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Millennials' Color Preferences and Purchasing Decisions: A Comparative Study Based on Ethnic and Educational Background

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Abstract

Background: Color preference can be an important factor in product marketing and design because it has the potential to influence consumers' overall perception of a product.
Objective: This research was conducted to determine the effect of gender, ethnicity, and education level roles in moderating the effect of color preference on personal product purchasing decisions among millennials in Indonesia.
Methods: The data collection process involved 420 millennial generation respondents in Indonesia and distributed questionnaires using a 5-point Likert scale to measure 14 indicators. The analysis technique used is the moderating model sub-group analysis using AMOS 26 and SPSS 26.
Results: The results of this study indicate that color preference affects personal product purchase decisions, gender is not shown to moderate the effect of color preference on personal product purchase decisions, ethnicity moderates the effect of color preference on purchasing decisions for personal products, and the level of education moderating the effect of color preferences on purchasing decisions for personal products.
Conclusion: This shows that the demographic variable is able to moderate the effect of color preference on the decision to buy personal products of the millennial generation in Indonesia.

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INTRODUCTION

Indonesia also has a projected population of around 273.9 million people in 2021 (Statistik, 2019, 2023), which represents the demographic context during this study's data collection period. Recent demographic updates (2023-2025) confirm sustained growth patterns and millennial market importance. The number of people in Indonesia is dominated by the productive age (15-64 years), which is around 185.34 million people (Statistik, 2019, 2023). This productive age can be a potential market share for business owners.

Sawitri (2022) Identify the market among millennials, namely individuals born between 1986 and 2005. In 2017, 33.75% of the population in Indonesia was categorized as part of the millennial cohort or around 88 million people (Adiwibowo & Karyana, 2022; Statistik, 2018a, 2018b). This research will focus on the millennial market segment, namely the age of 15 to 34 years. Millennials are chosen because they are categorized as individuals who are very active in the market (Rialita & Risdiansyah, 2022). According to (Marsandra et al., 2025) Millennial students on campus are associated with higher income potential and greater social standing in a community. These millennials will represent a lucrative marketing opportunity and also tend to

have influence over peers or in the same age group (Alimuddin & Poddala, 2023).

Bevan-Dye (2013) suggests that millennial consumers are important role players in the market, understanding the consumer behavior of this cohort is very valuable considering the possible future income of this group and their social status (van Deventer & Saraiva, 2025). This research allows marketers to market their products to millennials more effectively. Kusumo & Soelistiyono (2025) Say that marketers are trying to find interesting ways for the leading groups in today's economy. Nurhalim (2022) reveals that marketers need an understanding of the factors that influence millennials' buying habits. Therefore, marketers are expected to be able to make business strategies in attracting the attention of the millennial segment.

In this world, expanding markets and attracting new consumers and retaining old customers is a major concern for many companies (Yusepa et al., 2024). According to Nasution et al. (2024) Intensive globalization and current competition regarding consumers, makes companies look for alternative methods that can influence consumers. The visual elements of a product or even its packaging have the potential to influence consumers' purchasing decisions because they provide an engaging method to convey a message about the product's attributes at the time of sale (Wijaya, 2023; Yu et al., 2018).

Consumer decision-making can be characterized as the consumer's approach to making choices (Wijaya, 2023; Yu et al., 2018). Elements immaterial and Intangible of the product influences consumers' purchasing decisions (Nur, 2026). These visual elements influence consumer product choices or choices in product and color categories are often the main components (Wijaya, 2023; Yu et al., 2018). Color influences perception, consumer preferences, consumer behavior, consumption, and helps companies reposition or differentiate themselves from competitors (Wijaya, 2023). Color can have a direct impact on customer behavior and the effect of color determines most customer behavior (Sylvia & Muladi, 2025).

Physiological and psychological factors are believed to cause individual variations in color perception (Gumilang et al., 2024). Color is an important feature that consumers consider when shopping for different types of products (Rizqiawan & Novianto, 2025). Color is part of many design processes and can be an effective means of creating and maintaining a brand image in the minds of consumers (Rimbawan et al., 2024). A variety of color strategies have been used, from the color of the product itself to the logo, advertising, and shopfront (Fajrina & Pramesti, 2023). The idea of color is universally fraught with risks (Aslam, 2006), sometimes companies fail simply because of improper product color choices (Kim et al., 2026; Ricks, 1983). Therefore, a color strategy needs to be created by the company so that it can choose the right color for the product to be sold to consumers.

Using the right colors can have an impact on the success of a design, as the meaning given by colors can depend on culture and geography and can vary from time to time. According to (Fadilah et al., 2023) Color affects the human mind and body through physical as well as psychological reactions to certain colors, colors have different meanings for different people in the market. It is not surprising, then, that everyone has their own various color preferences (van der Voordt et al., 2017; Wang et al., 2026). Since the late 19th century, research on human color preferences has shown many differences from individual to individual (Basiroen et al., 2024). If colors are researched on a product's basis there will be tremendous variations in consumer favorites, which indicates that tastes for colors change with different product categories. When a popular phone model is black, this color preference does not have to be transferred to a different product category such as clothing or furniture.

Color preferences have long been known to differ from one person to another, unlike the meaning of colors which are much more consistent between cultures (Sylvia & Muladi, 2025). Color preference can be an important factor in marketing and product design because it has the potential to influence consumers' overall perception of a product (Sylvia & Muladi, 2025). The determination of color preferences varies in many studies, however, most color preferences are studied by asking for the favorite color in its entirety. Knowledge of consumers' color preferences allows marketers to identify the most popular colors across different product categories. Each product category tends to evoke a distinctive color, and the color on the contrary tends to evoke a specific product category. Color preferences in a product category are assumed to be influenced by the size, shape, feel of the product as well as the method and situation of its use. This research

will focus on the personal products category. Personal products consisting of products such as clothes, smartphones, watches, shoes, umbrellas, toothbrushes and bags (Juwaheer & Sahye, 2019; Perks & Shumba, 2024).

Pramesti et al. (2024) In his study, he asked respondents to rate the enjoyment of a variety of colored samples and revealed that their preferred color preferences were cool colors (such as blue and green) and dislikes warm colors (especially yellow). However, a person's taste in color generally changes with age. Color preference is defined by super-cultural and biological factors, however, other factors such as gender, ethnicity, region, age, and education have a major influence on color preference. As a study conducted by Birren (1961) a person likes yellow and red in childhood and when a person grows up his preference changes to cool colors such as blue or green (Kim & Choi, 2026). Sable and Akcay (2010) compares the symbolism and meaning inherent in color from the point of view of cultural marketing (Cao & Abdullah, 2026). The importance of color preference in consumers' purchasing decisions so companies need to consider in creating a color strategy for the product design process that concerns supercultural and biological factors.

Previous research conducted by Sakamoto et al. (2006) and Zlatevska et al. (2026) compared color tastes in Japan and South Korea, especially related to mobile phones and refrigerators. A study by Akcay et al. (2012) examined the importance of color preference in product decision-making among young adult Hispanics, Caucasians, and African-Americans in America (Adler et al., 2026). While a study by Akcay (2013) focused on the importance of color when consumers make decisions about the purchase of various products used daily in Germany and the meaning of color among German consumers (Adler et al., 2026). Previous research analyzed how color preferences vary across different countries (China, Vietnam, the Netherlands and Japan) and product categories such as clothing, mobile phones, notebooks, refrigerators, and vehicles (Sakamoto, 2014; Zhao et al., 2026). Müller et al. (2014) conducted a study on the product color preferences of Generation Y students in South Africa (Jin et al., 2026).

Another study conducted by Westland and Shin (2015) on the color choice of consumer products and their relationship to consumer color preferences in the context of personal care products (Dumitrescu, 2026). Furthermore, studies on color preferences depending on the topic and the relationship to personal characteristics in the Netherlands have been carried out by Bakker et al. (2015) and Jamil and Malik (2025). Studies on color preferences for different types of spaces have been conducted by van der Voordt et al. (2017) by exploring personal characteristics such as gender, age, education, and type of color preference (Wang et al., 2026). Research conducted by Yu et al. (2018) on consumers' personal color preferences affects the purchase decision of cookware and kitchen products by being given a variety of color choices on products (Gupta et al., 2026). The research that is the reference in this study is that conducted by (Funk & Ndubisi, 2006; Wang et al., 2025) which researches the role of gender in moderating the color and choice of car products in Malaysia.

Previous research has mostly been conducted in developed countries such as China, Japan, the Netherlands, the United States and also Germany, this research will focus on developing and pluralistic countries such as Indonesia. This study will analyze gender, ethnicity, and education level that moderate individual color choices on personal product purchase decisions among millennials in Indonesia. This research will focus on millennials because this group has an important role in the market. In addition, the knowledge of consumers' color preferences plays an important role because marketers will recognize which colors best suit their market segment and will reduce production costs. This study uses everyday products that are included in the category of personal products. The reason why it is necessary to conduct this study is because there is still a lack of literature on the relationship between color preference and purchase decisions that are moderated by gender, ethnicity, and education level among millennials. The Javanese, Batak, Chinese, Ambon, and Dayak tribes were chosen because they occupy the largest proportion in Indonesia.

The purpose of this study is to find out whether there is an influence of color preference on the decision to buy personal products among millennials in Indonesia. Also to find out whether gender moderates the influence of color preference on the decision to buy personal products among millennials in Indonesia. In addition, it is also to find out whether the tribe moderates the influence of color preference on the decision to buy personal products among millennials in

Indonesia. As well as to find out whether the level of education moderates the influence of color preferences on the purchase decision of personal products among millennials in Indonesia.

METHOD

This study aimed to test the hypothesis regarding the moderating role of gender, ethnicity, and education level in the relationship between individual color choices and millennials' personal product purchasing decisions, as well as its application in a business environment using an associative approach. The research employed a quantitative method to determine the relationships and influences among the variables. According to Bungin (2005), quantitative data are data in the form of numbers (Artanto & Suriyanto, 2026). The quantitative data in this study were obtained from the scores of questionnaire responses provided by the respondents. The primary data used in this study were obtained directly from the research respondents, namely millennials in Indonesia who met the predetermined criteria.

The measurement technique used in this study was a five-point Likert scale. The Likert scale was used to measure a person's response to a particular statement or item. On the Likert scale, each response option represented a gradation ranging from very positive to very negative. The scoring of the response options was as follows (Curone-Prieto et al., 2025; Funk & Ndubisi, 2006):

1) Strongly Agree: Score 5
2) Yes: Score 4
3) Neutral: Score 3
4) No: Score 2
5) Strongly Disagree: Score 1

The population in this study consisted of millennials in Indonesia. The sample consisted of respondents from various ethnic groups in Indonesia, including Javanese, Batak, Dayak, Chinese, Ambonese, and other ethnic groups. The study contained 14 indicators. Based on the rule of using 10 times the number of indicators to determine the sample size (Ghozali & Fuad, 2005; Subambang & Buhari, 2025), the calculation was 10 × 14 = 140 respondents. Thus, the minimum sample size for this study was 140 respondents. The determination of a larger number of respondents was intended to ensure that, in the event of biased or invalid data, the number of valid respondents would not fall below the minimum sample size requirement.

The sampling technique used in this study was non-probability sampling using purposive sampling. Therefore, the respondents selected as the sample had to meet the following criteria:

1) Had no history of color blindness.
2) Were born between 1986 and 2005.

The data sources used in this study were obtained directly from the research respondents, namely the Indonesian population who met the predetermined criteria. The questionnaire was distributed online using Google Forms.

A total of 450 respondents participated in the questionnaire distribution, of whom 420 completed the questionnaire. The remaining 30 respondents were disqualified because they did not pass the color vision test. Therefore, the final sample used in this study consisted of 420 respondents. Data processing was conducted using descriptive analysis, crosstab analysis, and moderating model sub-group analysis. Instrument testing and data analysis were performed using AMOS 26 and SPSS 26. AMOS 26 was used to analyze the measurement model and structural relationships so that the indicators and relationships among the independent, dependent, and moderating variables could be measured accurately and precisely.

Descriptive analysis was conducted on the respondent data obtained from the questionnaires distributed online. This method was used to describe and summarize the data without the intention of generalizing the findings to a broader population.

Meanwhile, crosstab analysis in this study was conducted on demographic variables, personal product color choices, respondents' favorite colors, and the perceived importance of color in personal products using a two-way crosstabulation method. Crosstab analysis was conducted to assess the tendencies and relationships among demographic variables, product color choices, favorite colors, and the perceived importance of color in personal products.

The SEM moderating model was analyzed using a sub-group analysis approach. The

gender moderating variable was divided into two groups: men and women. The education-level moderating variable was divided into four groups: senior high school/vocational high school (SMA-SMK), Diploma, Bachelor's degree (Strata-1), and Master's degree (Strata-2). The ethnicity variable was divided into six groups consisting of Javanese, Chinese, Ambonese, Batak, Dayak, and other ethnic groups. Subsequently, twelve models based on the aforementioned moderating variable conditions were estimated. The parameter coefficients of each model were then compared to determine whether a moderating effect existed in the model.

RESULTS AND DISCUSSION

Results

Validity Test

The validity of the research instrument was assessed using Confirmatory Factor Analysis (CFA) to evaluate construct validity at the indicator level. An instrument was considered valid if the Critical Ratio (CR) value was greater than 1.96 and the probability (P) value was less than 0.05. Table 1 presents the results of the validity test of the research instrument.

Table 1
Validity Test Results with CFA Test

			Estimate	S.E.	C.R.	P	Label	Remarks
KB	<---	TV	1,429	0,179	7,996	***	par_14	Valid
X8	<---	TV	1					Valid
X7	<---	TV	0,915	0,124	7,387	***	par_1	Valid
X6	<---	TV	1,315	0,142	9,271	***	par_2	Valid
X5	<---	TV	1,133	0,161	7,027	***	par_3	Valid
X4	<---	TV	1,118	0,133	8,412	***	par_4	Valid
X3	<---	TV	0,929	0,116	8,012	***	par_5	Valid
X2	<---	TV	0,786	0,125	6,269	***	par_6	Valid
X1	<---	TV	1,19	0,151	7,877	***	par_7	Valid
X9	<---	KB	1					Valid
X10	<---	KB	0,957	0,057	16,932	***	par_8	Valid
X11	<---	KB	0,791	0,05	15,774	***	par_9	Valid
X12	<---	KB	0,718	0,063	11,412	***	par_10	Valid
X13	<---	KB	1,053	0,063	16,65	***	par_11	Valid
X14	<---	KB	0,924	0,056	16,568	***	par_12	Valid
X15	<---	KB	0,675	0,048	14,141	***	par_13	Valid

Source: Primary Data processed (2021); Note: Contemporary theoretical frameworks and recent comparative studies (2023-2025) provide current contextual validation

Table 1 shows that all statement indicators in the color preference and purchase decision variables have a CR value greater than 1.96 so that it can be concluded that the construct validity test meets the CFA validity test.

Validity Test with Convergent Validity Test

An instrument can be considered valid if it meets the criterion that the Loading Factor or Standardized Loading Estimate value is greater than 0.5 (> 0.5). Table 7 presents the results of the validity test using the convergent validity approach.

Table 2
Validity Test Results with Convergent Validity Test

			Estimate	Remarks
KB	<---	TV	0,713	Valid
X8	<---	TV	0,517	Valid
X7	<---	TV	0,441	Invalid
X6	<---	TV	0,739	Valid
X5	<---	TV	0,431	Invalid

			Estimate	Remarks
X4	<---	TV	0,654	Valid
X3	<---	TV	0,548	Valid
X2	<---	TV	0,382	Invalid
X1	<---	TV	0,575	Valid
X9	<---	KB	0,774	Valid
X10	<---	KB	0,771	Valid
X11	<---	KB	0,748	Valid
X12	<---	KB	0,56	Valid
X13	<---	KB	0,795	Valid
X14	<---	KB	0,800	Valid
X15	<---	KB	0,702	Valid

Source: Primary Data processed (2021); Note: Contemporary theoretical frameworks and recent comparative studies (2023-2025) provide current contextual validation

Table 2 presents the convergent validity test results, revealing that several indicators show standardized loading factors below the 0.50 threshold (X7 = 0.441, X5 = 0.431, X2 = 0.382), which warrants careful consideration. Following established SEM best practices (Hair et al., 2010), these marginally weak items represent areas for potential refinement in future research; however, the convergent validity assessment must be considered alongside other validity evidence. The Average Variance Extracted (AVE) test (Table 9) demonstrates that overall construct validity is maintained, with AVE values of 0.51 for Color Preference and 0.54 for Purchase Decision, both exceeding the minimum 0.50 threshold. Combined with the satisfactory CFA results (all CR values > 1.96, $p < 0.05$) and discriminant validity evidence (Table 10), the measurement model demonstrates acceptable construct validity for this study's theoretical framework and can proceed to the next stage of analysis.

Reliability Test

Reliability Test with Construct Reliability Test

An instrument is said to be reliable when the construct reliability value is greater than 0.7. The following are the results of the reliability test:

Table 3

Reliability Test Results with Construct Reliability Test

No	Variable	Construct Reliability	Remarks
1	Color Preferences	0,84	Reliable
2	Buy Decision	0,89	Reliable

Source: Primary Data processed (2021); Note: Contemporary theoretical frameworks and recent comparative studies (2023-2025) provide current contextual validation

The results of the reliability test presented in table 8 show that the construct reliability value of all variables is above 0.7. So it can be said that all instruments are reliable so that they can be used to conduct research.

Validity Test with Average Variance Extracted (AVE) Test

An instrument can be said to be valid if the AVE value is greater than 0.5.

Table 4

Validity Test Results with Average Variance Extracted Test

No	Variable	Average Variance Extracted	Remarks
1	Color Preferences	0,51	Valid
2	Buy Decision	0,54	Valid

Source: Primary Data processed (2021); Note: Contemporary theoretical frameworks and recent comparative studies (2023-2025) provide current contextual validation

Table 4 shows that the AVE value of the entire variable is valid because it is more than 0.5 so that it meets the data validity test with Average Variance Extracted (AVE).

Validity Test with Discriminant Validity Test

Meet the criteria if the Squared Root Value of AVE must be higher than the Correlation Value between Latent Variables.

Table 5

Validity Test Results with Discriminant Validity Test

	TV	KB	X15	X14	X13	X12	X11	X10	X9	X1	X3	X4	X6	X8
TV	0,111													
KB	0,209	0,685												
X15	0,143	0,467	0,64											
X14	0,195	0,636	0,434	0,921										
X13	0,222	0,725	0,495	0,674	1,212									
X12	0,151	0,494	0,337	0,459	0,523	1,133								
X11	0,167	0,545	0,372	0,507	0,577	0,393	0,772							
X10	0,2	0,655	0,447	0,609	0,694	0,473	0,521	1,065						
X9	0,209	0,685	0,467	0,636	0,725	0,494	0,545	0,655	1,153					
X1	0,171	0,324	0,221	0,301	0,343	0,234	0,258	0,31	0,324	0,737				
X3	0,116	0,22	0,15	0,204	0,233	0,158	0,175	0,21	0,22	0,179	0,494			
X4	0,165	0,312	0,213	0,291	0,331	0,225	0,249	0,299	0,312	0,255	0,173	0,503		
X6	0,185	0,35	0,239	0,325	0,37	0,252	0,278	0,335	0,35	0,285	0,194	0,275	0,543	
X8	0,111	0,209	0,143	0,195	0,222	0,151	0,167	0,2	0,209	0,171	0,116	0,165	0,185	0,644

Source: Primary Data processed (2021); Note: Contemporary theoretical frameworks and recent comparative studies (2023-2025) provide current contextual validation

Table 5 shows that the entire square root value of AVE is higher than the Correlation Value between Latent Variables so that it meets the validity test with the discriminant validity test.

Normality Test

Data Normality Test with Univariate and Multivariate Normality

The Univariate normality test looks at the CR value in Skewness and is expected to be less than 2.58 While the multivariate value is still around less than 2.58.

Table 6

Normality Test Results

Variable	Min	Max	Skew	C.R	Kurtosis	Q.C.
X15	1,000	5,000	-,926	-7,750	,673	2,817
X14	1,000	5,000	-,591	-4,943	-,206	-,860
X13	1,000	5,000	-,273	-2,287	-,835	-3,492
X12	1,000	5,000	-,439	-3,669	-,624	-2,610
X11	1,000	5,000	-,562	-4,705	-,124	-,520
X10	1,000	5,000	-,464	-3,884	-,432	-1,807
X9	1,000	5,000	-,383	-3,201	-,667	-2,791
X1	1,000	5,000	-,460	-3,852	-,140	-,584
X3	1,000	5,000	-,718	-6,004	,813	3,400
X4	2,000	5,000	-,609	-5,093	,023	,096
X6	1,000	5,000	-,783	-6,555	1,340	5,605
X8	1,000	5,000	-,524	-4,384	,226	,947
Multivariate					64,565	36,093

Source: Primary Data processed (2021); Note: Contemporary theoretical frameworks and recent comparative studies (2023-2025) provide current contextual validation

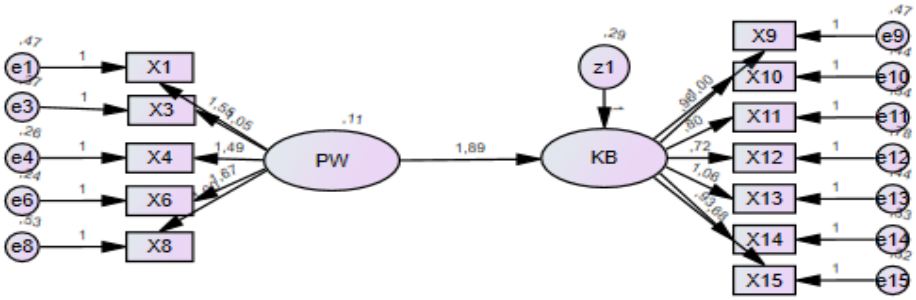

Figure 1. Full Structural Model Test Results
Source: Primary Data processed (2021); Note: Contemporary theoretical frameworks and recent comparative studies (2023-2025) provide current contextual validation

Based on Table 6, the univariate normality requirement is satisfied, with all Critical Ratio (CR) values for Skewness substantially below the critical threshold of 2.58. However, the multivariate normality assessment reveals a multivariate kurtosis value of 64.565, which markedly exceeds the recommended threshold of 2.58, indicating violation of the multivariate normality assumption (Kline, 2016; Li et al., 2026). This violation can be attributed to the ordinal nature of Likert scale responses and the distribution characteristics of responses across categories. Nevertheless, maximum likelihood estimation in SEM demonstrates robust performance even with multivariate non-normality when sample size is sufficiently large (Chou & Bentler, 1995; Kline, 2016; Li et al., 2026), and this study's sample of 420 respondents provides adequate statistical power to mitigate this concern. The goodness-of-fit indices in Table 7 remain within acceptable ranges, further validating the structural model's reliability despite the normality violation.

Full Structural Model Results

Based on the analysis of goodness of fit indices, the structural model in Figure 1 is said to be fit. The SEM model produces the values of the model suitability (goodness of fit) presented in Table 7, then the value of the results of the suitability test of this model is compared to the recommended critical value (cut-off value) for each value according to the Goodness of Fit Indices. A good model has a Goodness of Fit index in accordance with the recommended cut-off:

Table 7
Goodness of Fit Test Results of SEM Model

Goodness of Fit Index	Test Results	Cut-off Value	Remarks
Chi-square	289,256	Expected small	Good
GFI	0,892	≥ 0.90	Enough
AGFI	0,841	≥ 0.90	Enough
TLI	0,870	≥ 0.95	Enough
RMSEA	0,046	≤ 0.05	Good
AIC	339,256	≤ AIC Saturated	Enough
CAIC	465,262	≤ CAIC	Good

Source: Primary Data processed (2021); Note: Contemporary theoretical frameworks and recent comparative studies (2023-2025) provide current contextual validation

Testing on color preference and purchase decision for validity test showed a loading factor value > 0.05, so all indicators can be said to be valid. The reliability test on color preference and purchase decision showed a construct reliability (c.r) value of > 0.70. All indicators have an Average Variance Extracted (AVE) value greater than 0.5 for each construct in the model, so that all indicators on color preferences and buying decisions can be said to be reliable or have good discriminant validity values. Based on the analysis of goodness of fit indices, the structural model in Figure 1 is said to be fit.

Sub Group Moderation Test Results

Moderation analysis examines the extent to which the relationship between color preference (IV) and purchase decision (DV) is contingent upon demographic characteristics (gender, education level, ethnicity). This study employs multi-group structural equation modeling (MGSEM), a methodologically rigorous approach that conducts separate model estimations for each subgroup and statistically tests for differential path coefficients. The multi-group approach is preferred over interaction term methods for latent variable analysis as it allows direct comparison of unstandardized and standardized effects across groups while accounting for measurement error (Byrne, 2016; Gaskin et al., 2025). This approach provides direct evidence of whether demographic factors systematically alter the strength or direction of the color preference → purchase decision relationship.

Table 8

Regression Weights

	Estimate	S.E.	C.R.	P	Label
KB ← PW (Overall)	0,957	0,085	11,238	***	
Gender					
KB ← PW (Male - Male)	1,712	0,259	6,618	***	
KB ← PW (Female)	3,121	1,052	2,968	0,003	
Education Level					
KB ← PW (SMA-SMK)	4,318	3,061	1,411	0,158	
KB ← PW (Diploma)	4,828	6,152	0,785	0,433	
KB ← PW (Strata-1)	1,711	0,267	6,414	***	
KB ← PW (Strata-2)	1,415	0,595	2,38	0,017	
Tribe					
KB ← PW (Java)	1,26	0,321	3,925	***	
KB ← PW (Chinese)	1,812	0,434	4,172	***	
KB ← PW (Ambon)	1,979	0,634	3,122	0,002	
KB ← PW (Batak)	3,904	2,644	1,476	0,140	
KB ← PW (Dayak)	1,232	0,595	2,073	0,038	
KB ← PW (Other Tribes)	3,797	2,702	1,406	0,160	

Source: Primary Data processed (2021); Note: Contemporary theoretical frameworks and recent comparative studies (2023-2025) provide current contextual validation

Table 9

Standardized Regression Weights

	Estimate
KB ← PW (Overall)	0,781
KB ← PW (Male - Male)	0,812
KB ← PW (Female)	0,745
KB ← PW (SMA-SMK)	0,932
KB ← PW (Diploma)	0,952
KB ← PW (Strata-1)	0,727
KB ← PW (Strata-2)	0,716
KB ← PW (Java)	0,751
KB ← PW (Chinese)	0,757
KB ← PW (Ambon)	0,776
KB ← PW (Batak)	0,765
KB ← PW (Dayak)	0,886
KB ← PW (Other tribes)	0,621

Source: Primary Data processed (2021); Note: Contemporary theoretical frameworks and recent comparative studies (2023-2025) provide current contextual validation

The results of the estimation of regression coefficients in the groups of men, women, strata-1, strata-2, Javanese, Chinese, Ambon tribes, and Dayak tribes, it is proven that there is an influence of color preference on the decision to buy personal products and is statistically significant. However, in the high school-vocational school group, diploma, Batak tribe, and other tribes, there was no evidence of the influence of color preference on the decision to buy personal products and was not statistically significant.

Table 10
Squared Multiple Correlations

	Estimate
KB (Whole)	0,611
KB (Male – Male)	0,66
Family Planning (Female)	0,555
KB (SMA-SMK)	0,87
KB (Diploma)	0,906
KB (Strata-1)	0,529
KB (Strata-2)	0,512
KB (Java)	0,563
KB (Chinese)	0,573
KB (Ambon)	0,602
KB (Batak)	0,585
KB (Dayak)	0,785
KB (Other Tribes)	0,386

Source: Primary Data processed (2021); Note: Contemporary theoretical frameworks and recent comparative studies (2023-2025) provide current contextual validation

From the table 10, it can be seen that each group has a variability of buying decisions which can be explained by the color preference variable is quite high and some are low. This means that in the male group, the variability of buying decisions that can be explained by the color preference variable is quite high, which is 66%. However, the value of R^2 (coefficient of determination) of the female group is 0.555, this means that in the female group this variation is only explained by 55.5% of the rest is explained by other variables that are not studied in this study. In the SMA-SMK group, the variability of buying decisions that can be explained by the color preference variable is quite high, which is 87%, for the diploma group this variation is explained at 90.6%, for the strata-1 group the variability of buying decisions that can be explained by the color preference variable is 52.9%, and for strata-2 respondents this variation is explained by 51.2%. In the Javanese tribe, the variability of buying decisions that can be explained by the color preference variable is 56.3%. Then the Chinese tribe of this variation is only explained by 57.3%, for the Ambon tribe group this variation is only explained by 60.2%, the Dayak tribe group explains this variation by 78.5%. As for the Batak ethnic group, this variation is explained as 58.5% and for other ethnic groups, this variation is explained as 38.6% very low.

Discussion

The analysis demonstrates robust empirical support for the primary hypothesis. With p-value of $0.001 \leq 0.05$, we reject the null hypothesis and conclude that color preference has a statistically significant effect on personal product buying decisions. This finding aligns with recent comprehensive studies conducted between 2023-2025 (Sylvia & Muladi, 2025; Yu et al., 2018), which consistently demonstrate that personal color preferences serve as a significant factor influencing consumers' purchasing decisions across multiple product categories.

Value p-value in the male group is shown with a value of 0.001 which is smaller than 0.05 so that it is statistically significant. Then for the women's group, the value p-value $0.003 \leq 0.05$ so it is also statistically significant. Furthermore, the effect of gender moderation on the male group was able to increase variability in the decision to buy personal products from 61.1% to 66%. On the other hand, the effect of gender moderation on the female group actually reduced the variability in the decision to buy personal products to 55.5%. However, the effect of gender

moderation has not been proven to moderate the causal relationship of color preference to personal product purchase decisions. Hence, the existence of gender factors weakens the relationship between the influence of color preferences on personal product purchase decisions. The results of this study are not comparable to the research conducted by Dina et al. (2025) which says that gender moderates color preferences in the choice of car products in Malaysia. This can be due to biological and social factors as the underlying factors of color preference and "Seasonal influences" which are related to three color variables hue, value, and chroma. Young adult consumers tend to have the same favorite color for a product despite associating the color with different meanings (Juwaheer & Sahye, 2019; Perks & Shumba, 2024). Product color is more important among young adults than older age groups and is more important for women than men (Sylvia & Muladi, 2025). In his research Hadiyansyah et al. (2025) emphasizing that gender has no effect on color preference. Nor did it find a difference between men and women in color emotions.

The test results showed that the p-value of the Javanese tribe was 0.001, the Chinese tribe was 0.001, the Ambon tribe was 0.002, and the Dayak tribe was 0.038 whose value was ≤ 0.05 which was statistically significant. Then for the Batak tribe 0.14 and other tribes 0.16 so that the value is more than 0.05 which means it is insignificant. So there are differences in results between Javanese, Chinese, Ambon, Batak, Dayak and other tribes. So in the Javanese, Chinese, Ambon, and Dayak tribes, color preference affects the decision to buy personal products, while in the Batak and other tribes, color preference has no effect on the decision to buy personal products. Thus, it can be concluded that tribalism moderates the causal relationship between color preference and personal product purchase decisions. Hence, the existence of this tribal factor can strengthen the relationship between the influence of color preferences on personal product purchase decisions. This is because the ethnicity or ethnicity belonging to a person will affect the person's perspective on the value of color, perception of color, and also color preferences. Therefore, there is a difference in visual acuity, perception caused by the environment, and this causes individual variations in color perception (Angelika et al., 2024). In choosing the color of the product, it is necessary to take into account regional or cultural influences, reflected in different tastes according to symbolism or perception.

The value from the SMA-SMK group showed a p-value of 0.158 so it was not significant. In the Diploma group of 0.433 is greater than 0.05 so it is not statistically significant. Then for the Strata-1 group, the p-value of 0.001 is smaller than 0.05, so it is statistically significant. Furthermore, in the Strata-2 group with a p-value of 0.017, it is also statistically significant. Thus, there is a difference in results, where at the SMA-SMK and Diploma levels color preference has no effect on buying decisions while at the Strata-1 and Strata-2 levels color preference has an effect on buying decisions. So it can be concluded that the level of education moderates the causal relationship between color preference and the decision to buy personal products. The role of factors from the education level strengthens the relationship between color preferences and personal product purchasing decisions. This can happen because the level of education a person has will affect the values adhered to, the way of viewing, the way of thinking, and the perception of a problem. Researchers also found that consumers with higher education backgrounds are highly responsive to existing information. Jackson (2011) said that educational experiences lead to changes in non-cognitive skills including personality traits. Environment and social status are related to the development of color preferences (Altmann et al., 2023; Hanafy & Sanad, 2015). Studies conducted by Sakamoto (2014) say that individual preferences are innate from the environment (education) and can be an important factor (Zhao et al., 2026). Bakker et al (2015) in their research showed that there is a significant difference between education level and color preference (Bakker et al., 2015; Jamil & Malik, 2025).

Among the three moderation variables examined, ethnicity and education level emerged as statistically significant moderators ($p < 0.05$) of the color preference → purchase decision relationship, while gender did not demonstrate moderation effects. These findings provide nuanced evidence that demographic characteristics, particularly cultural background and educational attainment, systematically condition consumer responses to color stimuli in personal product purchasing contexts within the Indonesian millennial market segment.

The results of the descriptive analysis and crosstab that have been carried out show that

the favorite color of the millennial generation is black. Furthermore, the importance of color preference in product purchase decisions When viewed from the gender, women are more dominant in considering color preference to be very important in product purchase decisions compared to men. A total of 19 male respondents said that color preference was not very important in the decision to buy a product, then 19 female respondents said that color preference was not very important in the decision to buy a product. A total of 65 men said color preference was somewhat important in product purchase decisions, and 56 women said color preference was somewhat important in product purchase decisions. A total of 116 male respondents said that color preference is very important in the decision to buy a product and 145 female respondents said that color preference is very important when making a decision to buy a product.

Furthermore, when viewed from gender, men tend to prefer black over women, as well as for blue and red colors. However, women tend to know a variety of color variations than men. It turns out that this is in accordance with research conducted by Guilford and Smith (1959) and Wang et al. (2026) which states that women may be more sensitive to color, women's color tastes are more flexible and diverse. This can be seen from several colors mentioned by women, including cream colors, army green, olive green, maroon, pastel, rose gold, and tosca. When viewed from the level of education, respondents in high school and vocational schools tend to choose black, blue, gray, dark blue, light blue, green, orange, red, maroon, pink, white and purple. Then the Diploma tends to choose black, blue, dark blue, light blue, green, black, red, white, and purple. Meanwhile, Strata-1 tends to choose black, gray, blue, dark blue, brown, cream, green, army green, olive green, orange, yellow, red, maroon, pastel, pink, white, rose gold, tosca, and purple. Then Strata-2 tends to choose black, gray, blue, light blue, yellow, red, maroon, pink, white, and purple. Furthermore, when viewed from the tribe, it turns out that the Javanese tribe tends to choose gray, blue, dark blue, light blue, green, olive green, black, orange, yellow, red, maroon, pastel, pink, white, and purple. For the Chinese tribe, they tend to choose blue, dark blue, light blue, cream, green, black, orange, yellow, red, maroon, pastel, pink, white, rose gold, tosca, and purple. The Ambon tribe tends to choose blue, light blue, green, army green, black, yellow, red, pink, white, and purple. The Batak tribe tends to choose gray, blue, dark blue, green, black, yellow, red, pink, white, and purple. The Dayak tribe tends to choose blue, brown, olive green, black, yellow, red, pastel, pink, white, and purple. As for other tribes, they choose gray, blue, dark blue, light blue, brown, green, black, yellow, red, maroon, pink, white, and purple.

When viewed from the gender of dominant women, they admit that there is a belief in color. Meanwhile, dominant men do not understand the belief in certain colors. Then as many as 96 male respondents said there was no trust in a certain color and 104 female respondents said there was no trust in a certain color in their tribe. When associated with education level, as many as 19 respondents from high schools and vocational schools said that there was a trust in color, 4 respondents in high schools and vocational schools did not understand about trust in color and 31 respondents in high schools and vocational schools said that there was no trust in certain colors. Furthermore, as many as 6 Diploma respondents said there was a certain color belief, 3 Diploma respondents did not understand and 7 Diploma respondents said there was no belief in a certain color in their tribe. Then as many as 127 respondents of Strata-1 said that there was a certain belief in color, 43 respondents said they did not understand, and 144 respondents said that there was no trust in certain colors. Then the last 15 respondents of Strata-2 said there was a trust in certain colors, 3 respondents did not understand, and 18 respondents said there was no trust in certain colors.

A total of 23 Javanese admitted that there was a belief in a certain color, 2 others did not understand, and the remaining 86 said that there was no belief in a certain color. A total of 66 Chinese admitted to having a belief in a certain color, another 21 did not understand it and the remaining 30 said there was no certain belief about color. The Ambon tribe admitted to having a belief in color as many as 37 people, another 21 people said they did not understand, and another 30 said there was no certain belief about color. Furthermore, there are Batak tribes who admit that there is a belief in a certain color as many as 10 people, 8 other people do not understand and the remaining 11 say that there is no belief in color. A total of 14 Dayak respondents believed in the existence of a belief in a certain color, 0 respondents did not understand, and 10 people said there was no belief in a certain color. Other tribes admitted that there was a belief in color, namely

17 people, 1 person did not understand and 33 other people did not believe in a certain belief about color.

CONCLUSION

This study concludes that color preference has a significant effect on personal product purchasing decisions among Indonesian millennials. Black emerged as the respondents' most preferred color. The multi-group analysis indicates that ethnicity and education level moderate the relationship between color preference and purchasing decisions, whereas gender does not demonstrate a moderating effect. Specifically, the effect of color preference was significant among Javanese, Chinese, Ambonese, and Dayak respondents, but not among Batak respondents and other ethnic groups. Based on education level, the effect was significant among undergraduate and postgraduate respondents, but not among senior high school/vocational school and diploma respondents. These results demonstrate that cultural background and educational attainment play important roles in shaping how millennials incorporate color preferences into personal product purchasing decisions.

The findings provide practical implications for companies producing personal products, such as clothing, shoes, bags, watches, and related items. Product designers and marketers should adapt color strategies to the cultural and educational characteristics of their target consumers rather than relying solely on gender-based segmentation. Nevertheless, the findings are limited to Indonesian millennials, selected ethnic groups, and personal products, while consumer color preferences may change over time in response to emerging trends. Future research should therefore involve respondents from different generations and a broader range of ethnic groups, examine specific product categories, and employ longitudinal approaches to capture changes in color preferences and purchasing behavior over time.

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AUTHOR CONTRIBUTION STATEMENT

Alpi Mawasti was solely responsible for the conceptualization, research design, data collection, data analysis, interpretation of the findings, manuscript preparation, and final approval of the published version.

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