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## The Correlation and Awareness Level of Human Perspective on Environmental Conditions Through Viticulture, Specifically in the Location of Lincoln, Nebraska

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THE CORRELATION AND AWARENESS LEVEL OF HUMAN PERSPECTIVE ON  
ENVIRONMENTAL CONDITIONS THROUGH VITICULTURE, SPECIFICALLY IN THE  
LOCATION OF LINCOLN, NEBRASKA.

by

Weslyn Anne Ramaekers

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Thesis Advisor: Christine Haney Douglass

Thesis Reader: Leon Higley

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**Abstract:**

Our climate is ever changing, and rapidly at that. Yet, people seem to be more and more unaware and disconnected to our changing environment. This is where wine comes in, wine is a complex and concrete representation of each subtle ecosystem change that occurs in the environment. Therefore, the research question for this study is, can wine be used as a tool to raise individuals awareness levels about the environment? This study was conducted at three wineries in the location of Lincoln Nebraska, through implementation of a Google Forms survey. The survey consisted of a combination of categorical and quantitative environmentally wine focused questions. The key finding of this research study was that 99% of participants responded to wine being a tool that could raise awareness levels. It was concluded that wine and the process of viticulture can be used as a successful tool to raise individuals awareness level upon certain environmental factors that affect the product of wine.

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**Preface / Acknowledgments:**

I would like to thank each winery for allowing me to conduct my research at their property; James Arthur Vineyards, WunderRosa Winery and Deer Springs Winery. I would also like to thank my professor and director of the Environmental Studies Department, Dr. Dave Gosselin, my thesis advisor, Christine Haney Douglass for her support and my thesis reader, Leon Higley.

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**PREFACE (ACKNOWLEDGEMENTS)**

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## Introduction:

We are experiencing environmental climate change everyday “whether we like it or not” (Nicholas, 2015). The issue with this, is that there is an extreme disconnect between these environmental changes and society (Barry, 2009). However, there is a way to connect these two sensitive, yet vital issues. Wine and viticulture, the cultivation of grapevines (Cox, 2015) is a true, and concrete representation (Nicholas, 2015) of the earth and our changing ecosystem. Kimberly Nicholas states this excellently, “The wine industry is increasingly recognized as especially vulnerable to climate change due to the climate sensitivity of both winegrape yields and quality, making it an important model system for the agricultural impacts of global changes.” (Nicholas, 2012).

The disconnect between humans and the environment is explained well by Clayton Barry. Barry goes into several reason for what he calls the “society/environmental disconnect” (Barry 2009) such as; culture, religion, location, gender, age as well as sociological perspectives. Other examples he discusses such as; ecocentric versus anthropocentric perspectives and those view points towards the environment. Regardless of the reasons for this disconnection between human beings and nature, this lack of connection does exist.

In further explanation of wine, viticulture is the cultivation of grapevines (Cox, 2015). Viticulture represents the farming of grapes, and depends highly upon environmental factors that make a specific varietal of wine grape taste a specific way. To yield a specific taste in a desired wine, many environmental factors such as the soil type, precipitation, and amount of heat a grapes receives all play a role into how a certain wine will taste. Wine is a complex delicacy. It is

a product that enhances nature and does not tamper with it (MacNeil, 2001). It is a true product of the environment. Wine is a concrete and true representation of our changing climate (Nicholas, 2015). Wine displays itself as a delicacy because the flavors are complex, just as our ecosystem is complex. The palette, taste, and texture of wine all provide clear indications as to what varietal of grape the wine is derived from, what type of soil that grape is grown in (Cox, 2015), how much rainfall or water that grape may have received, or how much sunlight it absorbed (Sener, 2013). All of these environmental factors are aspects that go into one glass or bottle of wine.

Wine is highly environmental. If a grape vine is stressed in a “poor” rocky soil, as a result, the wine made from that grape vine will have a more tannic and full bodied flavor to it (MacNeil, Cox, 2001, 2015). Studies show that soil samples of a given grape varietal will have trace elements of zinc and magnesium and wine from grapes grown in these soils will also contain zinc and magnesium (Pohl, Mackenzie, 2007, 2005). This is proof that the soil has a direct correlation with the end product of wine. The same approach can be taken for moisture and heat applied to that grape. These are also the three environmental aspects I want to focus on the with this thesis.

There is a demand for environmentally “green” and friendly products today and specifically in the wine industry (Barber, Taylor, Deale & Strick, Flint & Golicic, 2009, 2010). In a study that Nelson Barber did on environmental purchase intention, he found that there is a heightened market for sustainable products, and more wineries are striving for a “green” approach in their farming methods. His results dealt with the demographics on how to best market to consumers in the wine tourism industry. Barber’s (Barber, 2009) methods are

beneficial to the field of study and therefore could potentially provide some indication for the future clientele of the wine industry.

Many people enjoy the social atmosphere and ambiance wine provides (Barber, 2010). In this study it is to be determined if this enjoyment that wine and the industry of viticulture provides, can be used as a tool to potentially connect and communicate environmental issues to people. Wine is viewed as a product of nature, and it has been this way for years (MacNeil, 2001). There are desirable traits with wine such as; being a product of fermentation, (Cox, 2015) which is a natural aging process and wine grapes are still harvested by hand. Cultures have revolved around wine for years, and there is a rich history with the art of wine (Kennedy, 2006). This history, location and climate that produces a certain wine, the terroir. These traits make wine desirable and an obvious tool to use in order to indicate the significance and relationship with the earth.

Using such an intricate product of the environment like wine, provides a tool to aid individuals in understanding that, just like wine, the environment is a complex delicate balance that needs to be taken care of. Grapes are tended to with care from the farmers. Some farmers prune more heavily on the side of the setting sun than the side of the rising sun, due to increased sunlight and temperature that a setting sun would produce (Cox, MacNeil, 2015, 2001). These grapes could possibly burn or get overly dry, this is why there is such care taken in every vine within a single vineyard. These details parallel how delicate our ecosystem is and what balance needs to remain in order for us to take care of our intricate earth. If individuals understand these aspects about grapes, and how the slightest imbalance can affect the composition of wine, then



maybe individuals will understand just how fragile our eco-system is, and how it should be treated with the same amount of care, thought and sustainability.

With this purpose in mind; to determine the correlation of human awareness on environmental issues through viticulture, my stated thesis question is; can wine and the process of viticulture be used as a tool to raise an individuals awareness level on environmental issues, those individuals currently being within Lincoln, Nebraska?

### **Materials and Methods:**

The research design and format was in the form of a survey entitled, “Environmental Awareness through means of Viticulture”, taken anonymously, using Google Forms through means of an Apple iPad Air 2. A consent letter was given to the participant in the beginning of the survey, where the individual had the option to partake in the survey. The survey had a combination of methods combined to receive successful results. The survey consisted of a total of six demographic questions. The demographic portion of the survey was chosen in the survey from prior successful research (Barber, 2009). Within the demographics there was one Likert scale question (Barber, 2010), this question asked, “How would you rate your depth of wine knowledge?”. There were five wine related questions, a combination of Categorical and Qualitative questions were designed into the survey due to prior successful research done with this methodology (Barber, 2010 & Polkinghorne 1989). After the wine related questions were answered by the participants there was an educational portion of the survey where the answers to each wine related question was given. Amongst the wine-related questions of the survey was a

combination of both categorical and qualitative questions, these questions were numbers 6 - 10.

The questions were related to specific environmental factors, such as; type of soil wine grows in, total precipitation a grape vine would receive, grape vines behavior in a warm moist weather condition versus a warm dry weather condition, and topography related to the grape vine.

In the survey, Environmental Awareness through means of Viticulture, quantitative data was received with the question related to type of soil wine grows in, total precipitation a grape vine would receive, grape vines behavior in a warm moist weather condition versus a warm dry weather condition, and topography related to the grape vine. Quantitative data is successful for gaining a knowledge base of human awareness or education levels for research methods (Polkinghorne, 1989), based upon this research quantitative methods to determine awareness level of the individual was used in this survey.

**Table for “Environmental Awareness through means of Viticulture” Survey Questions:**

Question asked:	Options for answer to question:
1.) Do you consider yourself to be aware of or concerned about the environment?	<ul style="list-style-type: none"> <li>- Yes</li> <li>- No</li> <li>- Indifferent</li> </ul>
2.) What is your age?	<ul style="list-style-type: none"> <li>- 21 - 30 years</li> <li>- 30 - 40 years</li> <li>- 40 - 60 years</li> <li>- Above 60</li> </ul>
3.) What is your gender?	<ul style="list-style-type: none"> <li>- Male</li> <li>- Female</li> </ul>
4.) Are you a native to Nebraska?	<ul style="list-style-type: none"> <li>- Yes</li> <li>- No</li> </ul>

Question asked:	Options for answer to question:
5.) How would you rate your depth of wine knowledge? (Barber, 2010)	<ul style="list-style-type: none"> <li>- Novice</li> <li>- Intermediate</li> <li>- Experienced</li> </ul>
6.) (Q1) Do you think that the quality of the soil has a direct affect upon the grape or flavor of wine? (Cox & Mondavi 1999, 2015)	<ul style="list-style-type: none"> <li>- Yes</li> <li>- No</li> </ul>
7.) (Q2) An abundance of water will produce: (Cox, 2015 & MacNeil, 2001)	<ul style="list-style-type: none"> <li>- a thicker skinned grape</li> <li>- a fuller fruit driven grape</li> <li>- both</li> <li>- none of the above</li> </ul>
8.) (Q3) Warm, moist weather late in the growing season has the potential to: (Cox, 2015 & MacNeil, 2001)	<ul style="list-style-type: none"> <li>- cause the grapes to ripen faster</li> <li>- develop a mold on the grape cluster</li> <li>- cause the grape to fall off of the vine</li> <li>- has no effect</li> </ul>
9.) (Q4) Vineyards in a warm, dry climate will produce: (Cox, 2015 & MacNeil, 2001 & Mackenzie, 2005)	<ul style="list-style-type: none"> <li>- deeper reaching roots</li> <li>- thicker skinned grapes</li> <li>- both</li> <li>- none of the above</li> </ul>
10.) (Q5) Vineyards grown on a hillside will develop: (Cox, 2015 & MacNeil, 2001)	<ul style="list-style-type: none"> <li>- dense cluster with smaller grapes</li> <li>- large cluster with bigger grapes</li> <li>- high sugar content in the the grapes</li> <li>- none of the above</li> </ul>

The “Table for “Environmental Awareness through means of Viticulture” Survey Questions:” above displays the questions asked to each participant and in the survey.

All of the answers to the environmental related questions were listed on the following page of the survey with educational graphics. After this page was the final categorical question that gauged if an awareness was gained by the educational portion of the survey. This question being; “Did this survey raise your awareness about how certain environmental factors effect the

flavors and composition of wine?”. For those individual who answered “no”, they were allowed to right a short response as to why the survey did not raise their awareness level.

All of the data collected was automatically transferred into Google Excel Spreadsheets, and statistically analyzed into Charts 1 and 2. Therefore data collected can be accurately analyzed. For my data to be analyzed, statistical methods of a “linear or multiple regression statistical model” (Steel & Torrie 1960) are used, which falls into the category of parametric statistics (Steel & Torrie 1960). Considering that in the data there will be a relationship between “multiple predictor variables and one continuous outcome” (Steel & Torrie, 1960), this is the most appropriate method. The multiple predictors are the self identified wine knowledge level (Steel & Torrie 1960). The relationship with those factors will determine the awareness level, being my continuous outcome.

The physical instrument used was an Apple iPad Air 2. The survey was conducted upon this touch screen computer. The participants of the survey easily handled instrument while taking the survey. The survey was under five minutes in length. The scores of this survey were converted into an excel spread sheet through Google Response, automatically. The precision of the data was accurately transferred into the excel document from Google forms. The data was not tampered with once transferred into the excel spreadsheets. The data was analyses to determine the overall outcome, being the awareness level of the participants. The reliability of this was dependent upon Google Forms to accurately transfer the data collected. After the data was received into Google responses, the education and awareness level of the environmental correlation with wine was determined, with the given responses received, based upon a statistical parametric approach.

In regards to confidentiality, all of the data collected was completely anonymous. The participant was not asked for his/her name, address or any personal contact information other than the demographics of age, gender and current location. The IRB Approval number: #20151115649 EX, and was granted on 11/16/2015, in order to maintain confidentiality and protection of the participants involved. The research was conducted at local wineries in the Lincoln, Nebraska area. The locations were James Arthur Vineyards, WunderRosa Winery, and Deer Springs Winery.

**Results:**

In reference to the research question for the field of study, can wine be used as a tool to raise an individuals awareness level upon the environment?, when the final question (“Did this survey raise your awareness level about how certain environmental factors affect the flavors and composition of wine?”), in the survey entitled “Environmental Awareness through means of Viticulture” was asked, 99% of participants answered “yes”.

Chart 1:

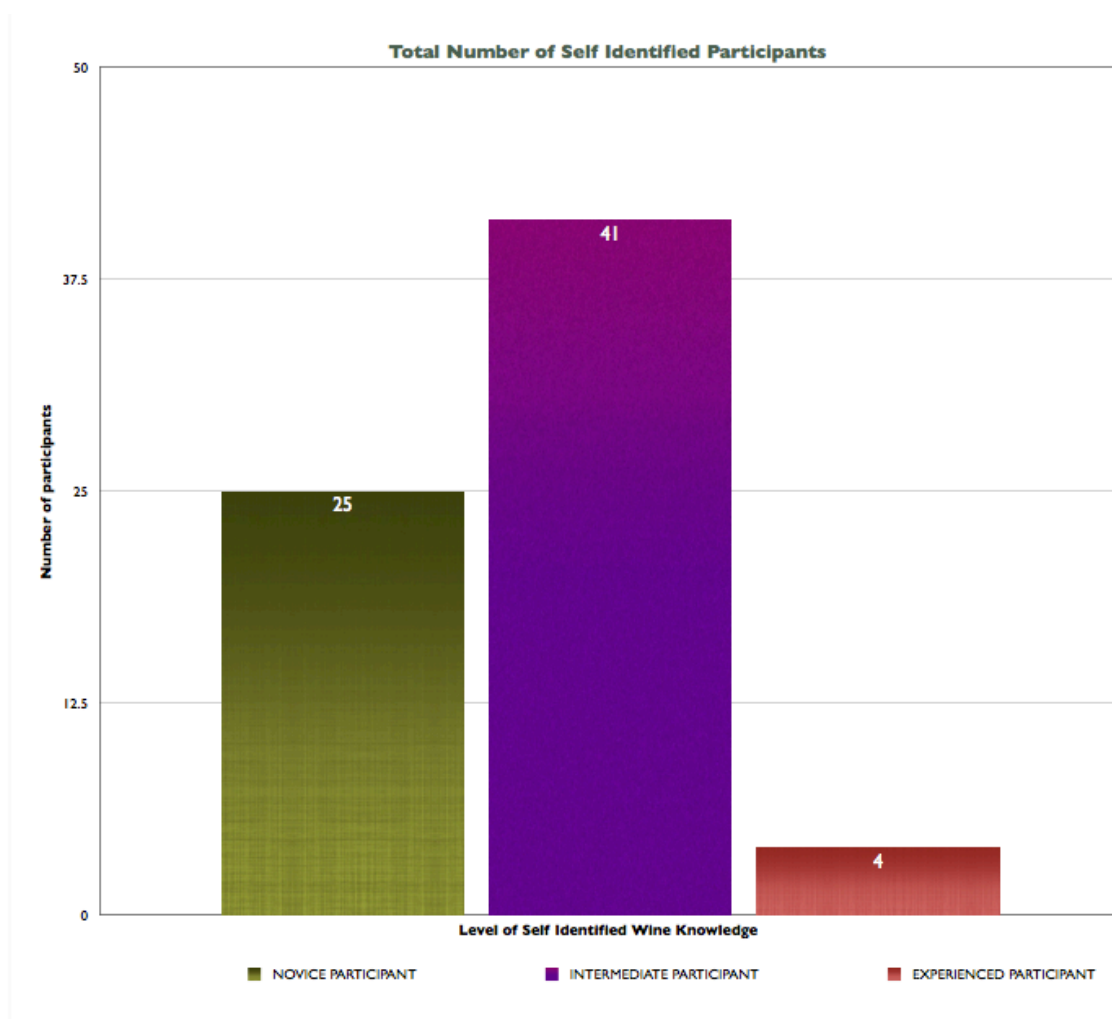


Chart 1 indicates the findings from the survey of the total number of self identified individuals that were novice, intermediate, or experienced in their depth of wine knowledge. Given these findings, there were a total of 70 participants ( $N = 70$ ) in the data collected.

Chart 2:

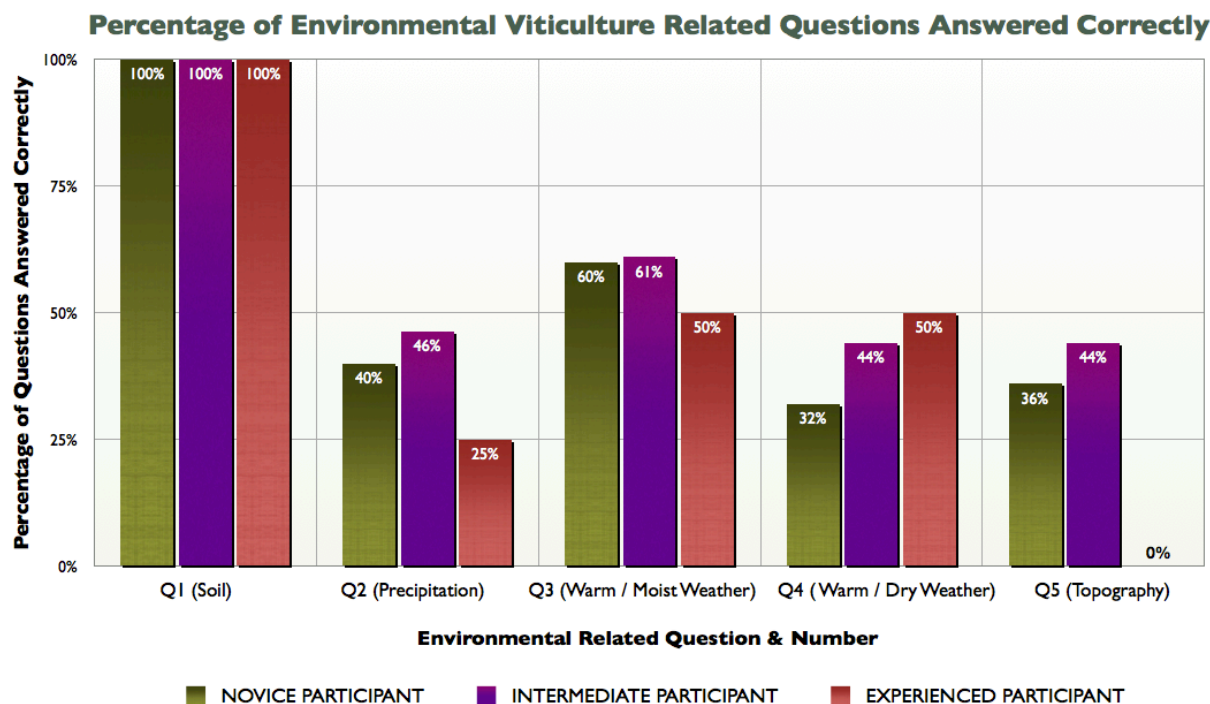


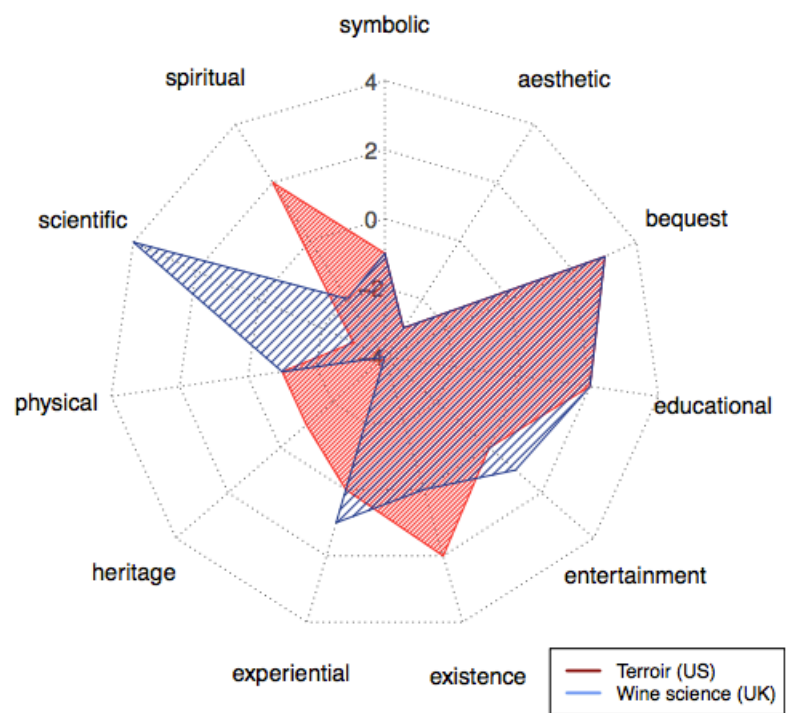
Chart 2 is representing the total percentage correct of each knowledge level of each environmental related question, these were the self reported participants in the survey. Each question (x-axis) is categorized into separate environmental factors that affect the development of a grape vine. Each question is represented by Q1 - Soil, Q2 - Precipitation, etc. The y-axis labels the percentage of questions answered correctly. Where the green color bar represents the novice self identified participant, the purple bar represents the intermediate self identified participant, the orange colored bar is representing the experienced self identified participant who partook in the survey.

## Discussion:

In regards to the research question; 99% of participants answered that the survey did raise their awareness levels on the environmental impacts of wine. This data was discovered by means of the final survey question.

The findings in chart 2 indicate that there is a variance in the knowledge level of each specific environmental factor between individuals. Prior research from Kimberly Nicholas (Nicholas) states that, “These results demonstrate that cultural values for the same ecosystems vary depending on location, history, and participants.”. This relates to the field of study in suggesting that a possible reason for the variance in knowledge on certain environmental factors are dependent upon cultural

values, as they were in Kimberley Nicholas's study. The figure to the right (Nicholas) displays Kimberly Nicholas's poster #29551 showing her graph based off of the study, “Individual and Shared Perspective Determine the cultural values of Terroir”. The



above data chart, indicates that each individual's perspective and experience towards wine varies upon culture and location. This data aids to the specific field of study in explaining the possible variance of knowledge in each environmental question.



**Summary and Conclusions:**

Based upon the data received from the Environmental Viticulture survey, 99% of individuals responded saying that the survey did raise their awareness level involving wine and the environment; it can be concluded that there is a strong association between an environmentally educational experience and wine. And therefore, based upon these findings the research question can be validated and interpreted that wine can be used as a tool to raise an individuals awareness levels on certain environmental factors.

However, there was an issue with the environmental question relating to soil (Q1). Considering the overwhelming majority answered it correctly, the methods would need to be reconsidered, this overwhelming accuracy in the specific soil survey question was an issue because Q1 stands as an outlier in statistical analyses resulting in skewed data. This one question did not provide an even representation in comparison to the other environmental questions. Statically, this skewed the data for all of the environmental wine related questions in the research.

For future research, this study opens the door to specify the depth of knowledge that was gained by an educational wine experience. This study proved that individuals were educated, but to what extent? Future studies could explore if the education of wine has the potential to be used as a tool for individuals to take action on their environmental education. A post interview conducted to study the overall retention of environmentally educational information and wine would be beneficial in means to discover the impact that this product of the earth could potentially have on the wine clientele.

## References:

- Barber, N., Taylor, C., & Strick, S. (2009). Wine consumers' environmental knowledge and attitudes: Influence on willingness to purchase. *International Journal of Wine Research*, 1(1), 59-72.
- Barber, N., Taylor, D. C., & Deale, C. S. (2010). Wine tourism, environmental concerns, and purchase intention. *Journal of Travel & Tourism Marketing*, 27(2), 146-165.
- Barry, C. (2009). The environment/society disconnect: An overview of a concept tetrad of environment. *The Journal of Environmental Education*, 41(2), 116-132.
- Cox, Jeff, and Tim Mondavi. *From Vines to Wines: The Complete Guide to Growing Grapes and Making Your Own Wine*. 5th ed. MA: Storey, 1999, 2015. Print.
- Flint, D. J., & Golicic, S. L. (2009). Searching for competitive advantage through sustainability: A qualitative study in the New Zealand wine industry. *International Journal of Physical Distribution & Logistics Management*, 39(10), 841-860.
- Kennedy, J. A., Saucier, C., & Glories, Y. (2006). Grape and wine phenolics: history and perspective. *American Journal of Enology and Viticulture*, 57(3), 239-248.
- MacNeil, K. (2001). *The Wine Bible*. New York: Workman Pub.
- Mackenzie, D. E., & Christy, A. G. (2005). The role of soil chemistry in wine grape quality and sustainable soil management in vineyards. *Water Science & Technology*, 51(1), 27-37.
- Pohl, P. (2007). What do metals tell us about wine?. *TrAC Trends in Analytical Chemistry*, 26(9), 941-949.

- Polkinghorne, D. E. (1989). Phenomenological research methods. In *Existential-phenomenological perspectives in psychology* (pp. 41-60). Springer US.
- Şener, H., & Yıldırım, H. K. (2013). Influence of different maceration time and temperatures on total phenols, colour and sensory properties of Cabernet Sauvignon wines. *Food Science and Technology International*, 19(6), 523-533.
- Steel, R. G. D., & Torrie, J. H. (1960). *Principles and procedures of statistics. Principles and procedures of statistics.*  
Chicago
- Nicholas, Kimberly. "Kimberly Nicholas - Stories of Change." Online interview. 17 Nov. 2015.
- Nicholas, Kimberly A., and William H. Durham. "Farm-scale adaptation and vulnerability to environmental stresses: Insights from winegrowing in Northern California." *Global Environmental Change* 22.2 (2012): 483-494.
- Nicholas, Kimberly. "Illustrating Nature-Human Interactions in Ecosystem Services: The Case of Terroir in Wine." Print.