

Wild Greens Knowledge and Consumption:

A QUALITATIVE EXPLORATION OF HUMAN AGENCY IN THE SOUTHERN
ARIZONA FOOD SYSTEM

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Abstract

This qualitative, single case study explores the influence of the dominant food system (DFS) on the knowledge and consumption of three wild greens (amaranth, lambquarters, purslane) by 24 Latinxs living in Tucson, Arizona (AZ), USA. The three greens are each considered to be traditional Latinx foods. In addition to the natural occurrence of the wild greens, Tucson was selected as the study site due to its rich and diverse food tradition and deep agricultural history. A pattern of decline in the knowledge and consumption of the wild greens is observed according to three overlapping themes: generational awareness, consumer demand and scarcity, and accessibility. The bureaucratic controls that bring calculability, efficiency, and predictability to the DFS are found to be influential in the decline in wild green knowledge and consumption by the study participants. The downward knowledge and consumption pattern is further considered in the context of participant agency within the DFS. Implications for practice include strategies for more purposefully leveraging community settings and alternative marketplaces to revitalize the knowledge and consumption of wild greens and other traditional foods. Recommendations are also provided for future research on the effects of rationalization within the DFS on human agency and traditional food consumption.

Keywords: Rationalization, human agency, traditional foods, wild greens

1. Introduction

Wild greens, defined as non-domesticated leafy vegetables, are often identified as traditional foods. Traditional foods are foods that are representative of and included in the established traditions and identities of groups or cultures (Bertozzi 1998; Jordana 2000). Indeed, the longstanding contributions of wild greens to regional food traditions and cultural identities are widely recognized (Nebel, Pieroni, and Heinrich 2006; Irvine 1956; Vieyera-Odilon and Vibrans 2001). Wild greens are also known for their high levels of micronutrients and are considered by some to be functional foods that contain medicinal and other physiological benefits that extend beyond nutrition (e.g., antimicrobial effects) (Rivera, Bocanegra-García and Monge 2010). Yet, regional knowledge on the harvesting, preparation, and consumption of these greens and other similar traditional foods is rapidly declining (Bharucha and Pretty 2010; Flyman and Afolayan 2006; Grivetti and Ogle 2000; Łuczaj 2010; Nebel, et al. 2006).

In this paper, we explore how the economic and social features of the dominant food system (DFS) contribute to the diminishing knowledge and consumption of wild greens by a particular population of Latinxs: those living in Tucson, AZ, United States (U.S.). We ask: In what ways, if at all, does the DFS (e.g., mass production, global supply chains and distribution) influence the knowledge and consumption of wild greens by Latinxs living in Tucson, AZ? Our focus is on three specific wild greens, all of which naturally grow and thrive in Tucson and the surrounding Southern AZ region: amaranth (*Amaranthus* spp.), lambsquarters (*Chenopodium* spp.), and purslane (*Portulaca oleracea*). We are careful to note that common English names are regionally specific. For example, lambsquarters and amaranth are called wild spinach or pigweed in some regions. Regardless, these greens are known to be consumed as traditional foods by many of the indigenous cultures living in Latin America (Salmón 1999; Vieyra-

Odilon and Vibrans 2001), as well as by Latinxs living in the U.S. (Minnis 1991; Nebel et al. 2006; Shackleton et al. 1998; Salmón 1999; Vieyra-Odilon and Vibrans 2001).

Our findings reveal a pattern of decline in the knowledge and purposeful consumption of the three wild greens by Latinxs living in Tucson. The following three overlapping themes frame this pattern in the broader context of the DFS: generational awareness, consumer demand and scarcity, and accessibility. The first theme suggests that the awareness and purposeful consumption of wild greens generally decline from one generation of Latinxs living in Tucson to the next. The second theme points to how relatively modest consumer demand in Tucson for the wild greens largely prohibits the production and distribution of such traditional produce within the DFS, which in turn leads to product scarcity. The third theme identifies and illustrates eight primary barriers that limit the overall accessibility of the wild greens by Latinxs living in Tucson. These barriers center on organizational and systemic controls, rather than on more individualized characteristics such as gustatory taste preferences and monetary price tolerance. The three themes are analyzed using the theories of rationalization (Kivisto 2011; Ritzer 1983; Romero-Gwynn et al. 1992) and human agency (Bandura 2006; Emirbayer and Mische 1998; Locke 1978; Lukes 1973). Future research is recommended on the rationalization effects of the DFS on human agency and traditional food consumption to include greater variation in locales/regions, traditional food types, and ethnic backgrounds. Additionally, community- and market-based applications of the findings (e.g., integration of wild greens in community gardens and urban crops; increased presence of wild greens in local and alternative market spaces) are provided.

1.1 Setting.

Tucson, AZ, was identified as an appropriate and important setting in which to conduct our study based on its rich and diverse food tradition, it having a deep agricultural history, and the natural occurrence and perseverance of wild greens within it and the surrounding region. The city is located on the eastern edge of the Sonoran Desert some 60 miles north of the U.S.-Mexico (MX) border and is home to just under 527,000 residents, 41.6% of who identify as Latinx (United States Census Bureau 2014). Tucson celebrates a rich and diverse food tradition as evidenced by it being designated in 2015 as the only City of Gastronomy in North America by the UNESCO Creative Cities Network (City of Tucson 2016).

Tucson and the 1,000 square-mile basin that encompasses it also has a deep agricultural history. Specifically, archeological remains of ancient irrigation canals built in the Late Archaic period (~4,000 years ago) have been found stemming out from the Gila, Salt, and Santa Cruz Rivers, all of which used to flow through the region (Diehl 1997; Fish and Fish 1992). These irrigation systems were used to support a wide range of traditional crops that included among others agave, cacti, cucurbits and beans, maize, and the three previously identified wild greens (Boyce and Swinburn 1993; Diehl 1997; Huckleberry and Rittenour 2014). The modern agricultural landscape of the Tucson basin began in the 1600's when Spanish Jesuits introduced cattle and a variety of non-native crops ranging from fruit trees to wheat. While the livestock and new crops were initially harvested in conjunction with native crops, over time they came to dominate the diets of the indigenous inhabitants of the region (Pima and Tohono O'odham peoples) (Doelle 1984). Presently, industrialized agriculture remains a vital component of the Tucson economy and, more broadly, the Southern AZ region. In 2012, for example, farmers and ranchers contributed \$261,943,000 in sales to the Southern AZ economy (Rice 2014).

Concurrently, a number of traditional greens, including amaranth, lambsquarters, and purslane, continue to grow wild in the Tucson basin (Huckell and Toll 2004).

2. Literature Review

The overall consumption of vegetables, including wild greens, is declining among Latinx populations in the U.S. (Ayala, Baquero, and Klinger 2008). This downward trend has been partially associated with dietary acculturation, which is a process that involves marginalized groups and under-represented populations altering, whether intentionally or unintentionally, their diets to better match that of the dominant culture (Romero-Gwynn et al. 1992). Specific to our current study, Latinxs generally consume less traditional and more industrialized foods (e.g., processed items) the longer they live in the U.S. (Perez-Escamilla and Putnik 2007). Moreover, this pattern of dietary acculturation has been linked to gradual declines in the overall health and well-being of Latinxs living in the U.S. (Lara, et al. 2005; Perez-Escamilla and Putnik 2007).

Wild greens are important components of local and regional food traditions (Łuczaj 2010). These greens are referred to in various literatures as “edible wild species” (Bianco, Santamaria, and Elia 1998), “edible wild plants” (Grivetti and Ogle 2000; Guil, Rodríguez-García, and Torija 1997), “wild vegetables” (Flyman and Afolayan 2006), “edible leaves” (Irvine 1956), “wild edible greens” (Nebel et al. 2006), “edible herbs” (Vieyra-Odilon and Vibrans 2001), “green leafy vegetables” (Gupta and Prakash 2009), “uncultivated edible plants” (Vazquez-Garcia 2008), “weeds” (Pieroni et al. 2002; Vieyra-Odilon and Vibrans 2001) and “weeds of agriculture” (Grivetti and Ogle 2000). Depending on the species, geographical location, and cultural context, wild greens can be eaten as common seasonal foods or as wartime and/or famine foods (Guil et al. 1997; Irvine 1956; Łuczaj 2010, Minnis 1991). In

other words, the perception and use of wild greens varies between cultures (Nebel et al. 2006). On one hand, for instance, the use of wild greens is associated with lower social standing in some Amazonia cultures (Bye, Jr. 2000). On the other hand, the consumption of the greens in regions such as the Toluca Valley, MX reflects higher social standing (Vieyra-Odilon and Vibrans 2001).

The overall consumption of wild greens as traditional foods has been diminishing at an increasing rate since the advent of industrialized agriculture and food production (Bharucha and Pretty 2010; Łuczaj 2010; MacNeish 1967; Pardo-de-Santayana et al. 2007). Potential reasons for such declines in consumption include a lack of access to wild plant resources due to changes in land use and development (e.g., large scale commercial agriculture subsuming small to midsized farmlands and rural landscapes) (Bharucha and Pretty 2010), colonialization and acculturation (Himmelgreen, Romero Daza, Cooper, and Martinez 2007; Minnis, 1991; Romero-Gwynn et al. 1992), and limited availability in conventional grocery stores (Pardo-de-Santayana et al. 2007). Additionally, the time required to independently harvest and prepare the greens deters consumption within industrialized societies that place high value on convenience and efficiency.

Contrary to the preceding patterns and trends, in regions of Latin America wild greens are still regularly grown and harvested on the edges of planned fields and intentionally cultivated when found growing naturally (Altieri, Anderson, and Merrick 1987; Bharucha and Pretty 2010; Coimbra et al. 2002; Vazquez-Garcia 2008; Welch et al. 2009). For example, traditional farmers in Tabasco, MX encourage the growth of certain wild species in their fields for a variety of purposes related to food production, crop resiliency, soil condition, ceremonial traditions, and medicinal needs (Altieri et al. 1987). Similarly, the Tarahumara

people in the Sierra Madre Occidental in Northern MX harvest wild greens during the spring and early summer to compensate for crop plants (e.g., maize, squash) that are not yet mature enough to eat and remain at risk for failure.

In Latin America, wild greens are collectively called *quelites*. *Quelite* is a Mexican-Spanish word derived from the Nahuatl language *quilitl* meaning any edible wild green (Vieyra-Odilon and Vibrans 2001). Although it is a broad term, it is also used specifically to talk about lambsquarters and amaranth greens, two common wild greens that are similar in taste and form and used interchangeably. Although purslane is also a *quelite*, we use the more specific Mexican-Spanish word *verdolagas* to differentiate it from the two distinctly different greens.

3. Conceptual Framework

Constructs drawn from the theories of rationalization and human agency guide our study. First, Weber's (1922) theory of rationalization is used to explore how wild greens are positioned and treated in the DFS. This classical sociological theory is particularly relevant to our study given the emphasis it places on the various forms of control (bureaucratic, economic, environmental, governmental, political, social) that bring calculability, efficiency, and productivity to mass production and consumption. Such assertions of control remain vital to the 21st century economy (Collier 2006), and more specifically, to the promotion of large-scale agriculture and the marginalization of small-scale agriculture and associated practices (e.g., traditional food consumption) (Thompson and Coskuner-Balli 2007). Accordingly, the specific effects of rationalization and the underlying control over food traditions that exist outside of the mainstream warrant continued scholarly attention.

Second, the theoretical notion of human agency (e.g., Bandura 2006; Emirbayer and Mische 1998; Locke 1978; Lukes 1973) guides our exploration of how Latinxs make meaning of and respond to the three wild greens within the context of a highly rationalized DFS. In particular, we explore how, if at all, the DFS is influencing the agency of Latinxs living in Tucson as evidenced by their consumption of the wild greens. Agency recognized through the self-awareness, self-determination, and intentionality of the participants specific to their consumption of the wild greens within in a rationalized environment that favors mass production and consumption over individualism and tradition.

3.1. Rationalization Theory

According to Weber (1922), rationality represents an overarching strategy that encourages and rewards efficiency, calculation, and control within and between the cultural, economic, political, and social environments that shape the modern, post-industrial human condition. The pervasive, ongoing enactment of such strategy at the organizational and systemic levels within and between capitalist societies has created an “iron cage” that is marked by economic and societal homogenization and the lack of individual freedom and choice (Kivisto 2011; Romero-Gwynn et al. 1992). The DFS, which is industrial in nature and global in scale (Fugile, Wang, and Ball 2012; Murray 2001; Phillips 2006), is a direct representation of such rationalization (Ritzer 1983; Thompson and Coskuner-Balli 2007).

The metaphorical cage that develops through rationalization is constructed and sustained through the bureaucratic assertion of economic, environmental, governmental, political, social, and technological controls (Ritzer 1983). Such controls are organizationally and systemically asserted to minimize uncertainties and variabilities and optimize performance and output. The enactment of rationalization strategy is recognized through calculability,

efficiency, and predictability. In the context of the DFS, calculability determines productivity as evidenced by profit-oriented measures such as the number of food items produced and sold. Consequently, the more subjective and diverse outcomes that are often associated with traditional food production and consumption (e.g., environmental impact of traditional food of individual and family well-being, community development) are likely to be devalued. Efficiency prioritizes the rapid and mass production and consumption of food items over the more deliberate and localized production and consumption of traditional foods. Relatedly, predictability is tied to the capacity to replicate the efficient production and mass distribution of food products regardless of location. Localized variations in production and consumption make traditional foods relatively unpredictable in an economic sense and thereby incongruent with the priorities of the DFS. In this study, we turn to rationalized control and the underlying concepts of calculability, efficiency, and predictability to more clearly understand the position of traditional food in the broader context of the highly rationalized DFS.

3.2. Human Agency.

Philosophers consider human agency to be the capacity of individuals to make rational choices freely and independently (Locke 1978; Lukes 1973). In human cognitive theory, agency refers to the intentional influence one has over their individual life actions, decisions, and circumstances (Emirbayer and Mische 1998). Agency also implies the ability and willingness of individuals to be aware of, responsible for, and responsive to their own thoughts and actions (Bandura 2006). In sociological terms, agency is the ability of individuals to willfully participate in activities that are specific to their self-determined needs, circumstances, and goals (Emirbayer and Mische 1998). Regardless of disciplinary perspective, human agency is expressed through self-awareness, self-determination, and intentionality. These expressions

help guide our exploration of the agency of Latinxs living in Tucson, AZ specific to their knowledge and consumption of the three wild greens within the broader context of the highly rationalized DFS (Beardsworth and Keil 2002; Perez-Escamilla and Putnik 2007).

The meaning and significance that Latinxs living in Tucson apply to the wild greens (i.e., self-awareness), as well as the actions they take to access and consume these traditional foods (i.e., self-determination, intentionality) is illustrative of their agency within the DFS (Bandura 1989; Marshall 2000; Terosky, Campbell, and O'Meara 2014). Specifically, the meaning these individuals develop and apply to wild greens is an indication of their experiences and perspectives relative to both their Latinx food traditions and the surrounding DFS. This insight is consistent with existing perspectives that argue individual agency is expressed through the construction and maintenance of cultural meaning, traditions, and identities via food consumption (Fischler 1988; Long 2001, 2015). Likewise, the self-determination and intentionality of Latinxs living in Tucson to consume the wild greens despite the barriers and limitations posed by the DFS is equally indicative of agency. Lastly, we remain attentive throughout our analysis to the understanding that individuals are likely to express agency differently across organizational and social environments (Terosky et al. 2014). For example, a Latinx may embrace and resolutely pursue a traditional diet that includes wild greens at home, but acquiesce to mainstream foods when eating in public settings.

4. Methods

4.1. Study Design

We conducted this study using a qualitative, single case study design. The previously described historical, social-cultural and economic intersections between agriculture, food, and the Latinx community that exist in Tucson led us to select the city as our case site. By bounding our

exploration to a single site, we are able to develop a richer, deeper understanding of how the highly rationalized DFS influences the agency of Latinxs as expressed through their knowledge and consumption of wild greens (Creswell 2009; Yin 2014).

4.2. Sample Selection

Latinxs living in Tucson, AZ were selected as the focus of our study for three reasons. First, there is a deep cultural connection between Latinxs and wild green consumption (Minnis 1991; Salmón 1999; Vieyra-Odilon and Vibrans 2001). Second, the adoption of mainstream diets that are promoted by the DFS has been negatively associated with the health and well-being of Latinxs (Lara, et al. 2005; Perez-Escamilla and Putnik 2007). Third, the high concentration of Latinxs living in Tucson allowed us to explore patterns of wild green knowledge and consumption across multiple generations.

The participants in our study were selected purposefully using theoretical-based and chain sampling strategies. Theoretical-based sampling allows researchers to develop a sample composed of participants that are directly reflective of the principles and concepts that guide a particular study (Onwuegbuzie and Leech 2007). Using this strategy, we first identified public retail spaces in Tucson where Latinxs are likely to purchase their food. These locations included a conventional supermarket located in a predominantly Latinx neighborhood, two *carnicerías* (Mexican butcher shops), a corner store/*tortilleria* (tortilla bakery), and a farmers' market operated in a predominantly Latinx neighborhood by the Community Food Bank of Southern Arizona (CFBSA). Within these public market spaces, prospective participants (both consumers and food purveyors) were provided with a brief description of the study. Only those individuals that self-identified as Latinx and expressed an interest in participating in our study were interviewed. Chain sampling was then used to expand the size and depth of the sample.

Chain sampling involves participants providing referrals to other prospective participants that reflect the demographical and/or theoretical parameters of a study and are thus likely to hold perspectives and experiences relevant to the phenomenon of interest (Creswell 2009).

The sampling strategies just described were pursued until saturation was reached (Glaser and Strauss 1967). Our final sample includes 24 participants. Among these 24 participants are 19 consumers, two supermarket produce managers, two *carnicería* owners/managers, and the owner of a corner store/tortilleria. Figure One illustrates in greater detail the composition of the sample, which includes representation of four generations of Latinxs living in Tucson, AZ and nine distinct heritages within the broader Latinx ethnicity.

Figure 1. Participant by age, generation in the U.S., and heritage

Name	Age	Generation in the U.S.	Heritage
Alegria	1	Third	Mexican American (Sonora)
Alejandra	3	Second	Mexican American (Sonora)
Alonso	5	First	El Salvadorian
Armando	2	Second	Mexican American (Sonora)
Bea	3	First	Mexican American (Sonora)
Elena	3	Second	Mexican American (Sinaloa)
Emilio	2	Second	Chicano (Mexico City) *
Emily	3	Third	Mexican American (Sonora)
Gabi	3	Fourth	Mexican American/Italian
Gloria	2	Third	Mexican American (Sonora)
Griselda Sr.	5	First	Mexican American (Sonora)
John	4	Third	Mexican American
Juan	2	First	Mexican American (Guadalajara)
Lea	3	First	Mexican American (Mexico City)
Leo	2	N/A	Mexican/New Mexican
Linda	2	First	Mexican (Sonora)
Lupe	5	First	El Salvadorian
Maria	3	First	Mexican American (Sonora)
Neomi	6	Third	Mexican American (Sonora)
Patrick	4	Fourth	Mexican American (Sonora)
Peter	4	Fourth	American (Mexican Indian)**
Raul	4	First	Mexican American (Sonora)
Tiana	2	First	Mexican American (Sonora)
Victor	2	First	Mexican American (Sonora)

1= (15-20 years of age); 2= (20-35 years of age); 3= (35-50 years of age); 4= (50-65 years of age); 5= (65-75 years of age); 6= (75-85 years of age)

*Self-Identified as Chicano and stated that Chicano was more indigenous than Latinx

** Self-Identified as American with Mexican Indian (Tarahumara) roots

4.3. Data Collection

The primary sources of data were individual, semi-structured interviews with each of the 24 participants. The interview protocol was formulated using the previously outlined theoretical constructs of rationalization and human agency (Bandura 2006; Emirbayer and Mische 1998; Locke 1978; Lukes 1973; Ritzer 1983; Weber 1922). Specifically, the protocol included questions designed to reveal participants' knowledge of, interest in, and consumption of the three wild greens, as well as the conditions and strategies that influence the availability of these foods within the three market settings (i.e., conventional supermarket, carnicerías, tortillería). Interviews were conducted in either English or Spanish depending on the preference of each participant. The interviews, which lasted between 30 and 75 minutes, were audio recorded and later transcribed in preparation for analysis. Secondarily, the shopping patterns and food choices of Latinx consumers were captured during ~23 hours of naturalistic observations within each of the market settings (Maxwell 2013). Observations were recorded as hand written field notes, which were later summarized for analysis.

4.4. Data Analysis

The data were deductively and inductively analyzed. Deductively, an initial round of idiographic analysis (Gelo, Braakmann, and Benetka 2008) was performed using a structured coding framework composed of the previously identified rationalization and human agency constructs (Miles and Huberman 1994). This initial analysis revealed preliminary insights within individual transcripts and field note summaries. Next, the preliminary insights were

synthesized through several iterative rounds of nomothetic analysis (Gelo et al. 2008) to reveal and narrow sample-wide trends and patterns of the agency the participants express relevant to the knowledge and consumption of the three wild greens within the broader context of the DFS. Inductively, the data were analyzed outside of the structured framework using an open coding strategy (Locke 2001). Inductive analysis provided us with the opportunity to discover any relevant themes or patterns not directly reflective the conceptual framework, but nonetheless relevant to our research question.

4.5. Trustworthiness

Five steps were taken to enhance the trustworthiness of our findings. First, credibility was established through the triangulation of data gathered from multiple sources (Berg and Lane 2014; Lincoln and Guba 1985). Second, summaries of each interview were sent to the corresponding participants with the request for confirmation of and clarification on the insights captured from the data. Eighteen of the 24 participants responded with some level of feedback to these member checks (Creswell 2009). No participants requested that their interviews be removed from the dataset. Third, we conducted multiple rounds of individual and collective analysis to identify and further develop the consistencies in our findings, as well as to account for any inconsistencies. Fourth, we engaged in theory triangulation (Lincoln and Guba 1985) when turning to the theoretical constructs of rationalization and human agency to interpret the data. Lastly, we present the case with thick description in order to enhance its transferability.

5. Findings

Data analysis reveals a general pattern that indicates the knowledge and consumption of wild greens drops from one generation of Latinx consumers in Tucson to the next. Three overlapping themes emerge from the data that help describe this pattern in the broader context

of the DFS. The three themes, each which are articulated next, are: generational awareness, consumer demand and scarcity, and accessibility.

5.1. Generational Awareness

The first theme is specific to generational awareness. In particular, first-generation participants indicate being more likely to consume wild greens than those participants who were born in the U.S. Conversely, 20% of the participants, all of whom are at least second-generation Latinxs, report having never tried any of the three wild greens. A comparison between the comments shared by Griselda, a first-generation Latina consumer, and her granddaughter, Gloria, a third-generation Latina consumer, help contextualize such generational differences. When reminiscing about the harvesting of the greens in MX, Griselda states,

Well, the old people eat the *verdolagas*. In Mexico you will see, it is beautiful, between Nogales and Magdalena there is a big river and you see the *verdolagas*-green, green. I remember my husband washing the *verdolagas* and putting [them] in the bags and putting in the freezer.

Gloria's associates the greens with her grandparents when saying,

So, there's a lot of foods that you hardly ever hear about anymore because the *nanas* and *tatas* are no longer around to keep it going, or the moms and dads never learned to do it. It's funny because my grandmother still makes a lot of that stuff, and she'll make it sometimes just for her, like when my grandfather was alive she made a lot of things that I'd be like, "what is that?", you know, and she'd say, "Oh, I used to make this. They call it poor people's food."

The generational variation in the knowledge of and appreciation for wild green consumption expressed by Griselda and Gloria is representative of similar perspectives shared by other study participants. For example, Armando, a second-generation Latino who works as a produce manager in a conventional supermarket, states, "I don't know. My parents never did [consume wild greens], so I don't". Similarly, Peter, a fourth-generation Latino consumer, says, "I would

eat other meals, but not that. I would eat the beans, but if she [grandmother] put the *verdolagas* in there or the *quelites*, I wouldn't eat it. We were just more Americanized, I guess.”

The aforesaid perspectives and experiences suggest that the self-awareness, self-determination, and intentionality of wild green consumption declines from one generation to the next among Latinxs living in Tucson. As outlined earlier in the paper, self-awareness, self-determination, and intentionality are three hallmarks of human agency (Bandura 2006; Emirbayer and Mische 1998; Locke 1978; Lukes 1973). Accordingly, the agency of the study participants as expressed through their knowledge and consumption of the wild greens successively diminishes across generations.

5.2. Consumer Demand and Scarcity

The second theme underpinning the general decline in the knowledge and consumption of the wild greens by Latinxs in Tucson is specific to consumer demand and scarcity. Regardless of generation, a majority of the study participants (67%) expressed some level of interest in including one or more of the three greens in their diets. Moreover, only two of the study participants who have tried the wild greens indicate that they do not eat them because of gustatory taste. Yet, the overall consumer demand for the wild greens is not at a level that economically incents the technological adaptations (e.g., genetic modifications) and process innovations required for mass production and distribution within the DFS, which regardless may not be ecologically and/or socially desirable. Hence, the greens are not able to meet the standards of calculability, predictability, and control that are required within the highly rationalized DFS. Consequently, few conventional grocery stores carry the greens and those that do are pressured to sell them on the day of arrival. Armando, the second-generation Latino who works as a produce manager in a conventional supermarket, describes his concerns over

the shelf life of the *verdolagas* when stating, “Yeah, they don’t last long. See, we got those in today [*verdolagas*] and I’ll put them out today, and tomorrow they’ll be brown, you know, they’ll be dry.”

Low consumer demand and the subsequent absence of the wild greens in conventional supermarkets have led a number of the study participants to integrate mainstream alternatives into their diets. For instance, Juan, a first-generation Latino consumer, says, “It’s [*verdolagas*] not something that’s often seen in stores because it was so bottom tier that it’s like, well, we have spinach now.” Emily, a third-generation Latina consumer, reflects a point of view similar to Juan’s when stating,

I haven’t eaten *verdolagas* in a long time because I can’t find them. I know the [conventional market] has them sometimes when they’re in season. I’ve seen them there, in fact, I’ve bought them there, but I’m [now] not used to seeing them.”

Emily goes on to indicate that she now uses mainstream produce alternatives (e.g., cilantro, spinach) to the point that she no longer looks for the wild greens even on a seasonal basis. In short, relatively low consumer demand makes it very difficult, if not often impossible, to purchase the wild greens within conventional retail spaces. In turn, this scarcity further threatens the participants’ knowledge and consumption of the wild greens.

5.3. Accessibility

The third theme revealed through our analysis is accessibility to the wild greens, both within and outside of the DFS. Unfortunately, more than half of the study participants with an expressed interest in wild greens (56%) report being unable to procure the plants for themselves in Tucson. Figure 2 outlines the eight factors that the participants identify as the primary procurement barriers. These barriers indicate accessibility to the wild greens is being compromised by a complex mix of participant perspectives and experiences that are being

subtly and gradually influenced by the highly rationalized DFS. We specifically note that monetary price is *not* a barrier to access.

Figure 2. Barriers to procuring wild greens

Barrier	Examples	# of Participants
Afraid to pick them in the city due to chemical runoff	"They don't eat them as much as they used to, just because the soil's not as clean now and they can't eat them." -- Armando	2
Quality of greens lacking in store bought variety	"I think it is better if you pick your own and it is really fresh. Over here (U.S.) it is days old and there (Sonora, Mexico) on a daily basis they get new vegetables." --Lea	5
Not knowing where to find them	"...you can hardly get them. It is hard to find them." --Lea	4
Herbicide use	"I honestly think it was Roundup. I think the runoff from other people's lawns. I've had roommates who have put it on my lawn." --Emily	2
Stigma--greens as weeds or "poor people's food"	"My mom didn't use them (wild greens) as much, maybe because she thought--and I'm just saying this, not that she's ever said anything, only poor people do that." --Gabi	7
Time constraints	"I find tacos aren't too bad, ground beef tacos. Other than that, I don't eat a lot of greens. That's probably all I have time for to be honest with you." --Patrick	4
Fear of regulations/laws	"Well, we're not allowed to take the plants out, the state won't let us." --Elena	3
Not sure how to use them/ recipes not written down	"I can honestly say that there's people in my age group whose parents were	4

	<p>probably familiar with those types of foods (wild greens), but they didn't learn how to cook them and don't know how to share them and just don't integrate them into their daily eating." –Alejandra</p>	
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One primary feature of the DFS that contributes to the preceding eight barriers is bureaucratic control, which Weber (1922) argues is a core attribute of rationalization and the resulting metaphorical “iron cage” that frames industrialized economies and societies (Kivisto 2011). More specifically, the consistency, efficiency, and productivity that is the foundation of industrialized economies and society is largely dependent on the organizational and systemic capacity to control mass production and consumption. Control increases predictability and growth, and decreases uncertainty and loss. More specific to our study, control over the DFS is gained and sustained through economic strategy, environmental manipulation, government interventions, and public policy making. This control and subsequent rationalization has come in part at the expense of participant access to the wild greens. For instance, government restrictions (real or perceived) on the transportation of vegetables across the U.S./MX border, as well as on the picking of wild plants in public spaces reduce consumer access to the wild greens. For example, Linda, a first-generation Latina consumer, explains why she eats the greens only when in MX when saying, “Just when I go to MX to see my parents, because they don’t bring that kind of stuff here. You cannot cross the border with vegetables.” Similarly, other participants describe not picking the greens that grow wild along the dry river beds that run through Tucson, as well as in other public spaces located within the city (e.g., parks), out of fear of the potential legal consequences of being seen doing so. In short, bureaucratic controls

and, more generally, formal rationality erodes the self-determination and intentionality of the participants to include the wild greens in their diets.

The importance of control within a rationalized society extends beyond economic, governmental, and societal structures to include environmental manipulation. For instance, Emily, a third-generation Latina consumer, says,

I eat them [wild greens] when they're growing in my lawn, and I haven't seen them in years, I would say it's been about four years since I've seen them growing wild. They grew in the yard, they grew on the street, they grew everywhere. You could get them anytime they were in season, just pull over and pick them off the ground. I've been looking for them and I can't find them... I honestly think it was Roundup. I think the runoff from other people's lawns. I've had roommates who have put it on my lawn.

Emily's comments provide further indication of how rationalized activities that are aimed at control, in this case the use of pesticides to eradicate edible plants that grow wild within planned landscapes, limit the accessibility of the wild greens in Tucson.

The rationalization of the DFS and the prominence and appeal of efficient and calculated access to mainstream foods can, at least in part, supersede one's own values and preferences. Raul provides a particularly compelling example of this finding. He first says,

It's important to me that my kids tell me they walked by a place and they thought of me, and they ate a food and they thought of me or they smelled a smell and they thought of me.

But, when asked about the wild greens that he ate growing up and why he doesn't continue to eat them, Raul responds,

Well, I don't crave them, and the recipes got away, when we started putting worse ingredients in our food we made our food worse not better. In the beans, instead of putting *verdolagas*, we started putting chorizo or cheese in them. They taste great, but I don't think they're as good for you... You know, the food that our parents made us—we can afford hamburgers now, we can afford pizza, you go and dine out and all this other stuff, versus they were thrifty and smart and they ate off the land more because it was more necessary.

The limited accessibility of the wild greens within the DFS also contributes to a subtle, but influential stigma that further threatens the agency of the participants. Alejandra, a second-generation Latina consumer, depicts the stigma when describing the city's demolition of a large part of the historic barrio district to make room for a large convention center in the 1960's. She states,

When the City of Tucson had the representatives coming over and trying to talk these people out of their homes, to buy their homes from them and say, "Oh, you're living in blight. Look at all those weeds that are growing in your yard", which was food. So, there's a lot of that interplay that's still instilled in our cultural psyche, and I think that it's there and you can't get away from it. I think as people become educated and realize, wait a minute, they were trying to whitewash us and impose their values that it's better to go buy packaged food because only poor people grow their own food.

The systemic stigma described by Alejandra has not yet, however, fully dissuaded the study participants from at least appreciating, if not seeking out, the wild greens. For instance, Gabi, a fourth-generation Latina consumer, expresses a determination to continue to include traditional foods, such as the greens, in her and her family's diet. She explains,

When the topic of *verdolagas* came up I remembered my grandmother making them and thinking why is she feeding us weeds...And, then growing up I had *verdolagas*, purslane, growing in my yard and I would think, I know what that is, that's not a weed, and I would cook it for my family. And they would see me picking it in the front yard and say, why are you feeding us weeds? And I would say, it's not really a weed, it's a green, just try it.

Juan, a first-generation Latino consumer, goes further to suggest scarcity may actually be helping to de-stigmatize the greens by turning these traditional foods into more of a delicacy than a shameful remnant of past diets. He says,

That's how we see the *verdolagas*, as a treat, not something like, oh, God, I have to eat *verdolagas* again because it's the only thing that's in the fridge. It's like, oh, I get to eat *verdolagas* because they're in season. That's fun, that's exciting—I guess you don't consider it anymore as poor people's food.

The accessibility of the wild greens, and even more so other types of traditional foods, does increase within alternative and more localized retail market spaces. In particular, the CFBSA farmers' market serves as a relatively reliable, but seasonally dependent outlet for the greens and other traditional foods (i.e., *nopales*, which are the pads of prickly pear cactus). The *carnicerías* (Mexican butcher shops) and corner store/*tortillería* also provide Latinx consumers with access to traditional foods that are not readily available at conventional supermarkets. For example, the *carnicerías* carry a Mexican cheese that is not offered elsewhere, but is a main ingredient in a dish common to the Sonoran region of MX known as *caldo de queso*. The corner store/*tortillería* also produces and sells a popular salsa made from the native chiltepin pepper, which is not readily available in conventional supermarkets. Despite stocking such traditional foods, neither the corner store/*tortillería* nor the *carnicerías* carry any of the three wild greens.

6. Discussion and Conclusion

As we described at the onset of this paper, Tucson and the surrounding basin has an extensive agricultural history that stretches from the oldest known indigenous crop production activities in North America beginning some 4,000 years ago (Diehl 1997; Fish and Fish 1992) to its extensive, present-day industrialized agricultural economy (Rice 2014). Furthermore, the city, which is home to nearly 220,000 individuals who identify as Latinx, celebrates a deep and diverse food tradition as illustrated in part by being named the first and only UNESCO City of Gastronomy in North America (City of Tucson 2016). Despite such regional diversity and richness in food production and consumption, the three wild greens, which naturally grow and thrive in the Southwestern U.S., are scarcely found within and around Tucson. Our findings indicate that this scarcity, which begins with the wild greens not meeting the required consumer

demand and production efficiencies of the highly rationalized DFS, underpins a complex economic and socio-cultural dynamic that ultimately threatens the agency of Latinx consumers living in Tucson. Next, we use our findings to further purpose how rationalization (and especially bureaucratic control) in the DFS contributes to the scarcity and subsequent declines in the knowledge and consumption of traditional foods within and across marginalized communities and underrepresented populations (Franzen and Smith 2009; Phillips 2006; Pingali 2006).

Our case analysis has shown that the barriers constraining access to traditional foods extend beyond the most obvious effects of product scarcity in the DFS. In other words, declines in knowledge and consumption are not due only to the absence of traditional foods on store shelves. Instead, we have uncovered that behind these declines is a subtler, more gradual dynamic. Recall that we found no indication that price limitations prevent the study participants from purchasing the wild greens on the limited occasions when these traditional foods are available in conventional grocery stores. We also uncovered no evidence to suggest that gustatory taste preferences dissuade participant consumption of the wild greens. We did, however, observe a clear erosion in the awareness and understanding of how to grow and/or prepare the wild greens from one generation to the next. This lack of awareness and understanding is being amplified as participants increasingly substitute the traditional wild greens with far more readily available conventional produce (e.g., cilantro, spinach). Returning to the notion of human agency, declines in awareness and understanding of the wild greens appear to be undermining the determination and intentionality of Latinxs living in Tucson to consume these traditional foods. This detrimental effect appears to be more insidious than overt. More specifically, our findings suggest product scarcity is permeating and deteriorating

the core of traditional diets rather than simply preventing convenient and predictable access to certain traditional foods.

The effects of the preceding erosion extend beyond participant knowledge of how to grow and prepare the greens. In particular, the participants are often unwilling to transport the greens from MX (where they grow much more freely and abundantly) to the U.S. or harvest the plants when found growing naturally in public spaces within Tucson out fear of suffering perceived (and potentially real) legal consequences. This finding further illustrates the complex and extensive influence and control of the DFS on traditional food consumption (Fuchs and Kalfagianni 2010).

Some of the participants also describe an unwillingness to consume the wild greens out of concern of the stigmas that may be attached to these traditional foods. This sense of stigmatization has also been observed with other traditional foods across a range of marginalized communities and underrepresented populations (Counihan 1992; Hough and Sosa 2015). Here, we have further illuminated how the control and characteristics of rationality that shape the DFS contribute to such stigmatization and subsequent loss of agency. One approach for countering perceived stigma that warrants consideration is the adoption of contemporary packaging strategies that balance relevancy and nutritional value with tradition. The effectiveness of these strategies, when responsibility managed to maintain the integrity of tradition, have been shown to be effective approaches to increasing traditional food consumption (Guerrero et al. 2009).

Interestingly, we also captured a perspective that suggests product scarcity may actually be promoting rather stigmatizing the wild greens. Specifically, one participant (Juan) suggested that scarcity may in some cases be helping elevate rather than threaten the image and appeal of

the wild greens. The promise of this possible outcome should be treated with caution in that increases in popularity and demand could result in the wild greens becoming cost-prohibitive to those who consider them to be traditional foods. In other words, with market trendiness comes the risk that traditional foods, such as the wild greens, will become gentrified within the DFS (Anguelovski 2015).

We encourage future research on the role of culturally significant, yet underutilized neighborhood assets (e.g., *bodegas/corner stores*, *carnicerías*, *tortillerías*) as distribution sites of traditional produce such as the wild greens we have featured here. More attention should also be directed at the effectiveness of farmers' markets and community-supported agriculture (CSA) programs as viable outlets for wild greens, as well as other traditional foods that are scarcely found within the DFS. This set of recommendations is consistent with Park et al.'s (2011) finding that alternative market spaces are more appealing traditional food outlets to marginalized and underrepresented consumers than are conventional grocery stores. Additionally, local and urban farmers should be further encouraged to more purposefully and consistently integrate traditional produce such as the wild greens into their crop rotations in order to better supply the aforesaid alternative market spaces.

Initiatives that equip and empower individuals to cultivate and harvest wild greens within their own neighborhoods and communities should also be more purposefully considered. Community gardens, common green areas (e.g., neighborhood parks), and other under-developed public spaces (e.g., vacant lots, sidewalk meridians, roadsides) all represent potential edible landscapes in which the highly durable wild greens could be grown (McLain et al 2012). Equally important, the promotion of the wild greens as community-based crops would likely enhance the self-awareness, self-determination, and intentionality of individuals and families;

all of which are hallmarks of human agency (Bandura 2006; Emirbayer and Mische 1998; Locke 1978; Lukes 1973). Active engagement in the cultivation of these crops would also encourage individuals to better understand and retain the meaning and value of wild greens as traditional foods regardless of the controls and pressures that are being imposed on them by the highly rationalized DFS (Kittler, Sucher, and Nahikian-Nelms 2012).

In closing, we have contributed to the understanding of how the DFS is supplanting the food traditions and overall agency of marginalized communities and underrepresented peoples (Franzen and Smith 2009; Phillips 2006; Pingali 2006). Specifically, we have illuminated and analyzed within the broader context of the DFS the gradual reduction of Latinx knowledge and consumption of three wild greens in Tucson, AZ. Such reduction in agency is likely to be more profound in other locales and regions that have less agricultural history and gastronomical vibrancy compared to Tucson and its surrounding region. Also, the loss of agency is likely to be greater relative to traditional foods that are less naturally occurring compared to the three wild greens that when left undisturbed grow freely in the Southwestern U.S. Relatedly, the close proximity of Tucson to MX (and thus Latin America) may help preserve some agency among the Latinxs living in this particular locale/region. Individuals who live in locales/regions that are further removed geographically from their ancestral lands are likely to be more vulnerable to the loss of agency and subsequent declines in the knowledge and consumption of their traditional foods. Accordingly, we encourage future research on the effects of the highly rationalized DFS on human agency and traditional food knowledge and consumption to include greater variety in terms of locales/regions, traditional food types, and ethnic backgrounds.

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