

A Pilot Study: Predictors of Dairy and Plant-Based Milk Consumers' Attitudes

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Introduction

Dairy cow milk is an animal-based, whole food product that is a colostrum-free, whitish liquid produced by a cow (Malbon, 2007). In contrast, plant-based alternative milk varies widely in nutrition and is sourced from plants like coconuts, oats, almonds, or soy (McCarty et al., 2017). Although there are nutritional differences between the two types of milk, consumption of and market for functional foods depend on health consciousness and knowledge (Hoque et al., 2018). Consumers with more knowledge are more likely to buy and consume functional foods (Divya & Nakkeeran, 2018). Consumers can be influenced to purchase or consume milk based on their satisfaction with sensory qualities (e.g., taste or texture) and existing beliefs (Shifferstein, 2001). Social influence from family, friends, coaches, teachers, and health professionals plays a significant role in consumption of plant-based alternatives (Lacroix et al., 2016; Rosenlöw & Hansson, 2020; Thompson et al., 2024). The perceived benefits of dairy include weight management, heart health, and digestion, while plant-based milk consumers tend to benefit from products being lactose-free and a feeling they contribute to an environmentally sustainable world (Aydar et al., 2020; Korhonen, 2009). Literature suggests a need for further research on the environmental impact of plant-based alternative diets and their potential contribution to nutrient deficiencies in children when compared to dairy consumption, which has shown to provide essential vitamins and minerals to both children and adults (Emery, 2018). Overall, factors influence consumers' intentions to purchase or consume milk; yet, understanding how these factors contribute to their attitudes is the primary objective of this study.

Theoretical Framework

The value-attitude-behavior (VAB) model (Homer and Kahle, 1988), the theory of reasoned action (TRA; Fishbein and Ajzen, 1975), and Parrella's (2023) proposed model guided our study. The VAB model suggests a hierarchy where values (e.g., environmental concerns, health consciousness, knowledge) shape attitudes (e.g., perceived benefits and risks), which influence behavioral intentions (intention to purchase milk in the current study). TRA complements VAB by emphasizing the role of subjective norms and attitudes in shaping intentions. By integrating these two models, we aimed to identify the variables and relationships that explain consumers' attitudes toward purchasing dairy and plant-based alternative milks. The predictors we examined included knowledge, belief, subjective norms, perceived benefits, perceived risks, trust, health consciousness, and environmental concern.

Methods

The study described herein is a pilot study for a larger funded project. The study employed an experimental design using randomized control trials through a cross-sectional survey. Our pilot study sample included students, faculty, and staff from Texas A&M University who consume dairy and plant-based alternative milk. Most respondents reported drinking dairy milk (72.38%; $n = 76$). They were between 18 and 34 years old (71.43%; $n = 75$), were female (63.81%; $n = 67$), held a bachelor's degree or higher (68.57%; $n = 72$), were not on a diet affecting their milk consumption (80.95%; $n = 85$), and identified as white (59.05%; $n = 62$). The survey was distributed via bulk mail services, resulting in data collection from 223 participants with only 105 usable after data cleaning. The survey comprised several sections, including questions related to our predictors and outcome variable. Data analysis involved conducting a multiple linear regression with attitude (3 items) as the dependent variable and eight predictors:

knowledge (3 items), belief (7 items), subjective social norms (3 items), perceived benefit (4 items), perceived risk (3 items), trust (8 items), health consciousness (3 items), and environmental concern (4 items).

Prior to conducting the regression analysis, diagnostic checks of the residuals were performed to verify the assumptions of linear regression were satisfied. These included assessments of linearity, homoscedasticity, and normality. The Shapiro-Wilk normality test yielded a p -value of 0.8918, indicating normal distribution. Variance inflation factors (VIF) were checked for multicollinearity, with all VIFs below 5, suggesting no collinearity issues. Residual plots showed no obvious patterns, indicating the assumption of linearity was met. Residuals displayed a fairly consistent spread across predicted values, suggesting homoscedasticity as evidenced by the residuals versus fitted values plot. Residuals appeared reasonably normally distributed in the Q-Q plot. Cook's distance was used to assess influence and identify outliers.

Results

The regression model was significant ($p < 0.001$) with an adjusted R-squared of 0.5227, indicating the model explained 52.27% of the variance in attitude. Among the predictors, **belief** ($\beta = 0.24, p < .001$) and **benefit** ($\beta = 0.17, p < 0.01$) were significant positive predictors of attitude, while knowledge, norm, risk, trust, health and environment were not significant.

Conclusions

The two predictors of attitude among dairy and plant-based alternative milk consumers are belief and perceived benefit. Therefore, milk consumers who are satisfied with the sensory qualities and hold positive pre-existing beliefs about the milk they consume (Shifferstein, 2001) tend to have a more positive attitude toward drinking milk. Additionally, consumers who perceive the milk they drink as beneficial to their health or environmental sustainability tend to have more positive attitudes toward drinking dairy or plant-based milk.

Implications/Recommendations/Impact

From the results of our pilot study, we can infer that consumers' attitudes toward drinking dairy and plant-based alternative milk are significantly influenced by their beliefs and perceived benefits. Previous literature supports this finding and indicates that many factors contribute to consumers' beliefs about milk, including its physical or sensory qualities (e.g., good taste and texture), consistency, and beliefs related to the production process (Shifferstein, 2001). As for perceived benefits, they can be influenced by demographic factors, and consumers' perceptions of how milk contributes positively to their health or the environment (Aydar et al., 2020; Korhonen, 2009). We recommend agricultural communicators and extension personnel consider these factors when they communicate about milk. Leveraging the beliefs and perceived benefits of milk according to consumers when communicating about the product can have significant economic impacts and enhance overall consumer knowledge, as informed consumers are more likely to purchase functional foods (Divya & Nakkeeran, 2018).

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