CSTEM: An Evolution in the Sensory Evaluation of Alcoholic Beverages (In Consideration of a Modern Alternative to the Traditional Alcohol Spirits Tasting Method)

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by

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Abstract

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C:STEM (Carmer Spirits Tasting Enhancement Method) (See Appendix A) is a proposed alternative to the traditional spirits tasting method (defined as seeing, smelling, tasting) (See Appendix B) established as the prevailing industry standard among spirits professionals, aficionados and general consumers. This research is intended to evaluate and demonstrate the difference between the prevailing traditional tasting method and C:STEM for the accuracy of objective tasting criteria, subjective evaluations and hedonistic experiences.
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Part One
Introduction

It is useful to trace the historical background of how humans came to the method of tasting alcoholic beverages that exists today. There is a difference between the physical act of tasting alcoholic beverages for safety or nourishment as opposed to the hedonistic endeavor of using one’s senses to evaluate the alcoholic beverages via tasting. It is the later type of hedonistic perspective that this paper focused on investigating.

History has shown a direct connection and roadmap to the steps in the traditional method for tasting alcoholic beverages that elicits the questioning of the method itself. Through literature review, professional operations, discussions with both novice and expert tasters a singularity presented itself. That singularity dictated the questioning of the current alcoholic beverage sensory evaluation tasting method (the traditional tasting method).

Purpose

To explore the viability of an alternative alcoholic beverage tasting method, expected to provide an option to the traditional (and only known) method of tasting.

Objectives

An objective is to teach the tasting methods, both traditional and C:STEM, so tasters may experience and examine the results on a personal level. By comparing and contrasting the methods, the goal is to produce meaningful insight that demonstrates a measurable difference between the methods regarding customer perception and perceptual accuracy.
Justifications

The lack of an option for tasting and sensory evaluating alcoholic beverages has created a space to explore options. There was no alternative method to the traditional tasting method, thus limiting the ability to compare and contrast tasting results and improve understanding of the sensory evaluation of the spirits experience. Since this is a huge focus in the food and beverage industry currently, it follows that the search for an option is needed. The researching of an alternative method could also help to stabilize and legitimize future research and development in the industry.
Part Two

Literature Review

Introduction

Studying the days of the cavemen using their senses for protection lead to an understanding of the hierarchy of the human’s senses. That hierarchy of human’s senses went from anthropologic notations to philosophic and then scientific evaluation. With medical breakthroughs and scientific investigation (mostly regarding wine) more detailed understanding of the senses most important to evaluating alcoholic beverages was discovered. The entire history of sensory evaluation of alcoholic beverages is hinged on the traditional method of tasting. In looking back at the historical position of the evaluation alcoholic beverages it has gained fervor and importance at a geometric rate over the last 50 years (Beverage Tasting Institute, 2011). That is to say all strata of the population from experts and professionals in the spirits business, to teachers and students, are actively involved in the sensory evaluation of alcoholic beverages. It is an accepted and respected part of cultures all around the world. Tastings are routinely held in virtually every civilized country. The following pages will examine in detail the only method (to date) ever used to do such evaluations.

History Leading to the Traditional Tasting Method

When discussing the history of man and the reasoning behind the development and evolution of the traditional tasting method it is prudent to start at the beginning. At the beginning of human’s existence the primitive human’s lived in caves. It was these ancestral cavemen that provide the common visual of humans referred to as cavemen (American Heritage Dictionary, 2011). Cavemen were bereft and made to deal with
enemies in the form of animal and insect species, nature and acts of the divine. It is how and why these defenses developed that was pertinent. The first level of defense against such danger was the caveman’s visual acuity. “The caveman’s environment placed dependence upon his ability to achieve at far. He had to be able to see at a distance to kill or be killed” (Manas, 1952, p. 62). That is to say that the cavemen relied on their vision as the first line of defense. Another investigation showed “To survive in such a habitat these early primates (sic. Cavemen) developed refined visual acuity …” (Rossi, 1977, p. 294). Sight was not only primary, but it was the first sense used on a daily basis.

It was not enough to be able to see danger lurking or coming at the caveman. Other senses needed to be employed for the caveman’s safety and preservation. The next line of defense used the sense of smell (olfaction). Wild fires were common and cavemen lived amongst the animals, flora and fauna. To discern whether something was a threat cavemen often used “…even olfactory cues (burning)” (Smith, 1955, p. 112) their sense of smell. The sense of smell can be used at a distance, not quite that of vision, but certainly further than the sense of taste.

The next sense to emerge as integral in the caveman’s defense was that of taste. This protected the caveman from ingesting bad foods, poisonous plants and tainted water. Maybe we did inherit part of our ancestral caveman’s brain. “Go back about a hundred thousand years ago to the time when cavemen roamed the earth (the Paleolithic Age) … Human survival was determined by a person’s ability to seek out foods that were safe (not toxic), … It’s also how our ability to perceive bitter taste, which warned us away from poisonous foods, and our sour taste, signaling “proceed with caution,” developed”
(Greene, Kearny-Cooke, & Jibrin, 2010, p. 22). It is clear that the sense of taste was something of a last sense defense.

These three senses are correlated by distance as well as order of use. This formed a sort of hierarchy in the use of these senses that formed the basis of the way in which we still taste today.

**Hierarchy of Senses for the Traditional Tasting Method**

This hierarchy of senses that was first used for preservation would soon be used for sensory evaluation. The traditional method that came about was seamlessly intuitive based on that premise. It is imperative that alcoholic beverages be evaluated for consistency, quality and pleasure. As David Hume (a noteworthy Scottish empiricist philosopher in the 18th century) suggests, “that one who has not tasted wine can have no idea of the taste of wine. That impression must come from a previous experience of wine (Hume, 1748, p.197)”.

It is noteworthy to understand that wine has dominated what there was and is of the literature regarding sensory evaluation of alcoholic beverages. As early as the 1700’s it was in the lexicon of the day as evidenced by Hume’s seamless use of wine in analogues form.

It was wine that dominated human history with its use in rituals as far back as 5,000 years ago in Cairo, Egypt. It was in Egypt that “archeologists uncovered a 5,000 year old chamber believed to have been used for the burial ritual of Egypt’s first major pharaoh – and found a cache of 200 rough ceramic beer and wine jars” (Associated Press, 2005, p. 1). Man discovered fermentation to make mead, beer and wine over 5,000 years ago. Distilling of grains to make alcoholic sprits is only a few thousand years old and was only perfected in the last century. “The first clear evidence of distillation comes from the
Greek alchemists working in Alexandria in the first century AD” (Forbes, 1970, p. 6).

Due to this discrepancy there is a much longer written history of evaluating wine as opposed to spirits. The method used for spirit evaluation is, however, identical to that of wine. Both have always used the traditional method of evaluating alcoholic beverages.

**Traditional Method of Tasting**

“The act of Wine Degustation didn't get its start at high society dinner tables as a way to see what was good with lamb, and what is better with beef. Wine Degustation came into being as a method of deciding what was safe to drink and what might be poisonous due to bad storage or aging processes. While today these tasting methods are less defensive, since modern methods of wine making produce safer wines, some wines you may get to embrace were bottled 100 years ago, or even 200” (Powell, April, p. 5).

The traditional method is defined as look, smell and taste. Those three steps, in that order are repeated throughout respected textbooks, websites, educational videos, and even university lecture notes. So pervasive is this notion and understanding that there is not a mention of an opposing or different method in the literature. That there are no other methods is both surprising and preposterous. All the methods on record are based in that traditional method’s tripartite approach. That is to say that any other methods in the literature are but variations or modifications on that theme. The individual parts of the traditional method are important to delineate for accuracy and understanding. Let’s look at the first step based on visual acuity.

The first step is with the eyes. The eyes take in different visual cues from the alcoholic beverage to be evaluated. Visual, sight, look, and see are all terms used to describe this first step. The evaluator looks for different items depending on the goal of
the tasting (Peynaud, 1996) The color, clarity, brightness and viscosity of the alcoholic beverage are a few of the more important and oft included variables when using this sensory evaluation method. Another important idea of the visual stage of evaluation is to identify items that should not be in the liquid. Some of these items can welcome and add positively to the experience like bubbles (carbonation), legs (viscosity) and sediment. Other times there may occur unwanted visual aspects that are referred to as flaws and faults. These items include but are not limited to; particles floating on top of the liquid (flocculation), snowflake like particles that are suspended in the midst of the liquid (tartrate crystals), and solids that have precipitated to the bottom of the liquid (sediment).

The understanding of the depth of each step of the traditional method makes clear the importance and function of the parts as with respect to the whole of the method.

The second step in the traditional method is to smell. Understand that by smelling it is universally understood that this will be done with the nose. This step is often referred to as nosing (Scotch Whisky.com, 2011). The objective with this step is to smell what the distiller intended. It is common knowledge and well established that the five tastes humans sense on the tongue are sweet, salt, sour, bitter and Umami. “In humans those five basic tastes deliver the perfect gustatory package to compliment the odorants rushing up the nose to the olfactory bulb” (Blodgett, 2010, p. 117). This points to the fact that we actually smell in our retro nasal cavity where the olfactory bulb is located (See Appendix C). This is accomplished through the nose using the nasal passage as a conduit (See Appendix D). This is the most discussed and revered part of tasting. “In fact, all the master blenders work primarily by nosing, not by tasting” (Hansell, 2011, p. 8). It is put forth as a dictum, not a choice. The nose may fatigue and experts refer to sensations such
as 'nose prickle', or 'nose drying', or even 'nose burn' (Standley, 2011). It is important to know this is a possibility and in most cases an eventuality.

Taste is the last of the steps in the traditional method. Its importance is based in the fact we have evolved since the caveman and so has our brain. “A notable share of this enlarged capacity is involved in flavor perception and behavioral responses to flavors” (Shepard, 2006, p. 318).

This touches on the hedonistic interest and evolution of human’s need to enjoy what they taste (Macallan Scotch Tasting, 2011). Further, evaluate the taste so that they may enjoy the experience. The evolution of the discerning palate created a need for a system for evaluation of alcoholic beverages. It is imperative that a short discussion on the two senses not discussed here, touch and hearing.

Touch takes the form of mouth feel when it is used in the vernacular on sensory evaluation. This is seldom added to the traditional method and therefore not included herein. The focus of this research is to show the traditional method naked, not in its various permutations. These permutations are small additions or explications of the same basic three step traditional method that is the standard. It is like wearing a different tie with a suit to work. The dress code is more concerned with the basic suit, any additions or affects are just that and not relative to the discussion.

Hearing is not important a necessary sense involved in most tastings. It is rarely used and seldom meaningful in the sensory evaluation of alcoholic beverages. There is no mention of using this sense in the literature regarding the traditional method. The few times it did come up were private tasting notes on sparkling forms of alcohol. These notes seemed to be in jest and not educational or professional.
By understanding the three steps it makes the traditional method easier to use and understand. It is also universally accepted as the proper method. The traditional method is currently only way to evaluate alcoholic beverages.

**Conclusion of the Traditional Method of Tasting**

Why whisky instead of wine? Wine, beer and whisky dominate the literature with regard to tasting notes. All three beverages use the same traditional method, occasionally adding a nuance here and there. Wine has more citations than beer and whisky combined because it has been evaluated using this method for a longer period of time. Wine also has a culture that perpetuates the need for differentiation in this way and has used these tasting to determine descriptive vocabulary, sales tools and price of its products. Michael Jackson was the Aristotle of both the Beer and the Whisky world. That is to say he was the first to write it all down in a meaningful, pseudo scientific manner with categories and tasting notes (Jackson, 2011). A recent phenomenon of the last half-century as evidenced by Mr. Jackson’s passing in 2007. It is thought to be more difficult to taste whisky due to the excessive alcohol that hides and obscures the person’s ability to sensory evaluate the beverage. The Whisky category is growing and recently held a symposium and tasting in St. Petersburg, Russia to showcase American whiskey (Mustard, 2008), with the focus on hedonistic and sensory evaluation tasting. The only method available was the traditional method. That is how it was taught, pitched and evaluated.

**History of the Alternative Method**

Why the alternative method and how did it come about? “Whiskey is an incredibly nuanced drink, full of flavors that are both subtle and complex at the
same time. Learning to taste it properly can open up a whole new world of enjoyment (The Nibble, 2011). This is the state of the world currently, which begs for an option or an improved method.

One of the premises of the free market enterprise system is competition. Competition is seen as the avenue to make both parties better, more efficient and ensure progress in the given field. The pairings are seemingly endless: like, Apple and Microsoft, Toyota and General Motors, Southwest Airlines and Delta Airlines, Chevron and Shell Oil, and the list goes on. In food and beverage the likes of Modavi and Kendall Jackson, Morton’s and Ruth’s Chris, Heinz and Hunts, Jack Daniels and Jim Beam come to mind. All of these situations are in balance. A yin and a yang as it were. One company or idea trying to constantly beat and better the other. The traditional alcoholic beverage tasting method has no such companion. No options to keep the method in check. No opposite to compete. No option for comparison or revelation. Until now with this alternative method.

It is ingrained in whisky lore and culture that the nose is the most prized sense regarding the fulfillment of Scotch whisky enjoyment. So fundamental is this concept that the Scotch distillers and ambassadors are united in pleading for the customer to nose the whisky first. This nosing is almost religious in its fervor and unquestioned acceptance amongst connoisseurs (Hay, 2011).

It is equally well known that the alcohol in the whisky may burn the nostrils. That same alcohol may wear out the nose’s ability to nose. Further, the high alcohol in whisky, normally 80 proof and above, is the most formidable barrier to enjoying the beverage. That is one of the many reasons it is often recommended to add water to the whisky to
nose and taste it. That is sounds like adding sugar to unripe fruit so you can eat it. If the fruit is not ripe or edible then pass on it. This is the major area of change and dispute between the traditional method and the alternative method.

In order to postulate a new method it seemed logical to change the process. While using the same senses as the traditional method to make the new method less alien, the new alternative method mostly calls for a different order of use for the same senses. More specifically alternative method requires a different order of operation. This change should lead to a different outcome (Miller, 2011).

**Hierarchy of Senses Supporting an Alternative Method**

The senses have a term subsumtion that is at the root of the ineffectiveness of the traditional tasting method and the crux of the effectiveness of the alternative method. Subsumtion is the idea that when two senses are being used one will take over or subsume the other. The order by which the traditional method flows has olfaction prior to taste as operations. The issue becomes the true hierarchy of these particular senses. The sense of smell will subsume the sense of taste (Carpenter, 1984) and therefore creating an issue of optimization for the taste operation. In the alternative method olfaction does not have the opportunity to subsume taste because taste is completed prior to the olfaction operation. This enables both senses to be utilized more fully. Due to the optimization of the senses the outcome and journey are also altered.

**The Alternative Method of Tasting**

It is prudent to walk through the steps of the alternative method to understand its goals and objectives. It is also important to clarify the differences between this alternative
method and the traditional method. The alternative method changes the order of operation of the senses involved in the hope of producing a different result.

Step one of the alternative method is the use of the sense of vision. The visual aspect of the alternative method is identical in objectives and scope to that of the traditional method. During this step the taster will look for visual flaws that could disrupt or impair the tasting. This is also a moment that the taster can ready their body for the steps to follow. Since there is no difference in the methods in their respective first step there should be no impact, either positive or negative deriving from this initial step.

Step two is where the real measure of difference between the methods occurs. The alternative method does not smell here, it tastes. This may sound odd at first, but understanding the true hierarchy of senses it is logical. Due to the ease by which the nose fatigues it logically follows to put the least amount of pressure and force on that sense which can sustain the least. The difference is magnified by how it tastes and is based on the subsumtion hierarchy discussed earlier. The order is imperative, but there are other factors that make the alternative method a dramatic departure from the traditional method. There are physically more systems and muscles working in the mouth (See Appendix E) than in the nose (See Appendix F).

The Tongue is also a key to this new method (See Appendix G). The crux of the issue is the misunderstanding and lack of understanding of the tongues potential functions. “Despite an abundance of studies on the tongue and its functions, as well as numerous proposed tongue models over the years, much of the anatomical and biomechanical details of the in vivo human tongue remain poorly understood”
(See Appendix G). This is true in science, and so in sensory evaluation too. Most research dollars spent to test the human tongue revolve around medical issues such as diseases. There are few if any dollars allocated for hedonistic based studies like the use of sensory evaluation of alcoholic beverages. Even though this discrepancy exists, it is apparent to the human eye how complex the tongue is and how valuable a role it plays to the hedonistic side of human beings. Understanding the potential uses of the tongue and other parts of the mouth make the second step of the alternative method a logical conclusion of the facts, not an irrational jump into the unknown.

**Conclusion of the Alternative Method**

Why is this alternative method different from the traditional method? Why is this difference significant and noteworthy? The idea of changing the order by which you taste will logically have a potential effect on the outcome of the experience. By using the more durable sense of taste prior to engaging the more sensitive and easily fatigued nose offers the taster the opportunity to experience the beverage differently. The hierarchy of senses has more than just custom and tradition that influence its use. Subsumtion tells us that if a human’s senses are used in the wrong sequence it may have a demonstrable effect on the outcome. The subject of hierarchy should not be ignored either. There are highest and best uses of skills and senses. The demonstrable difference in switching the order of operation in the alternative method may take advantage of the idea and feelings behind hedonist tastings. In the words of acclaimed spirits author and historian Paul Pacult, “Today, as we stand peering into the approaching face of a new millennium, distilled spirits, especially the upper echelon products, are the darlings not only of the well-
heeled, but likewise of increasing numbers of the wannabe well-heeleds. Generation X is definitely going upscale” (Pacult, 2011, p.3).
Part Three

Introduction

The goal of tasting is to be able to identify flavors so you can determine if you like the beverage or not. Unlike the human ancestor Oog, we know the beverage is not going to harm us. So why is the use of the same defensive hierarchy preferred when there is no actual danger present?

Understanding this point let’s examine the biggest issues with tasting whisky today. The most common complaint is there is too much alcohol in the whisky. The second biggest issue is most people have not been trained on where to smell. The third issue is that it is easier to identify flavors and smells when are able to heat the liquid. These are the issues many people have in general with trying to evaluate alcoholic spirits. This paper proposes a new alternative method that will eliminate those obstacles to your tasting, understanding and therefore your enjoyment.

C:STEM

The Alternative Tasting Method

The alternative method addresses these concerns by addressing the senses in a different order. We do not smell. Not at first anyway. We will take a small sip, maybe a third of what is in a normal one-ounce pour. Virtually all humans have a natural incline to their jaw (See Appendix E). The goal is to let the liquid pool in the front of the mouth with the lips remaining closed. The liquid will cover or touch parts of the tongue, lips, gums, lower palate and the salivary glands. When the need to breathe arises during this step the mouth remains closed and the nose does the breathing. The mouth must remain closed throughout this tasting process to ensure the best results possible. As the spirit
starts to burn your tongue it is actually separating the alcohol from the flavors, phenolics and aromas. Alcohol is effectively removed during this phase. Not literally removed, but figuratively inasmuch as its deleterious effects are muted. The majority of the alcohol stays with the tongue, thus enabling the other senses to do their job unimpeded.

If you were to put your finger in your nose and mouth at the same time they would eventually meet at your retro nasal cavity. That is where scientists suggest we should smell (See Appendix C). The most easily fatigued organ involved in our senses is our nose; therefore, the choice to do that later and start through the mouth where our strength lies is the second step.

There is a subsumption that occurs when we use our senses. That is to say that one sense will subsume another. Olfaction, or smell, is the ultimate in subsection and therefore should go last. It is a logical idea to first that which would be less effective and diminished in its capacity should it not go first.

The last item to be addressed is the heating up of the alcoholic beverage. This is accomplished by taking small swallows, maybe six, from the small taste you started with. Because the body is near 100 degrees and the room is closer to 70 degrees the liquid will heat up naturally. This is preferred to artificially heating up the spirit and changing its chemical composition. The idea is to let the body and its systems organically process the spirit.

After the taste and method are finished it is now time to use olfaction and smell the whisky. Due to the order of operation the nose is not doing the lions share of the work and can concentrate on deciphering what is in the glass. The alcohol is virtually non-existent at this stage and therefore does not interfere with the smelling stage. The tongue
seems to posses memory as is evidenced by the next stage, the sip. After taking a small sip the taste and aromas come clearly and unobstructed

**Conclusion**

The idea that consumers are more interested in a hedonistic and ritualistic experience when tasting alcoholic beverages is repeated often in the literature. People enjoy tasting and the sensory evaluation experience. The traditional tasting method works to some degree. The traditional method has stood as the sole method of tasting for hundreds of years with all the literature dependant upon it. This way of tasting is ingrained in our culture and there is no real reason to replace it at this point. It is not the goal of introducing this new method, C:STEM, to wipe out or replace the traditional method. It is not possible, feasible, wise or necessary to get rid of the traditional method. To have an alternative tasting method could lead to different results and experiences.

C:STEM is the first alternative tasting method to the traditional method on record. This gives great structure and perspective to both methods. It validates the idea of hedonistic experiences through tasting. As an option in the process of research and development it makes both methods stronger. The major weakness of the traditional method was it had nothing to compare to in the way of competition. Now that there are two worthy methods they can be compared and contrasted making both richer nuance and understanding.

The ability to teach two methods to students, staff, professionals and the public at large is meaningful. As with most things, tasks and ideas, when unchallenged they are taken without question and lose their way. This can lead to less conformity and understanding of the idea. At one point in its history a forward pass in a football game was
illegal. When the forward pass became legal and there were two ways to move the ball it was literally a game changer. In a mere 60 years it has elevated pro football to the most popular sport in the United States. The game was just fine before the introduction of the forward pass, but it changed dramatically and forever with the choice of method.

**Recommendations**

The ideas for recommendations grew out of the relationship that theses methods have with each other, science, and alone. The ability to test these methods side by side would be exciting and potentially fruitful. There could be a revelation that makes both methods more popular like the Pepsi challenge in the 1970’s. When comparing two methods the research is rife with ideas on how to pit one against another. The potentially rich vein that may grow organically from competition between these methods may produce even more methods.

Science should put money into the research of exactly how these methods differ. The isolation and or the specific combination used in each method should be dissected and addressed. The results may translate to other areas like food and even health. Perhaps the research will lead to a better understanding of ourselves and how we work. Like different diets for different people, maybe the research and testing can point a person in their own direction to produce the best results for them. New books may be written. Journal articles can be expanded and enlightened with this new variable added. The alcohol beverage industry can take and use this situation to their advantage as well. Companies can have an option on how to differentiate their products in a personal manner by choosing a method. The marketing aspects of a new player also produce and intriguing opportunity.
The clinical research is by far the most important recommendation from the paper. This research may shed light in areas otherwise ignored. Hedonistic, medical, and clinical revelations come from examining both new and existing methods, and this situation is calls for the same treatment. Another recommendation is to push and popularize C:STEM on its merits, diversity and unique approach to tasting. The stature of C:STEM will enable the aforementioned ideas and recommendations to be taken more seriously and get funded more readily. Many times research is performed on old ideas and proven procedures, but to be at the cusp of a new procedure to implement opens up a wide variety of old research. To insert C:STEM where the traditional method was used and then commence the research again could prove worthy.

The recommendation from this paper is to get people, new and already in the business of tasting, to try C:STEM and potentially invigorate themselves and an industry that serves them. People like to feel special, and alternatives are where such differences lie. The value added of an alternative tasting method could possibly lead to greater understanding of the parts that make it up. The research that would uncover the secrets and the higher functions of the senses involved in C:STEM could affect many industries.
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APPENDIX A
Info Graphic of the Alternative Tasting Method: C:STEM
APPENDIX B
Info Graphic of The Traditional Tasting Method
APPENDIX C
Cross Section of the Human Skull Focused on the Positioning of the Olfactory Bulb in relation to the Nose

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APPENDIX D
Cross Section of the Human Skull to Show Ratios of Size with regard to the Retro Nasal cavity and the Mouth

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APPENDIX F
Anatomy of the Human Olfactory System