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Impact of Personalization on Buying Behavior: An Empirical Study

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ABSTRACT:

Personalized marketing is characterized by targeting advertising and product recommendations based on customer data to maximize e-commerce purchases. This study examines the link between perceived personalization and buying behavior and compares the effect with brand trust and privacy concern, while controlling for age and gender. Online consumers ($n = 171$) participated in a convenience sample survey that used five-point Likert scales (Cronbach's $\alpha = .82-.86$) to measure the variables of interest. Data were analyzed using chi-square tests of independence, one-way ANOVA with Tukey post hoc comparisons and simple and multiple linear regression. Purchase frequency through personalized advertising was associated with age group ($\chi^2(4) = 19.24, p < .001$, Cramér's $V = .24$), but purchasing after a personalized advertisement was not associated with gender ($\chi^2(1) = 1.04, p = .307$). Buying behavior differed across age groups ($F(2, 168) = 6.86, p = .001, \eta^2 = .076$) and purchase-frequency groups ($F(2, 168) = 6.76, p = .002, \eta^2 = .075$); post hoc follow-ups showed that 18–25-year-olds scored higher than older respondents and that infrequent buyers scored lower than the other groups. Perceived personalization alone explained 45.9% of the variance in buying behavior; adding brand trust and privacy concern explained 55.6% (adjusted $R^2 = .548$), with personalization ($\beta = .54$) and trust ($\beta = .32$) as positive and privacy concern ($\beta = -.13$) as a small negative predictor. The findings suggest that businesses should employ relevant personalization and transparent data practices.

Keywords: personalized marketing; digital marketing; buying behavior; brand trust; privacy concern; personalization–privacy paradox; regression analysis

1. Introduction

E-commerce, social media, and mobile applications have enabled firms to engage with consumers in new ways. Instead of disseminating a uniform message to a large audience, marketers can now use browsing and purchase histories to deliver targeted advertisements and product recommendations. Common examples include recommendations on online stores and retargeting advertisements on social media platforms. Personalization of this kind aims to make advertising effective, by reducing search efforts, which is expected to raise conversion and retention.

The same data collection raises concerns about privacy and manipulation. Consumers may welcome relevant offers, yet feel that they are being watched. This tension is known as the personalization–privacy paradox: the commercial benefits of personalization are not uniformly positive and depend on consumers' trust and characteristics. The issue is particularly relevant in India, where mobile-based retail and online advertising are growing quickly among younger consumers.

1.1 Problem statement

Although many firms embrace personalized advertising, little is known about how consumers' perception of personalization translates into buying behavior after controlling for trust, privacy concern and demographic characteristics (age and gender) are considered together. This study fills this gap.

1.2 Objectives

To examine how perceived personalization influences consumers' buying behavior.

To assess the roles of brand trust and privacy concern in buying behavior under targeted online advertising.

To test whether purchasing through targeted advertisements is associated with gender and age group.

To compare buying behavior across age groups and purchase-frequency groups.

To offer managerial recommendations for ethical and effective personalization programs.

1.3 Scope and significance

The study encompasses consumers who browse websites and apps where advertisements and recommendations are algorithmically generated. The integrated model of personalization, trust and privacy concern is tested, and guidance is offered to practitioners on the level of personalization and the data-transparency practices that facilitate purchasing.

2. Literature review and hypotheses

2.1 Personalization and consumer response

Early work on website and email personalization shows that tailoring content to individuals can boost response. Ansari and Mela (2003) found that customizing email content increased response rates, and Tam and Ho (2006) showed that web personalization influences how users process information and make decisions. Bleier and Eisenbeiss (2015) found that the effectiveness of personalized ads depends on the interaction of what is personalized, when and where, suggesting that relevance, not personalization, is key to response. Under the theory of planned behavior (Ajzen, 1991), advertising that encourages positive attitudes should enhance purchase intentions and, ultimately, behavior.

2.2 Trust

Trust reduces perceived risk and uncertainty during online exchanges. Morgan and Hunt (1994) identified trust as a critical driver of relationship commitment, and later work treats it as a prerequisite for consumers to agree to the use of their information. Consumers who trust a brand are more likely to favor customized promotions because they believe the brand handles data ethically.

2.3 Privacy concern and the personalization–privacy paradox

Awad and Krishnan (2006) described a personalization–privacy paradox in which consumers value tailored services but are reluctant to share the information needed to provide them. White et al. (2008) found that highly personalized solicitations can provoke reactance, and Aguirre et al. (2015) showed that personalization can reduce the response when consumers become aware that their data are collected without transparency. Privacy concern is expected to moderate the effect of personalization on purchasing.

2.4 Demographic differences

Younger consumers spend more time on digital platforms and are more aware of algorithmic recommendations, so their exposure to and acceptance of personalized advertising may differ from that of older consumers. Evidence on gender differences in online buying motivations is mixed. These observations motivate the following hypotheses.

2.5 Research gap

Most studies examine personalization, trust, and privacy separately, often using experimental studies in Western samples. Few integrate them in a survey-based model that explores the self-reported buying behavior of young Indian consumers. This study fills this gap.

2.6 Hypotheses

Each hypothesis is tested at $\alpha = .05$. H1–H4 are non-directional (two-tailed); H5 and H6 are directional, with signs predicted from Sections 2.1–2.3.

Table 1. Research hypotheses

No.	Null hypothesis (H0)	Alternative hypothesis (H1)
H1	Gender and purchasing after a personalized advertisement are independent.	Gender is associated with purchasing after a personalized advertisement.
H2	Age group and frequency of purchasing through personalized advertising are independent.	Age group is associated with frequency of purchasing through personalized advertising.
H3	Mean buying behavior is equal across age groups ($\mu_{18-25} = \mu_{26-35} = \mu_{36+}$).	Mean buying behavior differs for at least one pair of age groups.
H4	Mean buying behavior is equal across purchase-frequency groups ($\mu_{rarely} = \mu_{sometimes} = \mu_{often}$).	Mean buying behavior differs for at least one pair of frequency groups.

No.	Null hypothesis (H0)	Alternative hypothesis (H1)
H5	Perceived personalization has no effect on buying behavior ($\beta_1 = 0$).	Perceived personalization has a positive effect on buying behavior ($\beta_1 > 0$).
H6	Personalization, brand trust and privacy concern have no joint effect on buying behavior ($\beta_1 = \beta_2 = \beta_3 = 0$).	The predictors jointly affect buying behavior, with personalization ($\beta_1 > 0$) and trust ($\beta_2 > 0$) positive and privacy concern ($\beta_3 < 0$) negative.

3. Research methodology:

3.1 Research design

The study is a descriptive, explanatory, quantitative investigation that uses a cross-sectional survey.

3.2 Sample and sampling

The population comprises consumers who shop online and have encountered targeted ads or recommendations. A non-probability convenience sample of 171 respondents was collected using an online Google Form shared on social media and messaging platforms. Respondents were required to have been exposed to targeted advertisements or recommendations.

3.3 Instrument

Data were collected with a structured questionnaire (Appendix A). Section A recorded gender, age group (18–25, 26–35, 36 and above), frequency of buying through personalized advertising (rarely, sometimes, often) and whether a purchase had been made after a personalized advertisement in the previous three months (yes/no). Section B contained 14 statements rated on a five-point Likert scale (1 = strongly disagree, 5 = strongly agree) to measure four constructs: Perceived Personalization (PER, 4 items), Brand Trust (TRU, 3 items), Privacy Concern (PRV, 3 items) and Buying Behavior (BB, 4 items). Each construct score is the mean of its items.

3.4 Analytical procedures

All analyses were performed in Microsoft Excel. Descriptive statistics and Cronbach's alpha were used to profile respondents and assess reliability, with $\alpha \geq .70$ taken as acceptable (Nunnally, 1978). Chi-square tests of independence were used to examine H1 and H2, with Cramér's V as the effect size and expected cell counts compared against the minimum of 5. One-way ANOVA was used to examine H3 and H4, with eta squared (η^2) as the effect size and Tukey HSD post hoc comparisons, computed from the group means and pooled within-group mean square, to identify pairwise differences. Simple and multiple linear regression (Excel LINEST) were used to examine H5 and H6. The multiple regression model is:

$$BB = \beta_0 + \beta_1(PER) + \beta_2(TRU) + \beta_3(PRIV) + \varepsilon$$

Multicollinearity was assessed with variance inflation factors (VIF) derived from the predictor correlation matrix. Effect sizes follow Cohen (1988).

4. Data analysis and results

4.1 Respondent profile

Table 2. Demographic and behavioral profile of respondents (N = 171)

Variable	Category	n	%
Gender	Male	90	52.6
	Female	81	47.4
Age group	18–25	80	46.8

Variable	Category	n	%
	26–35	53	31.0
	36 and above	38	22.2
Purchase frequency via personalized ads	Rarely	38	22.2
	Sometimes	74	43.3
	Often	59	34.5
Purchased after a personalized ad (past 3 months)	Yes	33	19.3
	No	138	80.7

The sample is slightly male-dominated (52.6%) and young, with 46.8% aged 18–25. About 78% of respondents buy through personalized advertising at least sometimes, whereas 19.3% had purchased after seeing a personalized advertisement in the previous three months.

4.2 Reliability and descriptive statistics

Table 3. Descriptive statistics and reliability of the constructs

Construct	Items	Mean	SD	Cronbach's α	t vs. midpoint (3)
Perceived Personalization (PER)	4	3.47	0.82	.860	7.50***
Brand Trust (TRU)	3	3.50	0.80	.818	8.17***
Privacy Concern (PRV)	3	3.32	0.89	.854	4.70***
Buying Behavior (BB)	4	2.80	0.79	.843	−3.31**

Note. N = 171; df = 170 for all t tests. $p < .01$, $p < .001$.

All four scales exceed the .70 reliability threshold ($\alpha = .818-.860$). Respondents rated personalization ($M = 3.47$), trust ($M = 3.50$) and privacy concern ($M = 3.32$) significantly above the scale midpoint, whereas buying behavior ($M = 2.80$) was significantly below it. Respondents therefore perceive advertising as personalized and trust brands moderately, but report only modest purchasing in response to it.

4.3 Correlations

Table 4. Pearson correlations among the study variables

Variable	PER	TRU	PRV	BB
PER	—			
TRU	.380***	—		
PRV	−.152*	.028	—	
BB	.678***	.520***	−.202**	—

Note. N = 171. $p < .05$, $p < .01$, $p < .001$ (two-tailed).

Buying behavior correlates strongly with perceived personalization ($r = .678$) and moderately with trust ($r = .520$), and negatively with privacy concern ($r = -.202$). Personalization correlates moderately with trust ($r = .380$) and weakly and negatively with privacy concern ($r = -.152$); trust and privacy

concern are essentially unrelated ($r = .028$). All predictor intercorrelations are well below .80, and VIF values (Section 4.6) confirm that multicollinearity is not an issue.

4.4 Chi-square tests of independence

Test 1 (H1): gender and purchase after a personalized advertisement.

Table 5. Gender by purchase after a personalized advertisement (observed counts, row %)

Gender	Yes	No	Total
Male	20 (22.2%)	70 (77.8%)	90
Female	13 (16.0%)	68 (84.0%)	81
Total	33 (19.3%)	138 (80.7%)	171

The association was not significant, $\chi^2(1, N = 171) = 1.04$, $p = .307$, $\phi = .078$ (critical value 3.841 at $\alpha = .05$). All expected counts exceeded 15, and applying Yates' continuity correction does not change the conclusion ($\chi^2 = 0.68$, $p = .408$). We therefore fail to reject H0: H1 is not supported. Male respondents (22.2%) were somewhat more likely than female respondents (16.0%) to have purchased after a personalized advertisement, but this difference is within sampling variation.

Test 2 (H2): age group and purchase frequency.

Table 6. Age group by purchase frequency through personalized advertising (count, row %, adjusted standardized residual)

Age group	Rarely	Sometimes	Often
18–25 (n = 80)	8 (10.0%), -3.60	38 (47.5%), 1.05	34 (42.5%), 2.06
26–35 (n = 53)	13 (24.5%), 0.49	22 (41.5%), -0.31	18 (34.0%), -0.10
36 and above (n = 38)	17 (44.7%), 3.79	14 (36.8%), -0.91	7 (18.4%), -2.36
Total (N = 171)	38 (22.2%)	74 (43.3%)	59 (34.5%)

Note. Adjusted residuals beyond ± 1.96 indicate cells that differ significantly from independence.

Age group and purchase frequency are significantly associated, $\chi^2(4, N = 171) = 19.24$, $p < .001$, Cramér's $V = .237$ (critical value 9.488), a small-to-medium effect. The minimum expected count is 8.4, so the test is valid. H0 is rejected and H2 is supported. The residuals show where the association arises: respondents aged 18–25 were less likely than expected to buy rarely (10.0%) and more likely to buy often (42.5%), whereas respondents aged 36 and above were more likely than expected to buy rarely (44.7%) and less likely to buy often (18.4%). The 26–35 group did not depart from independence.

4.5 One-way ANOVA

Table 7. Mean buying behavior by age group and purchase frequency

Grouping variable and level	n	Mean BB	95% CI
Age group: 18–25	80	3.03	[2.87, 3.19]
Age group: 26–35	53	2.65	[2.44, 2.86]
Age group: 36 and above	38	2.54	[2.29, 2.79]
Purchase frequency: Rarely	38	2.43	[2.18, 2.68]

Grouping variable and level	n	Mean BB	95% CI
Purchase frequency: Sometimes	74	2.82	[2.63, 3.01]
Purchase frequency: Often	59	3.02	[2.81, 3.23]

Note. Confidence intervals use the pooled within-group mean square ($MSW = 0.583$, $N = 1715$). The 18–25 mean is recovered from the reported grand mean and the age-group sum of squares; please verify against the Excel output.

Table 8. ANOVA summary

Source	SS	df	MS	F	p	η^2
Age group: between	7.996	2	3.998	6.863	.001	.076
Age group: within	97.869	168	0.583			
Age group: total	105.865	170				
Frequency: between	7.884	2	3.942	6.759	.002	.075
Frequency: within	97.981	168	0.583			

Buying behavior differed significantly across age groups, $F(2, 168) = 6.86$, $p = .001$, $\eta^2 = .076$, and across purchase-frequency groups, $F(2, 168) = 6.76$, $p = .002$, $\eta^2 = .075$ (critical $N = 1716$). H_3 and H_4 are supported; both effects are of medium size by Cohen's (1988) benchmarks ($\eta^2 \approx .06$ medium).

Table 9. Tukey HSD post hoc comparisons

Comparison	Mean diff.	q	p	Cohen's d
Age: 18–25 vs. 26–35	0.38	3.98	.015	0.50
Age: 18–25 vs. 36 and above	0.49	4.61	.004	0.64
Age: 26–35 vs. 36 and above	0.11	0.96	.777	0.14
Frequency: Rarely vs. Sometimes	–0.39	3.62	.030	0.51
Frequency: Rarely vs. Often	–0.59	5.25	< .001	0.77
Frequency: Sometimes vs. Often	–0.20	2.12	.293	0.26

Post hoc tests refine the omnibus results. Respondents aged 18–25 scored significantly higher on buying behavior than both older groups, which did not differ from each other; the pattern is therefore a difference between the youngest group and the rest rather than a steady decline with age. Likewise, infrequent buyers scored significantly lower than both other groups, while “sometimes” and “often” buyers did not differ significantly (Figure 1).

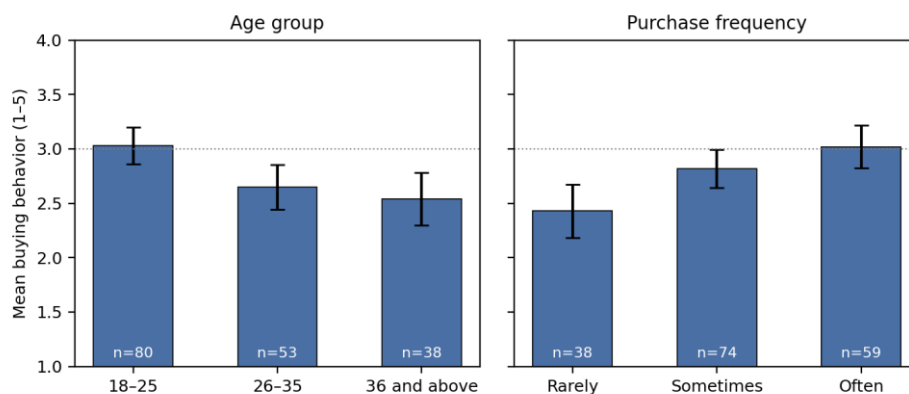


Figure 1. Mean buying behavior by age group and purchase frequency (error bars: 95% CI; dotted line: scale midpoint).

4.6 Regression analysis

Model 1 (H5): simple regression of buying behavior on perceived personalization.

Table 10. Simple linear regression predicting buying behavior

Predictor	B	β	t	p	R ²
Intercept	0.535				
Perceived personalization	0.654	.678	11.98	< .001	.459

Note. $F(1, 169) = 143.5$, $p < .001$; standard error of estimate = 0.582.

Perceived personalization explained 45.9% of the variance in buying behavior ($R = .678$, Cohen's $N = 1717$ __, a large effect). Each one-point increase in personalization was associated with a 0.654-point increase in buying behavior ($p < .001$), supporting H5.

Model 2 (H6): multiple regression of buying behavior on personalization, trust and privacy concern.

Table 11. Multiple linear regression predicting buying behavior

Predictor	B	SE	β	t	95% CI for B	p	VIF
Intercept	0.285	0.274		1.04		.301	
PER	0.518	0.055	.537	9.48	[0.41, 0.62]	< .001	1.21
TRU	0.315	0.055	.319	5.70	[0.21, 0.42]	< .001	1.18
PRV	-0.115	0.047	-.130	-2.47	[-0.21, -0.02]	.015	1.03

Note. $R = .746$, $R^2 = .556$, adjusted $R^2 = .548$, $F(3, 167) = 69.63$, $p < .001$; standard error of estimate = 0.531. Confidence intervals and VIF values are derived from the reported correlations and standard deviations.

The model was significant and explained 55.6% of the variance in buying behavior (adjusted $R^2 = .548$; $N = 1718$ __, a large effect). The fitted equation is $N = 1719$ __(PER) + 0.315(TRU) - 0.115(PRV). Personalization was the strongest predictor ($\beta = .537$, $sr^2 = .239$), followed by trust ($\beta = .319$, $sr^2 = .087$); privacy concern had a small but significant negative effect ($\beta = -.130$, $sr^2 = .016$). All VIF values were below 1.25, indicating no multicollinearity. H6 is supported with all three coefficients in the predicted direction.

Adding trust and privacy concern increased R^2 from .459 to .556 ($\Delta R^2 = .097$, $F(2, 167) = 18.19$, $p < .001$), so these two variables explain additional variance beyond personalization. Because the model is additive and no interaction terms were tested, the results do not show that personalization works better for high-trust or low-concern consumers; that moderation question is left for future work.

4.7 Summary of hypothesis tests

Table 12. Summary of hypothesis tests

No.	Test	Key result	Decision
H1	Chi-square: gender $\times$ purchase after ad	$\chi^2(1) = 1.04$, $p = .307$	Not supported
H2	Chi-square: age group $\times$ purchase frequency	$\chi^2(4) = 19.24$, $p < .001$	Supported
H3	ANOVA: buying behavior by age group	$F(2, 168) = 6.86$, $p = .001$	Supported
H4	ANOVA: buying behavior by purchase frequency	$F(2, 168) = 6.76$, $p = .002$	Supported
H5	Simple regression: PER $\rightarrow$ BB	$\beta = .678$, $p < .001$	Supported
H6	Multiple regression: PER, TRU, PRV $\rightarrow$ BB	$R^2 = .556$, $p < .001$	Supported

5. Discussion:

Perceived personalization is the main correlate of buying behavior in this sample, consistent with earlier evidence that relevance enhances advertising performance (Bleier & Eisenbeiss, 2015; Tam & Ho, 2006). Trust adds explanatory power and privacy concern has a small negative association, in line with the personalization–privacy paradox (Awad & Krishnan, 2006) and reactance to intrusive targeting (White et al., 2008). Personalization seems to work best when consumers believe their data are collected and used transparently – the next step is to test this in future work.

The findings suggest that businesses should embrace relevant personalization and be transparent about their data practices to enhance consumer buying behavior. This could enable firms to achieve their marketing goals while also respecting consumers' privacy concerns.

5.1 Managerial implications

- Ensure that investments prioritize recommendations that appeal to relevant consumers.
- Enhance trust by encouraging disclosure of information, simplifying consent and promoting openness.
- Improve privacy practices by explaining the reasons behind each specific advertisement, and giving users more control over how their data is collected.
- Personalization should be prioritized for young buyers, but a softer approach is needed for older consumers, who make fewer purchases via such advertisements.

5.2 Limitations and future research

Because the research used a convenience sample of 171 participants and relied on self-reporting, its ability to generalize is limited, and it is vulnerable to individual differences and recall and social-desirability biases. Since both the predictors and outcome were measured in the same survey, common-method bias cannot be ruled out. The cross-sectional design means that the findings only reflect associations, not causal relationships. The buying-behavior scale measures reported buying tendencies, not actual buying behaviors, and overlaps in content with purchase frequency may have artificially inflated the ANOVA results of H4. Likert composites were treated as interval data, and age-group analysis used three bands with the oldest containing only $n = 38$ respondents. Any extension of the analysis would need to include diagnostic tests of the ANOVA, regression, and assumptions (normality, homogeneity of variance, residual plots). Future studies should use a probabilistic sample, include additional variables, such as the type of platform and income, test the mediating/moderating effects of trust, and use structural equation modeling.

6. Conclusion:

This study investigated the role of personalization, trust, and privacy concern as predictors of buying behavior using chi-square tests, ANOVA, and regression analysis. Together, the three predictors explained 55.6% of the variance: personalization (POS) and trust predicted buying tendency positively, while privacy concern (PC) predicted it negatively. Purchase frequency and buying behavior varied with age, peaking among 18–25-year-olds but not differing by gender. Personalization, therefore, should be implemented carefully to maximize sales conversions by targeting the right consumers.

Declarations

Ethics and consent: [Insert statement, e.g., participation was voluntary and anonymous, and informed consent was obtained on the first page of the questionnaire.]

Conflict of interest: [The authors declare no conflict of interest – confirm.]

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Data availability: [The anonymized survey dataset is available from the corresponding author on request – confirm.]

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