Liquor-Based Canned Cocktail Production: Fizzy with the Rizzy
(Technical Paper)

The Underbelly of Ballet:
The Exploitative Empire of American Ballet Companies
(STS Paper)

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On my honor as a University student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments.

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Introduction

Between 2019-2022, canned seltzers, wine, and cocktails have grown in popularity while beer sales have largely declined. Their popularity has prompted traditionally beer-only brands, such as Anheuser-Busch, to introduce their own lines of alcoholic seltzers (Valinsky, 2019). A result of both the pandemic and a shift towards health-conscious drinking culture has driven the popularity of these beverages (*Ready To Drink Cocktails Market Size Report*, 2022-2030, n.d.). Consumers are more likely to buy a canned product reminiscent of going out to a bar that they can consume in the safety of their homes while also consuming a beverage that is marketed as low calorie. Many malt-based seltzers have a distinctive and unpleasant taste that becomes increasingly prominent at room temperature (Mull, 2022). Our technical team's canned-cocktail product will have a distilled liquor base that will overcome this fault and will use low-calorie sweeteners for consumers looking for healthier alcoholic beverages. Although distilled liquor has increased production cost than malt-based seltzers, many consumers would be willing to pay a premium for a better tasting canned cocktail, as demonstrated by the popularity of High Noon that advertises its ingredients of vodka and real fruit juice (Small, 2020). The final deliverable of this technical project will be a process design for a liquor-based canned cocktail, including fermentation, distillation, carbonation, and canning steps as well as expected production cost, scale, and safety evaluation.

The second project in this proposal evaluates the factors that contribute to gendered hierarchies in American ballet companies using actor-network theory analysis. Ballet's evident associations with innocence and femininity have allowed American ballet companies to perpetuate, innocently, their exploitation of female dancers through gendered hierarchies. This capitalization is derivatively reminiscent of 19th century sexual abuse of young ballet students in

the Paris Opera Ballet (Blakemore). Edgar Degas' famous *Little Dancer* statue, which has become a worshiped symbol among young aspiring ballerinas, depicts a "petit rat," a "frightfully ugly" depiction of a ballet dancer in training that confronts wealthy donors who sexually exploited these young dancers (Blakemore). Gray and Kunkel propose a theory that categorizes components of female ballet dancers' experiences and perceptions as fantastical beings, machines and slaves to the artform, and juvenile to their superiors, which contribute to their manipulation in American ballet studios (Gray & Kunkel, 2001). Free market capitalism in the United States encourages exploitation by rewarding efficiency in performance at as low a cost as possible, further encouraging practices that abuse female dancers' sexuality to encourage donations that finance the companies (Fairlamb, 1996). This study will determine how the perception of female ballet dancers and free market capitalism contribute to their exploitation and the establishment of this gendered hierarchy in American ballet companies.

Technical Topic

Motivation

Hard seltzer sales, such as White Claw, are growing at a much faster rate than beer sales, due to its popularity among Gen Z and Millenials who have established a drinking culture with seltzer brands. Trends such as the Smirnoff Ice challenge and colloquialisms such as "No laws when you're drinking Claws," contribute to the growing sales of canned seltzers and the expansion of product lines to include flavored seltzers (Goldfine). The trending drink in correlation with the onset of the pandemic has further skyrocketed sales. The pandemic contributed to a heightened apprehension to consume alcohol in public spaces, such as bars and clubs, and generated a shift towards at-home drinking as well as online food and beverage shopping to avoid viral exposure. Despite the decrease in social distancing procedures with

increased vaccine availability, consumers are still driven to consume convenient alcoholic beverages that can easily fit into busy lifestyles (*Ready To Drink Cocktails Market Size Report, 2022-2030*, n.d.). Thus, canned cocktails have high market potential and potential for growth due to their established pandemic popularity and convenience. Furthermore, canned cocktails have largely marketed themselves to health-conscious populations and the gluten-free community who are shifting towards drinking low-alcohol fruit-flavored beverages (*Ready To Drink Cocktails Market Size Report, 2022-2030*, n.d.).

As consumers have grown accustomed to drinking canned cocktails in the comfort of their homes, there is a growing desire for more sophisticated liquor-based products that can offer a better-tasting bar cocktail adjacent beverage. Most common seltzers have a lingering aftertaste from the malt-base that many consumers find unsettling. Our product aims to improve the taste by using a distilled liquor base instead. While this change will increase production cost, many consumers would be willing to pay a premium to remove the unpleasant aftertaste and our product will remain competitive. Additionally, in developing a liquor base there is broad versatility and a wide range of products that can be marketed from a more streamlined process. Different flavorings can be added to the liquor base and sold as different cocktails. We envision this product being consumed both at home and at formal events, where a more polished, mobile drink can replace live mixing of cocktails that may cause anxiety about the transmission of covid.

Process Overview

This Capstone project will design a process to ferment and distill cane sugar-based liquor for use in low-calorie carbonated canned cocktails. Our initial step is to produce a high concentration of ethanol within our mash. Sugar and water will be added with Safspirit C-70 yeast

in a fermenter to produce ethanol and carbon dioxide (Smith, n.d.). Yeast nutrients will be fed to help further the reaction. The fermenter would be connected to a heat exchanger, keeping the fermentation temperature around 25℃-33℃, the ideal range for the yeast strain used. The yield of ethanol produced will be kept around 10-15% ethanol purity, as too much ethanol would kill the yeast and inhibit further fermentation. The ethanol mash will then be transported to scrubbing and filtering units to remove any impurities and eventually sent through a continuous feed distillation process (Holl, 2022). This process consists of a distillation column, reboiler, condenser, and reflux drum. Steam will be used in conjunction with the heat exchange units to control the temperature of the columns. The ethanol mash will be injected into the column and vaporize on the trays traveling up the column where it will recondense and vaporize into a purer product. The bottoms product will consist almost entirely of water and other byproducts due to their higher boiling points (*Distillation of Mash and Rectification of Alcohol*, n.d.).

As ethanol is continuously distilled, the alcohol percentage/purity will increase to reach a goal of 80% purity. Fruit flavorings will be purchased and combined with the purified ethanol, water, stevia, and preservatives like sodium citrate to create a product of 4-7% ABV (alcohol by volume) (*How Is Hard Seltzer Made?*, n.d.). Once thoroughly combined, the drink will then be carbonated with food-grade carbon dioxide and sent to canning. We intend to sell 3-4 flavors in a mixed pack of 12 canned cocktails. The general outline of the block flow diagram is seen below.

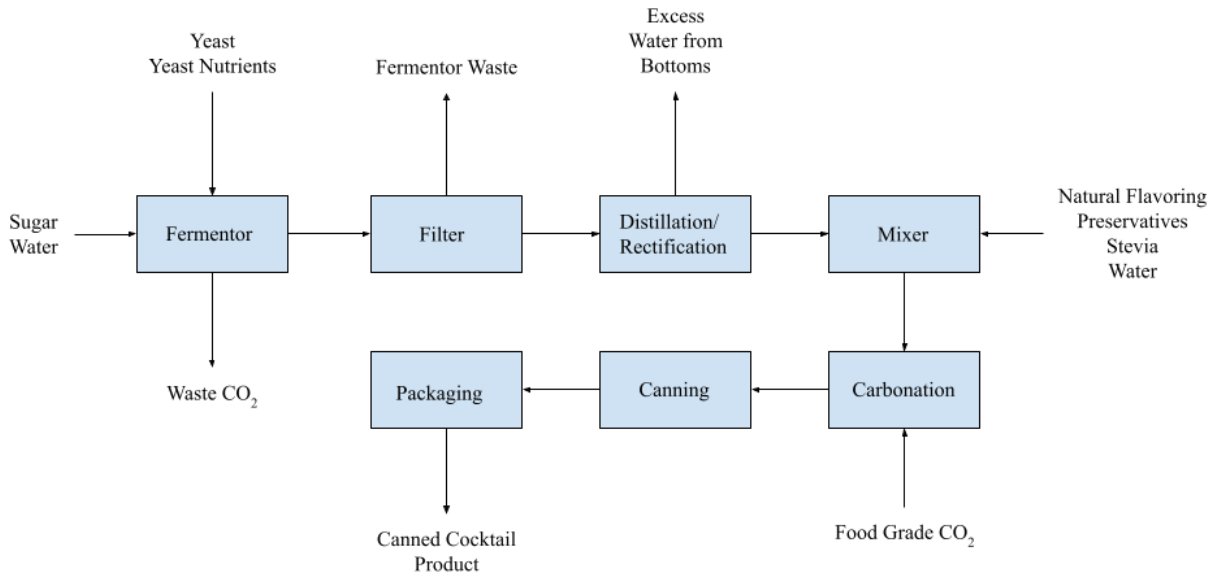

Figure 1. General Block Flow Diagram of Creating Canned Cocktails

(Adapted from Holl, 2022)

Process Modeling and Calculation Methods

Our group will follow previous literature and current plant designs to help guide our design process. The project will be advised by Eric Anderson, Professor at the University of Virginia. We will model our fermentation process using MatLab and Excel and will switch to Aspen Plus V11 for distillation. This modeling will begin with the introduction of sugar for our fermentation process and finish with our ready-to-drink canned cocktail. All inputs, outputs, side products, byproducts, and waste will be considered and properly accounted for so no stream or material is without a source and sink. This modeling will include factors such as scale, size of the plant, cost of operation, ingredients, and disposal. Additionally, to accompany our process modeling we will also consider and report any and all safety hazards or risks associated with our plant and the chemicals involved. Our team will write a Design Basis Memorandum in the Fall of 2022 and finish the technical design in Spring of 2023.

STS topic

Background

Ballet is rooted in religious, pagan ritual practices that were refined into court entertainments in the Middle Ages (Hammond, 1979). L'Académie royale de Musique, later known as the Paris Opera Ballet, established the ballet technique, set the vocabulary, and determined artistic standards, after which it spread throughout Europe and to Russia, where regional nuanced ballet styles emerged (Hammond, 1979). The United States did not have established ballet companies in the early 20th century until technique evolved to broader athletic movement with increased range and mobility, extreme turnout, hyperextension, and arched feet, largely popularized by George Balanchine's New York City Ballet (NYCB) company (Hammond, 1979). The post-World War II environment also facilitated new excitement towards innovative choreographies that emphasized rhythm, nuance, and dynamism in movement, leading to the formation of many prominent ballet companies (Denby, 1948).

As more American companies were formed, a clear hierarchical structure in modern ballet companies emerged where men are disproportionately recognized as choreographers and directors and women act as the dancers, or workers; ironic in an artform where the male dancers spend most of their time behind their female dance partners (Hanna, 1987). In 1984, approximately 75% of ballet companies had male managers, and in 1986 only 57% of companies were led by men (Hanna, 1987). Despite this increase in ballet companies founded by women, the largest companies including NYCB, American Ballet Theatre (ABT), The Joffrey Ballet, and San Francisco Ballet all had male directors and recognition of female choreographers and directors pales in comparison to men (Hanna, 1987). These hierarchical structures have contributed to the ballet ideal of femininity: virginity, excessive thinness, bodies arrested at puberty, that is rooted in misogyny and

control of ‘girls’ (Hanna, 1987). Furthermore, women can indulge in the arts because they traditionally have the option of marriage and financial support, allowing them to be poorly compensated and controlled by their dreams and passion for dance by male directors who profit off their labor, a symptom of capitalism (Hanna, 1987). The purpose of the STS topic will be to evaluate how the perception of female ballet dancers and capitalist exploitation allows for gendered hierarchies in American ballet companies.

STS Framework: Actor-Network Theory

The research topic clarifies the roles of female dancer perception and capitalism on establishing a structure based on sex in American ballet companies. In order to answer the research question, I will employ actor-network theory (ANT) to investigate the relationships that contribute to the establishment of gendered hierarchies in American ballet companies. ANT is a framework of analysis that focuses on identifying actors and their complex relationships within a structure in order to unveil the ‘black box’ (Cressman, 2009). The ANT framework will allow for strong analysis of the complex nature of structures of power and considers multiple avenues of attribution. In this study, the major actors are female ballet dancers and American capitalism and the network is the misogynistic structure of power. However, because ANT is generalizable, many criticisms stem from its infinite possibilities of actors and connections that can reduce its efficacy in never coming to a conclusion (Cressmen, 2009). In order to limit the limitless scope of ANT, my study will be focused on the female dancer archetype and American free market. In implementing ANT, the entangled relationships between the actors and the network will illuminate the context in which stratification is created in American ballet companies.

Research methodology: Network Analysis

I will utilize network analysis as my main research method and identify sources that help clarify the role of the actors in my hierarchical network. The sources will cover the history of ballet, discussion of gender in American ballet companies, and capitalist exploitation and will be used to evaluate the major actors in the network hierarchy. The purpose of the research will be to identify the specific aspects of the female ballet dancer archetype and the free market that allow for gendered division and exploitation of women in American ballet through explicit and implicit reasoning. I will gather sources such as journal articles and use network analysis to identify the key features of female ballet dancers and capitalism in establishing a male dominated ballet culture in the United States. By focusing the research using network analysis, the sources will more comprehensively address the ANT framework used to answer the research question and allow for a detailed analysis of the STS topic.

Conclusion

The final deliverables will be a technical project detailing the process design for liquor-based canned cocktails and an ANT analysis of gendered hierarchies in American ballet companies. I anticipate the technical project will demonstrate the feasibility of producing our better tasting canned cocktail product using simulation software. The STS deliverable will provide insight into how American gender roles, dream idealization, and economic policies allow for hierarchical structures that exploit women in ballet. The alcohol industry is a lucrative business allowing it to also exploit its workers through outsourcing labor and minimizing safety protocols. The study of American ballet companies will provide a framework to analyze such systems that establish hierarchies by various means in order to maximize profits in capitalist environments. In

evaluating how structures of power form and thrive, we can better understand what solutions will best reduce exploitation and abuse.

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