead to individuals missing out on legal products they would have otherwise taken advantage or citizens unintentionally breaking the law.

Other researchers have conducted research on topics around Cannabis in recent years and months with all the focus suddenly thrown on Hemp in the national debate. These include articles that have dove into looking how consumers perceives Hemp products for use in animal products (Kogan, 2016). Some research has been done in looking how stakeholders in the Industrial Hemp industry perceives the product (Stevenson, 2017). Our research is needed because while these studies have done a good job of covering their research topic, there is a hole missing on the perceptions of Hemp and Industrial Hemp in terms of Marijuana. These other studies either didn't address looking at the general public and only looked at stakeholders, or looked at different by-products of Cannabis, not specifically Marijuana.

In this paper, the intent was to understand how the public perception and use of hemp and hemp based products, notably, 1) do consumers perceive Hemp to be Marijuana, 2), are consumers using CBD oil and if so, do they feel that it works, and 3) should there be restrictions on the production of hemp based products, notably CBD oil.

Materials and Methods

Individuals completed a multi-question survey which included several types of questions, including yes/no, multiple response, and other questions. The survey had around 2,500 completed responses coming from the Southeastern states of Alabama, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, and Tennessee. The respondents answered a series of demographic questions that included their state of residence

and zip code, their race, gender, educational history, political affiliation, and household income. Zip codes were merged with zip code characteristics from the American Community Survey (United States Census Bureau, 2019a) to attain individual and geographic respondent profiles.

In addition to these demographic questions they were asked what they thought the term "Cannabis" meant, with the following options provided: Recreational Marijuana, CBD oil, Medical Marijuana, Fiber related products, building materials, animal products, food related products, body products, paper products, electronic wiring, hemp, industrial hemp, other, or never heard of. They were also asked the same question but substituted Cannabis with Hemp and then again with Industrial Hemp. For these two questions the options included were the same but the options that were the same as the term were dropped from the list. Respondents were also asked about their use of CBD oil and its effectiveness as well as whether various hemp based products should be illegal to produce, produce with restrictions, or free to produce without restriction.

Table 1 shows the breakdown of the demographics of the survey. The sample was fairly representative of the Southeast, except for having a lower median household income ($37,500) compared to the census estimate for the Southeast ($53,065) (United States Census Bureau, 2019b). The sample's median age (41) was slightly higher than the census median age estimate (38) (United States Census Bureau, 2019c).

With respect to restrictions on CBD, we utilized a multinomial logit model (MNL) to better understand which characteristics want CBD oil restrictions. The MNL model can be specified as described by Greene (2003: 721),

$$Prob(R_i = j) = \frac{e^{\beta_j' x_i}}{\sum_{v=1}^{3} e^{\beta_v' x_i}} \text{ where k = 1, 2, 3} \qquad (1)$$

where Prob(R_i = j) is the probability that respondent *i* chose choice *j* (i.e., should be illegal to produce, produce with restrictions, produce without restrictions); v_i is a set of demographics and individual characteristics/perceptions and zip code characteristics (Table 1); and ß is a vector of parameters. The MNL β parameter estimates represent log-odds, so we calculated and present the marginal effects. With respect to the marginal effects, continuous variables are interpreted as the percent increase/decrease in the probability of being in a category, given a one-unit increase in the explanatory variable's mean. For categorical variables, they are interpreted as the percent increase/decrease in the probability of being in a category, given a change from the base category to the category of interest (e.g., male to female).

Results and Discussion

Though the governmental regulations are clear that hemp and industrial hemp are not marijuana, there is confusion amongst many consumers. Twenty-nine percent of respondents associated hemp with recreational marijuana and 16% associated the term industrial hemp with recreational marijuana (Table 2). Thirty-five percent of respondents associated hemp with medicinal marijuana with 23% associating industrial hemp with medicinal marijuana. With respect to products being produced from hemp, there was low awareness or association of many hemp based products, such as paper products, food related products, and building materials. However, more common hemp based products, such as CBD oil and hemp fiber saw increasing levels of awareness. Forty-two percent of respondents perceived hemp as CBD oil while only 30% perceived hemp as fiber.

Given the CBD oil market is growing, we focus the rest of the discussion on this hemp based product. Only 12% of respondents had never heard of CBD oil, with 46% having heard of CBD oil but they (the respondent, friends, and family) had not used it (Table 3). Thirty-two percent of respondents (or their friends or family) had used CBD oil. Respondents having not heard of CBD oil were indifferent (54.8 = neither agree/disagree) that CBD oil helps with medical conditions. However, of those respondents that had heard of but not used or had heard of and used, they perceived greater medical benefits for CBD oil with respondents that had heard of and used scoring 83 on the 100-point scale.

With respect to legality, the number of respondents wanting to make hemp based production illegal ranges from 15% (fiber) to 22% (milk) (Table 4). Examining CBD oil, 18% of respondents want CBD oil to be illegal to produce with 43% wanting some sort of restriction on production. Forty percent of respondents do not want any restrictions on CBD oil production. Comparatively, 15% of respondents want fiber production to not be legal, while 38% want some restrictions on production.

Examining the marginal effects for CBD oil production show some interesting results. Notably, respondents with a high school or less education are 5.6% more likely to want CBD oil production to be illegal compared to respondents with a bachelor's degree (Table 5). Respondents with a graduate degree were 10.2% more likely to want CBD oil production to be illegal compared to respondents with a bachelor's degree. Rural respondents were less likely to want CBD oil production to be illegal, while areas with increasing numbers of people employed by agriculture were more likely to want CBD oil production to be illegal.

Younger respondents (i.e., Gen X and Millennial) were less likely to want restrictions on CBD oil production (Table 5). Respondents from Alabama, Georgia, Louisiana, Mississippi, and

Tennessee were also less likely to want restrictions compared to Kentucky (one of the state's leading in hemp production). Republicans were 10.9% more likely to want restrictions than Democrats while areas with a higher median household incomes were more likely to want restrictions.

Examining the no restriction group, younger consumers were more likely to not want any CBD oil restrictions (Table 5). Notably, Gen X and Millennials were 14% and 11.2% more likely to not want restrictions, respectively. Republicans were less likely to be in the no restriction group as they were more likely to be in the legal but with restriction group. As household income increases, respondents are less likely to be in the no restriction group.

Conclusions

There is dichotomy within the hemp market. Consumers have varying perceptions of what exactly hemp is and whether hemp based products should be legal to produce. With respect to CBD oil, respondents having heard of or used CBD oil are more inclined to perceive there to be a health benefit. However, there are segments of the population that believe CBD oil production should be illegal. As state and local governments, stakeholders, and producers look into expanding hemp acreage, the large amounts of confusion about hemp should be a top concern in order to not alienate consumers within their states, counties, communities.

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Table 1. Respondent characteristics from the online survey

	Mean	Standard Deviation
Alabama	9.47%	29.29%
Florida	10.51%	30.67%
Georgia	20.16%	40.13%
Kentucky	9.32%	29.08%
Louisiana	9.51%	29.34%
Mississippi	9.36%	29.13%
North Carolina	10.58%	30.76%
South Carolina	10.32%	30.43%
Tennessee	10.77%	31.00%
Male	36.51%	48.16%
Caucasian	71.52%	45.14%
Democrat	33.00%	47.03%
Republican	32.70%	46.92%
Other	34.30%	47.48%
High School or Less	33.07%	47.05%
Some College	36.74%	48.22%
Bachelors	19.20%	39.39%
Secondary Degree	11.00%	31.29%
Rural	37.68%	48.47%
Metro	15.00%	35.72%
Suburban	47.32%	49.94%
Median Age	41	--
Baby Boomers and Older	35.24	47.78%
Gen Z	40.00	48.93%
Millennials and Younger	25.11	43.37%
Median Household Income	$37,500	-
Area Median Age	38.77	6.02
% Male	48.6%	2.85%
% Caucasian	45.3%	18.17%

Number of Adults per Household	2.13981	1.075665
Number of Children per Household	0.7589803	1.195626
Median Household Income	53949.09	44889.3
% Work in Ag	1.12%	2.04%
% Speak English	89.97%	6.04%
Area Median Income	49144.13	17386.8

Table 2. Consumer perception of various terminology.

	Which Apply to Following Terms		
	Cannabis	Hemp	Industrial Hemp
Recreational marijuana	54%	29%	16%
CBD oil (Cannabidiol)	53%	42%	28%
Medical marijuana	64%	35%	23%
Fiber related products (such as clothing)	9%	30%	28%
Building materials	6%	16%	23%
Animal food or bedding	6%	11%	11%
Food related products (such as granola bars)	10%	13%	10%
Electronic wiring	3%	5%	8%
Hemp	33%	--	39%
Body products (such as shampoo, body wash, lip balm, facial cream, sunscreen)	13%	35%	17%
Paper products	9%	23%	21%
Industrial hemp	17%	22%	--
Other	1%	2%	1%
Never heard of	7%	12%	20%

Table 3. Use of CBD oils.

	Heard of oils made from CBD			
	Never Heard of	Heard of but you/friend/family have NOT used	Heard of and you/friend/family have used	Do not know if used or not
CBD oil	12%	46%	32%	10%

	CBD oil helps with medical conditions [a]			
	Never Heard of	Heard of but you/friend/family have NOT used	Heard of and you/friend/family have used	Do not know if used or not
CBD oil	54.8	71.9	83.4	60.0

[a] How much do you agree/disagree with the following statement: CBD oil (Cannabidiol) derived from hemp can help with certain medical conditions. 0 = Strongly Disagree, 50 = Neither Agree/Disagree, and 100 = Strongly Agree.

Table 4. Respondent perception of legality of hemp based products.

	Should be…		
Product	Not legal to produce	Able to produce with some restrictions	Able to produce without restrictions
CBD Oil	18%	43%	40%
Fiber for Products	15%	38%	47%
Beauty Products (e.g., shampoo, facial cream, etc.)	16%	38%	46%
Granola Bars	20%	40%	40%
Seeds	19%	40%	41%
Milk	22%	38%	40%
Other Food Products	20%	40%	40%
Other Household Items	17%	40%	43%
Other	21%	37%	42%

Table 5. Marginal effects from the multinomial logit model.

	Should be illegal to produce		Should be legal to produce but with restrictions		Should be legal to produce without restrictions	
	Marginal Effect	P-Value	Marginal Effect	P-Value	Marginal Effect	P-Value
Generation						
Gen X	-0.0010	0.9570	**-0.1387**	**0.0000**	**0.1397**	**0.0000**
Millennial or younger	0.0072	0.7530	**-0.1189**	**0.0000**	**0.1117**	**0.0000**
State						
Alabama	0.0320	0.4760	**-0.1139**	**0.0150**	0.0819	0.1200
Florida	-0.0220	0.5950	-0.0673	0.2070	0.0893	0.1200
Georgia	0.0404	0.3170	**-0.1032**	**0.0190**	0.0628	0.1860
Louisiana	0.0350	0.4400	**-0.0791**	**0.1000**	0.0441	0.3950
Mississippi	**0.1520**	**0.0060**	**-0.1544**	**0.0010**	0.0024	0.9640
North Carolina	0.0165	0.6940	-0.0768	0.1030	0.0603	0.2360
South Carolina	0.0742	0.1200	-0.0718	0.1320	-0.0024	0.9620
Tennessee	0.0329	0.4350	**-0.0863**	**0.0550**	0.0535	0.2710
Male	0.0039	0.8170	**-0.0497**	**0.0300**	0.0458	0.0450
Caucasian	**-0.0592**	**0.0120**	-0.0345	0.2380	**0.0937**	**0.0010**
Political Affiliation						
Republican	0.0330	0.1350	**0.1085**	**0.0000**	**-0.1415**	**0.0000**
Other party	0.0007	0.9740	0.0266	0.3280	-0.0273	0.2910
Education						
High school or less	**0.0562**	**0.0360**	-0.0312	0.3370	-0.0250	0.4390
Some college or Associates degree	-0.0036	0.8800	-0.0129	0.6740	0.0165	0.5900
Graduate degree	**0.1024**	**0.0080**	**-0.1081**	**0.0050**	0.0057	0.8920
Number of adults in household	0.0061	0.4260	**-0.0191**	**0.0760**	0.0131	0.2100
Number of children in household	-0.0061	0.4080	0.0136	0.1720	-0.0075	0.4400
Household income (in dollars) [a]	0.0003	0.1630	**0.0006**	**0.0200**	**-0.0009**	**0.0010**
Urbanicity						
Rural	**-0.0444**	**0.0720**	0.0501	0.1710	-0.0057	0.8720
Suburban	-0.0304	0.1980	0.0399	0.2320	-0.0094	0.7720
Zip Code Characteristics						
Percent male	-0.1146	0.7240	0.3163	0.4610	-0.2018	0.6320
Age (in years)	0.0017	0.3410	-0.0010	0.6870	-0.0007	0.7580
Percent Caucasian	0.0534	0.4780	**-0.1886**	**0.0680**	0.1352	0.1830
Percent speak English well	-0.2730	0.1050	0.1761	0.4500	0.0969	0.6710
Median household income [a]	-0.0004	0.4990	**0.0015**	**0.0470**	-0.0011	0.1430

Percent work in agriculture	**1.3013**	**0.0000**	**-1.2528**	**0.0390**	-0.0486	0.9320
Log Likelihood				-2,266.85		
LR chi2				168.4100		
Prob>chi2				0.0000		
Pseudo R2				0.0358		

[a] Household income is the change probability given a $1,000 change in the mean household income.