

## Behavioral Drivers of Buy Now Pay Later Over-Indebtedness in Indonesia

**ABSTRACT** - The rapid growth of Buy Now Pay Later (BNPL) services in Indonesia have transformed consumer access to digital credit while simultaneously raising concerns regarding impulsive borrowing and financial vulnerability. This study examines the psychological, perceptual, and cultural determinants of BNPL borrowing behavior, focusing on the roles of dark pattern exposure, impulsive buying tendency, perceived usefulness, perceived risk, and Islamic financial literacy. A quantitative cross-sectional survey was conducted among 587 Indonesian BNPL users between April and June 2025. Data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM). The findings indicate that exposure to dark patterns significantly increases impulsive buying tendency and perceived usefulness while reducing perceived risk, leading consumers to develop more favorable attitudes toward BNPL. Impulsive buying tendency, perceived usefulness, and attitudes toward BNPL were found to positively influence over-indebtedness intention, which subsequently increases repayment distress. Mediation analysis confirms that attitudes and borrowing intentions function as important psychological mechanisms linking cognitive perceptions and behavioral outcomes. In addition, Islamic financial literacy weakens the effects of impulsiveness and favorable attitudes on over-indebtedness intention, suggesting its role as a moral and cognitive safeguard within the Indonesian context. The study extends behavioral finance and financial technology literature by integrating manipulative interface design and religiously grounded financial literacy into consumer borrowing models. The findings also highlight the importance of ethical fintech design, transparent digital credit regulation, and culturally embedded financial education to support sustainable financial inclusion and reduce consumer financial vulnerability.

**ABSTRAK** - *Faktor Perilaku dalam Over-Indebtedness Buy Now Pay Later di Indonesia* Perkembangan pesat layanan Buy Now Pay Later (BNPL) di Indonesia telah mengubah pola akses masyarakat terhadap kredit digital, sekaligus menimbulkan kekhawatiran terkait perilaku berutang impulsif dan meningkatnya kerentanan keuangan. Penelitian ini mengkaji faktor-faktor psikologis, perseptual, dan kultural yang memengaruhi perilaku penggunaan BNPL, dengan fokus pada paparan dark patterns, kecenderungan pembelian impulsif, persepsi kegunaan, persepsi risiko, serta literasi keuangan syariah. Penelitian ini menggunakan pendekatan kuantitatif dengan desain survei potong lintang terhadap 587 pengguna BNPL di Indonesia selama periode April–Juni 2025. Analisis data dilakukan menggunakan metode Partial Least Squares Structural Equation Modeling (PLS-SEM). Hasil penelitian menunjukkan bahwa paparan dark patterns secara signifikan meningkatkan kecenderungan pembelian impulsif dan persepsi kegunaan, serta menurunkan persepsi risiko, sehingga membentuk sikap yang lebih positif terhadap BNPL. Kecenderungan pembelian impulsif, persepsi kegunaan, dan sikap positif terhadap BNPL terbukti meningkatkan niat berutang berlebihan (over-indebtedness intention), yang selanjutnya memperbesar tekanan pembayaran (repayment distress). Analisis mediasi mengonfirmasi bahwa sikap dan niat berutang berperan sebagai mekanisme psikologis penting yang menghubungkan persepsi kognitif dengan dampak keuangan yang merugikan. Selain itu, literasi keuangan syariah terbukti memperlemah pengaruh impulsivitas dan sikap positif terhadap niat berutang berlebihan, sehingga berfungsi sebagai pelindung moral dan kognitif dalam konteks masyarakat Indonesia. Penelitian ini memperluas kajian behavioral finance dan teknologi keuangan dengan mengintegrasikan desain antarmuka manipulatif dan literasi keuangan berbasis nilai keagamaan ke dalam model perilaku utang konsumen. Temuan ini menegaskan pentingnya desain fintech yang etis, regulasi kredit digital yang transparan, serta edukasi keuangan yang berakar pada nilai budaya untuk mendukung inklusi keuangan yang berkelanjutan dan mengurangi kerentanan keuangan konsumen.

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## INTRODUCTION

The rapid development of financial technology has transformed contemporary consumer finance, particularly through the emergence of digital credit services that offer fast and flexible payment solutions. One of the most prominent innovations is the Buy Now Pay Later (BNPL) model, which enables consumers to defer payments while maintaining immediate access to goods and services (Krause, 2025). Across various economies, BNPL has gained widespread acceptance due to its convenience, accessibility, and integration with digital commerce platforms. At the same time, growing scholarly attention has focused on the potential risks associated with these services, including impulsive purchasing behavior, weakened risk awareness, and increasing repayment difficulties among users (Juita et al., 2024). Keil and Burg (2023), for example, found that the availability of BNPL significantly increased purchasing behavior among consumers exposed to advertisements while simultaneously elevating the likelihood of default resulting from impulsive financial decisions. These developments indicate that although BNPL may expand financial access, it can also intensify consumer vulnerability when adequate protection mechanisms are lacking.

The expansion of BNPL services has become particularly visible in Indonesia, where digital transformation, high smartphone penetration, and the rapid growth of e-commerce continue to accelerate the adoption of alternative payment systems (Pratika et al., 2021). Deferred payment schemes, promotional incentives, and frictionless checkout processes have encouraged many consumers, especially younger users, to utilize BNPL for everyday transactions. Within the Indonesian context, financial practices are also closely connected to Islamic ethical principles that emphasize fairness, transparency, and the prohibition of *riba* in financial transactions (Sutikno & Aji, 2024). Recent studies examining BNPL from an Islamic perspective have discussed its compatibility with *maqāṣid sharia* and highlighted several concerns related to limited financial literacy, inadequate regulation, and insufficient transparency in digital credit systems (Firdaus et al., 2024). Despite these discussions, empirical evidence remains limited regarding how psychological tendencies, perceptions of financial risk, and digital interface manipulation interact within BNPL usage, particularly when viewed through the lens of Islamic financial literacy.

Previous studies have consistently identified impulsive buying tendency, perceived usefulness, and perceived risk as important determinants influencing BNPL adoption and credit-related decision-making (Hegawan et al., 2023). Much of this literature, however, has examined these variables primarily through the perspectives of the Technology Acceptance Model and behavioral finance frameworks, often treating them as isolated psychological or cognitive constructs. At the same time, research concerning dark patterns has largely emerged from the fields of e-commerce and human-computer interaction, with greater emphasis on user experience, privacy concerns, and ethical interface design (Mathur et al., 2019; Gray et al., 2018). Limited attention has been directed toward understanding how manipulative interface designs shape financial decision-making, borrowing intentions, or repayment-related behavior in digital lending environments. As a result, existing fintech and behavioral finance studies have not sufficiently incorporated interface-level manipulation as a structural factor that may contribute to financial vulnerability and over-indebtedness.

This study responds to that gap by integrating dark pattern exposure into a behavioral finance and technology acceptance framework to examine its influence on impulsive buying tendency, perceived usefulness, and perceived risk in BNPL usage. The study further investigates how these factors shape attitudes toward BNPL, intentions to over-borrow, and repayment distress among Indonesian consumers. In addition, Islamic financial literacy is positioned as a moderating factor that may reduce the transition from impulsive tendencies and favorable borrowing attitudes toward over-indebtedness intention.

Accordingly, this research aims to develop and evaluate a structural equation model using Partial Least Squares Structural Equation Modeling (PLS-SEM) to analyze the relationships among dark pattern exposure, impulsive buying tendency, perceived usefulness, perceived risk, attitudes toward BNPL, over-indebtedness intention, and repayment distress in the Indonesian BNPL context. The study also examines whether Islamic financial literacy weakens the positive relationships between impulsiveness and over-indebtedness intention as well as between favorable attitudes toward BNPL and over-indebtedness intention.

The study offers several contributions to the existing literature. First, it extends behavioral finance research by incorporating dark pattern exposure into models of consumer financial behavior. Second, it situates the analysis within a Muslim-majority emerging economy, allowing greater attention to cultural and ethical dimensions that remain underexplored in mainstream BNPL research. Third, the inclusion of Islamic financial literacy as a moderating construct provides insight into the potential role of value-based financial understanding in mitigating excessive borrowing behavior. In practical terms, the study also provides relevant implications for fintech providers and regulators in Indonesia concerning ethical interface design, transparent disclosure practices, and the development of Sharia-oriented financial literacy initiatives.

## LITERATURE REVIEW

### Theoretical Foundation

This study draws upon behavioral finance, consumer psychology, technology acceptance theory, and self-regulation theory to explain borrowing behavior within Buy Now Pay Later (BNPL) services. Although BNPL platforms are widely promoted as seamless and accessible payment innovations, emerging research indicates that their design features may also shape financial behavior in ways that increase consumer vulnerability.

One important concept in this discussion is the use of dark patterns, which refer to manipulative or deceptive interface designs intended to steer users toward particular decisions (Mathur et al., 2019). In BNPL systems, these designs may appear in the form of countdown timers, preselected payment options, or hidden cost disclosures. Such interface elements can intensify perceptions of convenience while simultaneously reducing users' awareness of financial risk. This mechanism aligns with dual-process decision-making theory, which suggests that emotional cues and heuristic processing often dominate rational evaluation, particularly under time pressure or cognitive distraction (Kahneman & Tversky, 1979).

Impulsive buying tendency therefore becomes an important psychological construct in explaining BNPL behavior. Individuals with stronger impulsive tendencies are more likely to

prioritize immediate gratification over long-term financial consequences, increasing their willingness to adopt deferred payment services (Keil & Burg, 2023). These tendencies may also encourage more favorable attitudes toward BNPL. In this study, *attitude toward BNPL* refers to an individual's cognitive and affective evaluation of BNPL as useful, attractive, or acceptable. In contrast, *over-indebtedness intention* reflects the willingness to borrow beyond one's repayment capacity. The distinction is important because consumers may evaluate BNPL positively without necessarily intending to engage in excessive borrowing.

Perceived usefulness and perceived risk further shape consumer attitudes. According to the Technology Acceptance Model (TAM), perceived usefulness strengthens positive attitudes toward technological innovations (Davis, 1989), whereas perceived risk tends to reduce acceptance and usage intentions (Featherman & Pavlou, 2003). Together, these constructs explain how consumers form favorable or unfavorable evaluations of BNPL services.

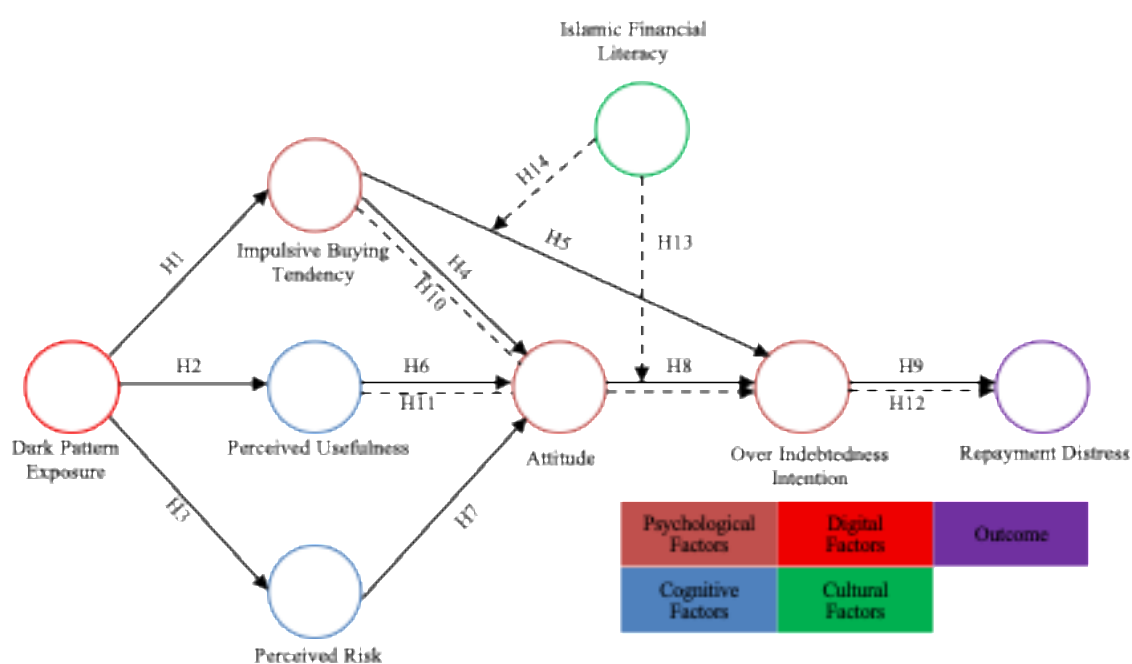


Figure 1. Research Framework

The framework also incorporates self-regulation theory to explain the moderating role of Islamic financial literacy. Self-regulation theory emphasizes individuals' ability to control impulses and align behavior with long-term goals and moral standards (Baumeister & Heatherton, 1996). In financial settings, Islamic financial literacy extends beyond technical financial knowledge by integrating ethical and religious principles, including the prohibition of *riba*, fairness in transactions, and accountability in financial conduct (Abduh & Omar, 2012; Furqan et al., 2025). Individuals with stronger Islamic financial literacy are therefore expected to exercise greater caution when evaluating and using BNPL services, reducing the likelihood that impulsive tendencies or favorable attitudes translate into excessive borrowing. Overall, the proposed framework explains how dark pattern exposure, impulsive buying tendency, perceived usefulness, and perceived risk influence attitudes toward BNPL, over-indebtedness intention, and repayment distress. Islamic financial literacy functions as a protective mechanism that may

weaken the progression from positive borrowing attitudes and impulsive tendencies toward financial vulnerability.

### **Dark Pattern Exposure and Consumer Perceptions**

Digital financial platforms increasingly rely on interface design to influence user behavior. Some of these strategies are categorized as dark patterns, defined as manipulative design practices that encourage users to make decisions they might not otherwise choose (Mathur et al., 2019; Ibrahim et al., 2024). Examples include default payment selections, artificial scarcity cues, and unclear disclosures regarding repayment obligations. Within BNPL services, such designs can enhance the attractiveness of deferred payments while obscuring their potential financial consequences.

Research in human–computer interaction shows that dark patterns reduce users’ sense of control and encourage irrational decision-making (Gray et al., 2018). From a behavioral finance perspective, these interface cues are expected to influence consumer perceptions in several ways. First, dark patterns may increase impulsive buying tendency because urgency cues and frictionless payment systems limit reflective decision-making and encourage immediate consumption (Keil & Burg, 2023). Second, they may strengthen perceived usefulness by emphasizing convenience, speed, and accessibility (Lazar et al., 2010). Third, dark patterns may reduce perceived risk because repayment obligations and hidden costs become less visible to consumers. In line with prospect theory, individuals tend to underestimate negative outcomes when risks are reframed or concealed (Kahneman & Tversky, 1979).

These arguments suggest that manipulative digital design shapes both cognitive and affective evaluations of BNPL services, increasing consumers’ susceptibility to excessive borrowing. Therefore, the following hypotheses are proposed:

**H1:** Dark Pattern Exposure positively influences Impulsive Buying Tendency.

**H2:** Dark Pattern Exposure positively influences Perceived Usefulness of BNPL.

**H3:** Dark Pattern Exposure negatively influences Perceived Risk of BNPL.

### **Impulsive Buying Tendency and Borrowing Behavior**

Impulsive buying refers to spontaneous and unplanned purchasing behavior driven more by emotional responses than rational deliberation (Rook & Fisher, 1995). In digital financial environments, BNPL services can intensify impulsive consumption because they reduce the immediate financial burden associated with purchases. Seamless checkout processes and deferred payment features further minimize consumers’ opportunity for careful financial consideration.

Prior studies consistently show that individuals with stronger impulsive buying tendencies are more likely to accumulate debt, encounter repayment problems, and experience financial stress (Fenton-O’Creedy et al., 2018). In BNPL contexts, impulsiveness may encourage consumers to perceive deferred payment systems as rewarding and convenient despite potential financial risks (Keil & Burg, 2023). Consequently, impulsive individuals are more likely to develop favorable attitudes toward BNPL services.

Impulsiveness may also directly increase over-indebtedness intention. Consumers with high impulsivity often underestimate repayment burdens and prioritize short-term utility over long-term financial stability, reflecting hyperbolic discounting behavior (Laibson, 1997). Previous evidence indicates that impulsive consumers are more likely to take on credit beyond their repayment ability, leading to financial vulnerability and repayment difficulties (Badgaiyan & Verma, 2015). Within BNPL systems, where approvals are often instant and credit checks limited, such tendencies become even more pronounced.

Based on this reasoning, the following hypotheses are proposed:

**H4:** Impulsive Buying Tendency positively influences Attitude toward BNPL.

**H5:** Impulsive Buying Tendency positively influences Over-indebtedness Intention.

### **Perceived Usefulness, Perceived Risk, and Attitude Formation**

Perceived usefulness and perceived risk are widely recognized as central determinants of financial technology adoption. According to TAM, perceived usefulness refers to the extent to which a technology enhances users' performance or efficiency (Davis, 1989). In BNPL services, usefulness is reflected in payment flexibility, ease of access to credit, and integration with digital commerce platforms. When consumers perceive BNPL as beneficial and convenient, they are more likely to develop favorable attitudes toward its use (Slade et al., 2015; Venkatesh et al., 2012).

In contrast, perceived risk refers to consumers' expectations of potential negative outcomes associated with using a financial service (Featherman & Pavlou, 2003). Within BNPL systems, these risks may include hidden charges, repayment difficulties, and excessive debt accumulation. Previous studies demonstrate that stronger perceptions of financial risk reduce consumers' willingness to adopt financial technologies (Gefen et al., 2003; Luo et al., 2021).

Attitudes toward BNPL therefore emerge from the balance between perceived benefits and perceived risks. Favorable evaluations become more likely when usefulness outweighs concerns regarding financial consequences. Based on this perspective, the following hypotheses are proposed:

**H6:** Perceived Usefulness positively influences Attitude toward BNPL.

**H7:** Perceived Risk negatively influences Attitude toward BNPL.

### **Attitudes, Over-indebtedness Intention, and Repayment Distress**

Within the Theory of Planned Behavior, attitudes are considered key determinants of behavioral intention (Ajzen, 1991). Consumers who hold favorable attitudes toward BNPL are more likely to use these services extensively, including for purchases that exceed their repayment capacity. Positive evaluations of BNPL convenience, accessibility, and flexibility may therefore encourage intentions to accumulate excessive debt (Sevim et al., 2012; Tokunaga, 1993).

Over-indebtedness intention refers to the willingness to borrow beyond one's sustainable repayment ability. Such intentions often emerge when individuals underestimate future repayment burdens and prioritize short-term benefits over long-term consequences (Laibson,

1997). Evidence indicates that BNPL users are more likely to experience financial stress and hold additional unsecured debt obligations compared with non-users (CFPB, 2022).

Over-indebtedness intention may eventually lead to repayment distress, which includes difficulties meeting financial obligations, late payments, and emotional stress related to debt accumulation. Previous studies on household debt consistently show that excessive borrowing increases the likelihood of delinquency and financial hardship (Disney & Gathergood, 2013).

Accordingly, the following hypotheses are proposed:

**H8:** Attitude toward BNPL positively influences Over-indebtedness Intention.

**H9:** Over-indebtedness Intention positively influences Repayment Distress.

### **Mediation Effects of Attitude and Intention**

Behavioral models often rely on mediating variables to explain how psychological and perceptual factors influence behavioral outcomes. In this study, attitude toward BNPL and over-indebtedness intention function as sequential mediators linking early cognitive evaluations to repayment distress.

Impulsive buying tendency, perceived usefulness, and perceived risk are not expected to influence repayment-related outcomes directly in all cases. Instead, these variables shape consumers' attitudes toward BNPL, which subsequently influence borrowing intentions (Ibrahim, 2023). Prior research on technology adoption and consumer behavior similarly identifies attitude as a critical mediator between beliefs and behavioral intention (Venkatesh et al., 2012).

A second mediating mechanism occurs through over-indebtedness intention. Favorable attitudes alone do not necessarily produce repayment distress unless they translate into excessive borrowing behavior. Debt behavior research consistently shows that borrowing intentions are strong predictors of delinquency and financial strain (Disney & Gathergood, 2013).

Therefore, the following hypotheses are proposed:

**H10:** Attitude toward BNPL mediates the relationship between Impulsive Buying Tendency and Over-indebtedness Intention.

**H11:** Attitude toward BNPL mediates the relationship between Perceived Usefulness and Over-indebtedness Intention.

**H12:** Attitude toward BNPL mediates the relationship between Perceived Risk and Over-indebtedness Intention.

**H13:** Over-indebtedness Intention mediates the relationship between Attitude toward BNPL and Repayment Distress.

### **Moderating Role of Islamic Financial Literacy**

Financial behavior in Muslim-majority societies is shaped not only by economic considerations but also by ethical and religious values. Islamic financial literacy combines financial knowledge with an understanding of Sharia principles, including the prohibition of *riba*, fairness in

transactions, and ethical accountability (Abduh & Omar, 2012; Kamri et al., 2014). Individuals with stronger Islamic financial literacy are expected to evaluate financial products more critically and avoid borrowing practices that conflict with long-term financial well-being and religious values.

Previous studies show that financial literacy reduces excessive borrowing and promotes more responsible financial management (Lusardi & Mitchell, 2014). Within Islamic contexts, higher Islamic financial literacy is associated with greater caution toward speculative and high-risk financial practices (Furqan et al., 2025; Mukti et al., 2025).

In the BNPL context, Islamic financial literacy may weaken the influence of impulsive tendencies and favorable attitudes on over-indebtedness intention. Consumers with stronger Islamic financial literacy are more likely to regulate impulsive behavior and evaluate borrowing decisions through ethical and prudential considerations.

Accordingly, the following hypotheses are proposed:

**H14:** Islamic Financial Literacy weakens the positive relationship between Impulsive Buying Tendency and Over-indebtedness Intention.

**H15:** Islamic Financial Literacy weakens the positive relationship between Attitude toward BNPL and Over-indebtedness Intention.

## METHODOLOGY

### Research Design

This study employed a quantitative research approach using a cross-sectional survey design to examine the relationships among dark pattern exposure, impulsive buying tendency, perceived usefulness, perceived risk, attitudes toward Buy Now Pay Later (BNPL), over-indebtedness intention, and repayment distress. Islamic financial literacy was incorporated as a moderating variable within the proposed framework. The cross-sectional design was considered appropriate because the study aimed to capture consumers' perceptions, attitudes, and behavioral intentions regarding BNPL usage within a specific period. As illustrated in Figure 1, the conceptual framework integrates constructs from behavioral finance, technology acceptance, and consumer psychology to explain borrowing behavior in digital credit environments.

### Data Collection Method

Data were collected through an online questionnaire distributed to Indonesian BNPL users between April 1 and June 15, 2025. The study used a non-probability convenience sampling technique combined with purposive screening criteria. Convenience sampling was selected because the survey was disseminated through online platforms and social media channels that are commonly accessed by active BNPL users. To ensure respondent relevance, purposive screening limited participation to individuals who had used BNPL services at least once during the previous six months.

The questionnaire link was shared through social media platforms and online discussion forums frequently used by young adult consumers, who represent one of the most active demographic

groups in Indonesia's BNPL market. A total of 612 responses were received. After excluding incomplete and inconsistent responses, 587 valid questionnaires were retained for analysis.

Table 1. Constructs, Measurement Items, and Sources

Construct	Sample Items (7-point Likert Scale: 1 = strongly disagree, 7 = strongly agree)	Sources
Dark Pattern Exposure (DPE)	<ol style="list-style-type: none"> <li>1. The BNPL application uses interface features such as countdown timers that encourage quick decisions.</li> <li>2. Certain payment options in BNPL applications appear to be automatically selected.</li> <li>3. Information regarding fees and charges is difficult to locate in BNPL applications.</li> <li>4. The design of BNPL applications makes it difficult to compare alternatives before making a decision.</li> </ol>	Adapted from Mathur et al. (2019) and Gray et al. (2018)
Impulsive Buying Tendency (IBT)	<ol style="list-style-type: none"> <li>1. I frequently purchase items spontaneously.</li> <li>2. "Just do it" reflects my purchasing behavior.</li> <li>3. My purchasing decisions are often influenced by my current feelings.</li> <li>4. I sometimes buy things without considering the consequences.</li> </ol>	Adapted from Rook and Fisher (1995) and Verplanken and Sato (2011)
Perceived Usefulness of BNPL (PU)	<ol style="list-style-type: none"> <li>1. BNPL services make online shopping easier for me.</li> <li>2. BNPL helps me manage spending more effectively.</li> <li>3. BNPL improves my purchasing capability.</li> <li>4. Overall, BNPL enhances the way I conduct transactions.</li> </ol>	Adapted from Davis (1989) and Venkatesh et al. (2012)
Perceived Risk of BNPL (PR)	<ol style="list-style-type: none"> <li>1. I am concerned that using BNPL may result in financial loss.</li> <li>2. I believe there are hidden risks associated with BNPL services.</li> <li>3. BNPL services may create uncertainty regarding repayment obligations.</li> <li>4. Using BNPL could lead to unexpected financial problems.</li> </ol>	Adapted from Featherman and Pavlou (2003) and Luo et al. (2021)
Attitude toward BNPL (ATT)	<ol style="list-style-type: none"> <li>1. Using BNPL is a positive idea.</li> <li>2. I have favorable feelings toward BNPL services.</li> <li>3. I like the concept of making payments through BNPL.</li> <li>4. Overall, I view BNPL positively.</li> </ol>	Adapted from Ajzen (1991) and Venkatesh et al. (2012)
Over-indebtedness Intention (OI)	<ol style="list-style-type: none"> <li>1. I intend to continue using BNPL even if repayment becomes difficult.</li> <li>2. I am willing to use BNPL despite limited repayment ability.</li> <li>3. I plan to depend heavily on BNPL for future purchases.</li> <li>4. I would consider using several BNPL services simultaneously.</li> </ol>	Adapted from Tokunaga (1993) and Sevim et al. (2012)
Repayment Distress (RD)	<ol style="list-style-type: none"> <li>1. I often feel stressed about paying BNPL installments.</li> <li>2. I sometimes experience difficulty meeting BNPL repayment deadlines.</li> <li>3. BNPL obligations make me anxious about my financial condition.</li> <li>4. Paying BNPL installments creates financial pressure for me.</li> </ol>	Adapted from Disney and Gathergood (2013) and Fenton-O'Creivy et al. (2018)
Islamic Financial Literacy (IFL)	<ol style="list-style-type: none"> <li>1. I understand that <i>riba</i> (interest) is prohibited in Islam.</li> <li>2. I understand the importance of fairness and transparency in financial transactions.</li> <li>3. I am aware of Sharia-compliant alternatives to conventional loans.</li> <li>4. I am able to manage finances in accordance with Islamic principles.</li> </ol>	Adapted from Abduh and Omar (2012), Mukti et al. (2025), and Furqan et al. (2025)

**Note:** Measurement items represent composite adaptations from the cited studies and were contextualized for the Indonesian Buy Now Pay Later (BNPL) environment.

The respondent profile showed that participants were predominantly young adults with an average age of 27 years. Gender representation was relatively balanced, while most respondents

reported lower-to-middle income levels. ShopeePayLater and Kredivo emerged as the most frequently used BNPL platforms, reflecting current market penetration trends in Indonesia.

Measurement items were adapted from previously validated scales and contextualized for the Indonesian BNPL environment. All constructs were measured using a seven-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Dark pattern exposure items were adapted from Mathur et al. (2019) and Gray et al. (2018). Impulsive buying tendency items were derived from Rook and Fisher (1995) and Verplanken and Sato (2011). Measures of perceived usefulness followed Davis (1989) and Venkatesh et al. (2012), whereas perceived risk items were adapted from Featherman and Pavlou (2003) and Luo et al. (2021). Attitude toward BNPL was measured using items adapted from Ajzen (1991) and Venkatesh et al. (2012). Over-indebtedness intention items were adapted from Tokunaga (1993) and Sevim et al. (2012), while repayment distress items were adapted from Disney and Gathergood (2013) and Fenton-O’Creevy et al. (2018). Islamic financial literacy items were adapted from Abduh and Omar (2012), Furqan et al. (2025), and Mukti et al. (2025).

A pilot study involving 50 BNPL users was conducted in March 2025 to assess item clarity, content validity, and cultural appropriateness. The pilot phase focused on evaluating the comprehensibility and contextual relevance of the questionnaire items rather than full psychometric assessment. Several minor wording adjustments were introduced to improve clarity before the main data collection process commenced.

### **Data Analysis Method**

Data analysis was conducted using Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS 4.0. PLS-SEM was selected because the study aimed to examine complex relationships involving mediation and moderation effects while simultaneously assessing predictive capability. The analysis began with preliminary data screening to identify missing values, outliers, and abnormal distributions. To reduce the possibility of common method bias (CMB), both procedural and statistical remedies were implemented. Procedurally, respondent anonymity was ensured and questionnaire items were randomized to minimize response pattern bias. Statistically, Harman’s single-factor test indicated that no single factor accounted for the majority of the variance.

A full collinearity variance inflation factor (VIF) assessment was subsequently performed following the recommendations of Kock (2015) and Kock and Lynn (2012). All VIF values remained below the conservative threshold of 3.3, indicating that common method bias was unlikely to present a serious issue. Additional assessments included marker variable analysis using a theoretically unrelated construct and a latent method factor test. Both procedures produced negligible method loadings, providing further support that common method bias did not substantially influence the data.

The measurement model evaluation focused on indicator reliability, internal consistency reliability, convergent validity, and discriminant validity. After establishing satisfactory measurement properties, the structural model was assessed to estimate direct effects, mediation effects, and moderation effects. Bootstrapping with 5,000 resamples was used to obtain standard errors and significance levels for hypothesis testing. Indirect effects were examined in

accordance with the procedures recommended by Hair et al. (2024) to distinguish between complementary and competitive mediation effects. Moderation analysis employed the product indicator approach to assess the interaction effects involving Islamic financial literacy.

Model fit and predictive performance were evaluated using several complementary indicators. The Standardized Root Mean Square Residual (SRMR) was used as the primary approximate model fit index, alongside the Normed Fit Index (NFI) and RMS\_theta, following recommendations from Henseler et al. (2016) and Hair et al. (2024). RMS\_theta was included to assess the extent to which residual correlations within reflective measurement models approached zero, indicating adequate model specification. Predictive relevance ( $Q^2$ ) and out-of-sample predictive validity were further assessed using the PLSpredict procedure to evaluate the robustness and generalizability of the proposed model.

## RESULTS AND DISCUSSION

### Descriptive Statistics

The descriptive statistics provide an overview of respondents' perceptions, behavioral tendencies, and financial literacy related to Buy Now Pay Later (BNPL) usage in Indonesia. As presented in Table 2, the mean score for dark pattern exposure was relatively high ( $M = 4.86$ ,  $SD = 1.21$ ), indicating that respondents frequently encountered persuasive or manipulative interface features within BNPL applications. Similarly, impulsive buying tendency recorded a moderately high mean score ( $M = 4.73$ ,  $SD = 1.34$ ), suggesting that spontaneous purchasing behavior was relatively common among BNPL users. These findings imply that the design characteristics of BNPL platforms may reinforce impulsive consumption tendencies among consumers.

Table 2. Descriptive Statistics of the Constructs

Construct	Mean	SD	Min	Max	Skewness	Kurtosis
Dark Pattern Exposure	4.86	1.21	1.00	7.00	-0.32	-0.41
Impulsive Buying Tendency	4.73	1.34	1.00	7.00	-0.27	-0.52
Perceived Usefulness	5.12	1.09	2.00	7.00	-0.44	-0.05
Perceived Risk	4.21	1.28	1.00	7.00	0.18	-0.47
Attitude toward BNPL	5.03	1.15	2.00	7.00	-0.39	-0.31
Over-indebtedness Intention	4.34	1.42	1.00	7.00	-0.02	-0.56
Repayment Distress	4.11	1.37	1.00	7.00	0.15	-0.42
Islamic Financial Literacy	5.27	1.18	2.00	7.00	-0.51	-0.21

Perceived usefulness showed one of the highest average scores ( $M = 5.12$ ,  $SD = 1.09$ ), reflecting respondents' generally positive evaluations of BNPL as a convenient and practical payment solution. Attitude toward BNPL was also favorable ( $M = 5.03$ ,  $SD = 1.15$ ), suggesting that most respondents viewed BNPL services positively. In contrast, perceived risk was comparatively moderate ( $M = 4.21$ ,  $SD = 1.28$ ), indicating that although users recognized the potential risks associated with BNPL, these concerns did not outweigh the perceived benefits and convenience offered by the services.

Indicators associated with financial vulnerability were present at moderate levels. Over-indebtedness intention recorded a mean score of 4.34 ( $SD = 1.42$ ), while repayment distress showed a mean value of 4.11 ( $SD = 1.37$ ). These findings suggest that a meaningful proportion

of respondents acknowledged tendencies toward excessive borrowing and experienced some degree of repayment-related pressure. Although the levels were not extreme, the results reflect growing concerns regarding the financial implications of BNPL usage among young consumers.

Islamic financial literacy demonstrated the highest average score among all constructs ( $M = 5.27$ ,  $SD = 1.18$ ). This result indicates that respondents generally possessed a relatively strong understanding of Islamic financial principles, including awareness of fairness, transparency, and the prohibition of *riba*. The finding also suggests the potential role of Islamic financial literacy in moderating financially risky behavior related to BNPL usage.

Across all constructs, skewness and kurtosis values remained within the acceptable range of  $\pm 1$ , indicating no substantial deviations from normality. These results support the suitability of the dataset for subsequent Partial Least Squares Structural Equation Modeling (PLS-SEM) analysis. Overall, the descriptive findings portray Indonesian BNPL users as digitally active consumers who perceive BNPL positively, demonstrate moderate impulsiveness, recognize certain financial risks, and simultaneously maintain relatively strong Islamic financial literacy.

### Measurement Model Assessment

The measurement model was evaluated to assess indicator reliability, internal consistency reliability, convergent validity, and discriminant validity. The results demonstrate that all constructs satisfied the recommended criteria for reflective measurement models.

As reported in Table 3, all outer loadings exceeded the recommended threshold of 0.70, indicating that each indicator contributed adequately to its respective latent construct. In addition, the bias-corrected bootstrap confidence intervals at the 2.5% and 97.5% levels excluded zero for all indicators, confirming that the loadings were statistically significant and stable.

Table 3. Reliability and Validity of Constructs

Construct	Item	Loading	t-value	2.5% CI	97.5% CI	Cronbach's $\alpha$	CR	AVE
Dark Pattern Exposure	DPE1	0.82	16.42	0.76	0.87	0.83	0.88	0.65
	DPE2	0.84	18.10	0.79	0.88			
	DPE3	0.79	14.73	0.72	0.84			
	DPE4	0.80	15.25	0.74	0.85			
Impulsive Buying Tendency	IBT1	0.88	21.02	0.84	0.92	0.87	0.91	0.72
	IBT2	0.84	18.67	0.78	0.88			
	IBT3	0.85	19.11	0.80	0.89			
	IBT4	0.83	17.94	0.77	0.87			
Perceived Usefulness	PU1	0.86	20.54	0.81	0.90	0.85	0.90	0.69
	PU2	0.84	19.83	0.78	0.88			
	PU3	0.80	17.25	0.73	0.85			
	PU4	0.82	18.06	0.76	0.87			
Perceived Risk	PR1	0.81	15.92	0.75	0.86	0.82	0.88	0.65
	PR2	0.83	16.88	0.77	0.88			
	PR3	0.79	14.44	0.72	0.84			
	PR4	0.80	15.03	0.74	0.85			
Attitude toward BNPL	ATT1	0.84	17.67	0.78	0.88	0.86	0.91	0.71
	ATT2	0.86	18.91	0.81	0.90			
	ATT3	0.83	17.05	0.77	0.87			
	ATT4	0.85	18.20	0.80	0.89			
Over-indebtedness Intention	OII1	0.86	19.45	0.81	0.90	0.88	0.92	0.73

Construct	Item	Loading	t-value	2.5% CI	97.5% CI	Cronbach's $\alpha$	CR	AVE
	OII2	0.87	19.83	0.82	0.91			
	OII3	0.85	18.56	0.79	0.89			
	OII4	0.84	17.94	0.78	0.88			
Repayment Distress	RD1	0.82	16.14	0.76	0.87	0.84	0.89	0.67
	RD2	0.83	16.98	0.77	0.88			
	RD3	0.80	15.37	0.74	0.85			
	RD4	0.81	15.88	0.75	0.86			
Islamic Financial Literacy	IFL1	0.84	17.91	0.79	0.88	0.86	0.91	0.71
	IFL2	0.85	18.63	0.80	0.89			
	IFL3	0.83	17.08	0.77	0.87			
	IFL4	0.86	18.84	0.81	0.90			

Internal consistency reliability was supported through both Cronbach's alpha and composite reliability (CR) values. Cronbach's alpha values ranged from 0.82 to 0.88, while CR values ranged from 0.88 to 0.92, exceeding the recommended minimum threshold of 0.70. These findings indicate satisfactory consistency among the indicators used to measure each construct.

Convergent validity was also established. Average Variance Extracted (AVE) values ranged from 0.65 to 0.73, surpassing the recommended threshold of 0.50. This indicates that each construct explained more than half of the variance of its indicators. The combination of strong factor loadings, acceptable reliability values, and satisfactory AVE scores demonstrates that the measurement items adequately represented their intended constructs.

Discriminant validity was subsequently assessed using the Fornell–Larcker criterion. As shown in Table 4, the square root of the AVE for each construct was greater than its correlations with other constructs in the model. These findings confirm that each construct captured a distinct conceptual domain within the BNPL borrowing framework.

Table 4. Discriminant Validity (Fornell–Larcker Criterion)

Construct	DPE	IBT	PU	PR	ATT	OII	RD	IFL
Dark Pattern Exposure (DPE)	<b>0.81</b>							
Impulsive Buying Tendency (IBT)	0.46	<b>0.85</b>						
Perceived Usefulness (PU)	0.41	0.44	<b>0.83</b>					
Perceived Risk (PR)	0.38	0.40	0.36	<b>0.81</b>				
Attitude toward BNPL (ATT)	0.42	0.48	0.55	0.39	<b>0.84</b>			
Over-indebtedness Intention (OII)	0.37	0.52	0.43	0.34	0.57	<b>0.85</b>		
Repayment Distress (RD)	0.33	0.46	0.40	0.42	0.51	0.58	<b>0.82</b>	
Islamic Financial Literacy (IFL)	0.29	0.32	0.41	0.35	0.39	0.37	0.33	<b>0.84</b>

The strongest correlation was observed between attitude toward BNPL and over-indebtedness intention ( $r = 0.57$ ). Nevertheless, this value remained lower than the square root of the AVE for both constructs (0.84 and 0.85, respectively), supporting adequate discriminant validity. Islamic financial literacy also maintained moderate correlations with the other constructs while remaining empirically distinct, suggesting that it represented a separate conceptual dimension within the model. These findings demonstrate that the measurement model possessed satisfactory reliability and validity, supporting the appropriateness of proceeding to structural model analysis.

## Structural Model Assessment

The structural model evaluation began with an assessment of overall model fit. As presented in Table 5, the Standardized Root Mean Square Residual (SRMR) value was 0.056, below the recommended threshold of 0.08 (Hu & Bentler, 1999). This indicates a relatively small discrepancy between the observed and predicted correlation matrices. The Normed Fit Index (NFI) reached 0.92, exceeding the recommended minimum value of 0.90 (Bentler & Bonett, 1980), suggesting acceptable model fit relative to the null model.

In addition, the RMS\_theta value was 0.09, below the recommended cut-off value of 0.12 (Henseler et al., 2016), indicating satisfactory specification of the reflective measurement model. The discrepancy measures d\_ULS (0.84) and d\_G (0.67) were also relatively close to zero, further supporting the adequacy of the proposed model.

Table 5. Model Fit Indices

Fit Index	Recommended Threshold	Obtained Value
SRMR	$\leq 0.08$ (Hu & Bentler, 1999)	0.056
NFI	$\geq 0.90$ (Bentler & Bonett, 1980)	0.92
RMS_theta	$\leq 0.12$ (Henseler et al., 2016)	0.09
d_ULS	Closer to 0 is better	0.84
d_G	Closer to 0 is better	0.67

The structural model results are summarized in Table 6. Overall, all proposed direct effect hypotheses were supported. The path coefficients ranged from 0.19 to 0.41, indicating meaningful relationships among the constructs included in the framework.

Table 6. Structural Model Results (Direct Effects)

Hypothesis	Path	$\beta$	t-value	p-value	Decision
H1	Dark Pattern Exposure $\rightarrow$ Impulsive Buying Tendency	0.29	6.12	0.000	Supported
H2	Dark Pattern Exposure $\rightarrow$ Perceived Usefulness	0.25	5.48	0.000	Supported
H3	Dark Pattern Exposure $\rightarrow$ Perceived Risk	-0.21	2.36	0.019	Supported
H4	Impulsive Buying Tendency $\rightarrow$ Attitude toward BNPL	0.31	7.22	0.000	Supported
H5	Impulsive Buying Tendency $\rightarrow$ Over-indebtedness Intention	0.27	3.41	0.001	Supported
H6	Perceived Usefulness $\rightarrow$ Attitude toward BNPL	0.34	8.05	0.000	Supported
H7	Perceived Risk $\rightarrow$ Attitude toward BNPL	-0.19	2.11	0.035	Supported
H8	Attitude toward BNPL $\rightarrow$ Over-indebtedness Intention	0.38	6.64	0.000	Supported
H9	Over-indebtedness Intention $\rightarrow$ Repayment Distress	0.41	9.12	0.000	Supported

Dark pattern exposure significantly influenced impulsive buying tendency ( $\beta = 0.29$ ,  $t = 6.12$ ,  $p < .001$ ) and perceived usefulness ( $\beta = 0.25$ ,  $t = 5.48$ ,  $p < .001$ ), while negatively affecting perceived risk ( $\beta = -0.21$ ,  $t = 2.36$ ,  $p = .019$ ). These findings indicate that manipulative interface designs encourage impulsive purchasing behavior, strengthen perceptions of convenience, and reduce consumers' awareness of financial risks associated with BNPL usage.

Impulsive buying tendency also demonstrated significant positive effects on both attitude toward BNPL ( $\beta = 0.31$ ,  $t = 7.22$ ,  $p < .001$ ) and over-indebtedness intention ( $\beta = 0.27$ ,  $t = 3.41$ ,  $p = .001$ ). This suggests that impulsive consumers tend to perceive BNPL more positively and are more likely to engage in borrowing behavior that exceeds their repayment capacity.

Perceived usefulness exerted a positive influence on attitude toward BNPL ( $\beta = 0.34, t = 8.05, p < .001$ ), whereas perceived risk negatively influenced attitude ( $\beta = -0.19, t = 2.11, p = .035$ ). The stronger effect of perceived usefulness compared with perceived risk suggests that the convenience and accessibility associated with BNPL services may outweigh concerns regarding potential financial consequences.

Attitude toward BNPL significantly increased over-indebtedness intention ( $\beta = 0.38, t = 6.64, p < .001$ ). Furthermore, over-indebtedness intention exhibited the strongest direct effect in the model on repayment distress ( $\beta = 0.41, t = 9.12, p < .001$ ). These findings indicate that favorable evaluations of BNPL may ultimately contribute to financial strain when they develop into intentions to borrow excessively.

### Mediation Analysis

The mediation analysis was conducted to examine the indirect mechanisms linking psychological and perceptual factors to over-indebtedness intention and repayment distress. The results are presented in Table 7.

Table 7. Mediation Results

Hypothesis	Mediation Path	Indirect Effect ( $\beta$ )	t-value	p-value	Decision
H10	Impulsive Buying Tendency $\rightarrow$ Attitude toward BNPL $\rightarrow$ Over-indebtedness Intention	0.12	3.54	0.000	Supported
H11	Perceived Usefulness $\rightarrow$ Attitude toward BNPL $\rightarrow$ Over-indebtedness Intention	0.13	4.11	0.000	Supported
H12	Perceived Risk $\rightarrow$ Attitude toward BNPL $\rightarrow$ Over-indebtedness Intention	-0.07	2.28	0.023	Supported
H13	Attitude toward BNPL $\rightarrow$ Over-indebtedness Intention $\rightarrow$ Repayment Distress	0.16	5.02	0.000	Supported

Attitude toward BNPL significantly mediated the relationship between impulsive buying tendency and over-indebtedness intention ( $\beta = 0.12, t = 3.54, p < .001$ ). This finding suggests that impulsive tendencies contribute to excessive borrowing intentions not only directly but also indirectly through more favorable evaluations of BNPL services.

Attitude toward BNPL also mediated the relationship between perceived usefulness and over-indebtedness intention ( $\beta = 0.13, t = 4.11, p < .001$ ), as well as the relationship between perceived risk and over-indebtedness intention ( $\beta = -0.07, t = 2.28, p = .023$ ). These results indicate that consumers' cognitive evaluations of BNPL play an important role in shaping borrowing intentions.

In addition, over-indebtedness intention significantly mediated the relationship between attitude toward BNPL and repayment distress ( $\beta = 0.16, t = 5.02, p < .001$ ). This finding suggests that positive attitudes toward BNPL contribute to repayment-related difficulties primarily when they translate into intentions to borrow beyond sustainable repayment limits.

Overall, the mediation results highlight the importance of attitude and intention as psychological mechanisms linking consumer perceptions and impulsive tendencies to financial outcomes.

## Moderation Analysis

The moderation analysis examined whether Islamic financial literacy weakened the effects of impulsive buying tendency and attitude toward BNPL on over-indebtedness intention. The results are presented in Table 8.

Table 8. Moderation Results

Hypothesis	Moderation Path	Interaction Effect ( $\beta$ )	t-value	p-value	Decision
H14	Impulsive Buying Tendency $\times$ Islamic Financial Literacy $\rightarrow$ Over-indebtedness Intention	-0.11	2.87	0.004	Supported
H15	Attitude toward BNPL $\times$ Islamic Financial Literacy $\rightarrow$ Over-indebtedness Intention	-0.09	2.14	0.033	Supported

The interaction between impulsive buying tendency and Islamic financial literacy was negative and statistically significant ( $\beta = -0.11$ ,  $t = 2.87$ ,  $p = .004$ ). Similarly, the interaction between attitude toward BNPL and Islamic financial literacy also demonstrated a negative and significant effect on over-indebtedness intention ( $\beta = -0.09$ ,  $t = 2.14$ ,  $p = .033$ ).

These findings indicate that stronger Islamic financial literacy reduces the extent to which impulsive tendencies and favorable attitudes toward BNPL translate into intentions to borrow excessively. Consumers with higher levels of Islamic financial literacy appear more capable of regulating borrowing behavior in accordance with ethical and financial considerations grounded in Sharia principles.

The structural model results demonstrate that dark pattern exposure, impulsive buying tendency, perceived usefulness, and perceived risk significantly shape attitudes and borrowing intentions related to BNPL usage. At the same time, Islamic financial literacy functions as a moderating factor that may reduce the likelihood of financially risky borrowing behavior.

## Discussion

The findings of this study provide a more comprehensive understanding of how digital interface design, psychological predispositions, and culturally embedded financial literacy interact in shaping borrowing behavior within the Buy Now Pay Later (BNPL) ecosystem in Indonesia. The results reinforce the argument that BNPL usage is not solely driven by economic need or technological convenience, but also influenced by emotional, cognitive, and ethical dimensions that shape financial decision-making.

One of the most significant findings concerns the role of dark pattern exposure in influencing consumer behavior. The results demonstrate that dark pattern exposure positively affects impulsive buying tendency and perceived usefulness while simultaneously reducing perceived risk. These findings are consistent with prior research in human-computer interaction and digital consumer behavior, which argues that manipulative interface designs influence users' decision-making processes through cognitive simplification, urgency cues, and emotional persuasion (Gray et al., 2018; Mathur et al., 2019). Features such as countdown timers, default payment settings, and concealed disclosures create an environment in which consumers make rapid decisions with limited reflection on long-term financial implications.

From a behavioral finance perspective, these findings align with dual-process decision-making theory (Kahneman & Tversky, 1979), which distinguishes between intuitive and deliberative cognitive processing. Dark patterns appear to activate intuitive and heuristic-based decision-making, encouraging consumers to prioritize immediate convenience and emotional satisfaction over rational assessment of repayment obligations. In this context, BNPL platforms function not merely as payment technologies but also as persuasive digital environments capable of shaping consumer cognition and behavior. The findings therefore extend previous dark pattern research beyond e-commerce and privacy concerns into the domain of consumer finance and indebtedness.

The positive relationship between impulsive buying tendency and both attitude toward BNPL and over-indebtedness intention further strengthens the relevance of consumer psychology theories in explaining digital borrowing behavior. Consistent with Rook and Fisher (1995), impulsive consumers tend to prioritize immediate gratification and emotional satisfaction over long-term financial planning. The findings also support hyperbolic discounting theory (Laibson, 1997), which explains how individuals disproportionately value short-term rewards while underestimating future costs.

In the BNPL context, this tendency becomes particularly important because deferred payment systems reduce the immediate psychological burden of spending. Consumers are able to obtain products instantly while postponing repayment obligations into the future. This structure weakens spending restraint and increases the likelihood of borrowing beyond sustainable repayment capacity. The significant direct effect of impulsive buying tendency on over-indebtedness intention therefore confirms earlier evidence that impulsiveness contributes to debt accumulation and financial vulnerability (Badgaiyan & Verma, 2015; Fenton-O’Creevy et al., 2018).

The findings also demonstrate that perceived usefulness exerts a stronger influence on attitudes toward BNPL than perceived risk. This result is broadly consistent with the Technology Acceptance Model (TAM), which identifies perceived usefulness as one of the strongest predictors of positive attitudes toward technological adoption (Davis, 1989). Respondents viewed BNPL as practical, accessible, and capable of easing short-term liquidity constraints, which strengthened favorable evaluations of the service.

At the same time, perceived risk negatively influenced attitudes toward BNPL, although its effect was comparatively weaker. This imbalance between utility and risk perception reflects an important characteristic of digital credit environments. Continuous exposure to promotional incentives, frictionless transaction processes, and positive consumption experiences may normalize financial risk and reduce consumers’ sensitivity toward potential negative outcomes. This finding is also compatible with prospect theory (Kahneman & Tversky, 1979), which suggests that individuals often underestimate risks when choices are framed in ways that emphasize gains and convenience.

The weaker role of perceived risk compared with perceived usefulness may additionally reflect the structure of BNPL systems themselves. Unlike traditional loans, BNPL services are often embedded seamlessly within online shopping platforms and presented as payment options rather

than debt instruments. As a result, consumers may cognitively categorize BNPL as a facilitative consumption tool instead of a borrowing mechanism. This interpretation supports previous research indicating that financial technologies can blur the psychological distinction between spending and borrowing, particularly among younger consumers (Luo et al., 2021).

Another important contribution of this study lies in the sequential relationship between attitudes, over-indebtedness intention, and repayment distress. The findings confirm that favorable attitudes toward BNPL significantly increase over-indebtedness intention, which subsequently contributes to repayment distress. This pathway strongly supports the Theory of Planned Behavior (Ajzen, 1991), which posits that attitudes influence behavioral intentions that eventually shape actual outcomes.

The mediation results further clarify that attitudes and intentions operate as psychological mechanisms linking impulsiveness and consumer perceptions to financial distress. Impulsive tendencies and favorable evaluations of BNPL do not automatically produce repayment problems; rather, repayment distress emerges when positive attitudes are translated into intentions to borrow excessively. This distinction is theoretically important because it highlights the role of behavioral planning and intention formation in transforming psychological predispositions into financial consequences.

The results also suggest that emotional and affective evaluations may dominate rational financial assessment within BNPL usage. The relatively strong path from attitude toward over-indebtedness intention indicates that consumers' emotional attraction to BNPL convenience may outweigh deliberative evaluation of repayment capability. This interpretation aligns with self-regulation theory (Baumeister & Heatherton, 1996), which argues that weakened self-control increases reliance on affective impulses and short-term rewards. In digitally mediated financial environments characterized by instant approval and frictionless transactions, opportunities for reflective self-regulation become increasingly limited.

The moderating role of Islamic financial literacy represents one of the central contributions of this study. The findings demonstrate that Islamic financial literacy weakens the positive relationships between impulsive buying tendency and over-indebtedness intention, as well as between attitude toward BNPL and over-indebtedness intention. These results indicate that consumers with stronger understanding of Islamic financial principles are less likely to translate impulsive tendencies or favorable attitudes into financially risky borrowing behavior.

This finding supports previous literature suggesting that financial literacy strengthens financial self-control and promotes more responsible financial behavior (Lusardi & Mitchell, 2014). More specifically, the results extend Islamic finance literature by demonstrating that Islamic financial literacy functions not only as a form of technical financial knowledge but also as a moral and ethical framework guiding consumption decisions (Abduh & Omar, 2012; Furqan et al., 2025). Principles such as the prohibition of *riba*, fairness in transactions, and accountability in debt obligations may encourage consumers to critically evaluate borrowing decisions and resist excessive indebtedness.

However, the findings should not be interpreted as evidence that Islamic financial literacy completely eliminates risky borrowing behavior. The moderation effects, while significant,

remained moderate in magnitude. This suggests that financial knowledge alone may not fully counteract the persuasive influence of digital design and emotional consumption impulses. The distinction between literacy, adherence, and religiosity therefore becomes important. Individuals may possess knowledge of Islamic financial principles while still engaging in risky borrowing when faced with convenience, social pressure, or emotionally appealing digital environments.

This interpretation is consistent with broader research in behavioral ethics and religious consumption, which demonstrates that knowledge of ethical principles does not always guarantee behavioral compliance (De-Clercq & Belausteguigoitia, 2020; Minton et al., 2019). Financial behavior is often shaped by the interaction between moral values, situational pressures, emotions, and technological environments. Consequently, future studies may benefit from examining additional dimensions such as religiosity intensity, moral identity, self-control capacity, or peer influence to better understand how ethical principles translate into actual financial behavior.

From a practical perspective, the findings carry important implications for regulators, fintech providers, and financial educators. For regulators, the results highlight the need for stronger oversight of interface design practices within BNPL platforms. Regulatory institutions such as Otoritas Jasa Keuangan may need to establish clearer standards regarding transparency, disclosure visibility, and manipulative interface features that obscure repayment obligations or encourage impulsive borrowing.

For fintech companies, the findings suggest that excessive reliance on persuasive design may generate long-term risks despite short-term gains in user engagement and transaction volume. Ethical interface design and transparent communication may help reduce financial vulnerability while maintaining consumer trust and sustainability within digital credit markets.

The study also emphasizes the importance of integrating Islamic financial literacy into financial education initiatives, particularly among younger consumers who dominate BNPL usage in Indonesia. Educational programs may benefit from combining technical financial management skills with ethical and behavioral dimensions of financial decision-making. Such initiatives could strengthen consumers' ability to critically evaluate digital borrowing offers and resist impulsive consumption behavior.

Several limitations should also be acknowledged. First, the cross-sectional design limits the ability to establish causal relationships between the variables. Future longitudinal studies could provide deeper insights into how borrowing behavior and repayment distress evolve over time. Second, the study relied on self-reported data, which may be influenced by social desirability bias or inaccuracies in respondents' recollection of financial behavior. Third, the study focused exclusively on Indonesian BNPL users, which may limit generalizability to different cultural or regulatory contexts.

Future research may also explore qualitative dimensions of BNPL usage, including emotional motivations, peer influence, and the lived experiences of financially distressed users. Comparative studies across religious, cultural, or national contexts may further clarify whether the moderating role observed in this study reflects specifically Islamic ethical frameworks or broader forms of moral financial reasoning.

Overall, the findings demonstrate that BNPL borrowing behavior emerges through the interaction of persuasive digital design, impulsive psychological tendencies, cognitive evaluations of usefulness and risk, and culturally embedded financial literacy. The study contributes to behavioral finance and Islamic financial studies by integrating technological, psychological, and ethical perspectives into a unified framework for understanding financial vulnerability in emerging digital credit markets.

## CONCLUSION

This study examined the interplay between psychological, perceptual, and cultural factors in shaping Buy Now Pay Later (BNPL) behavior among Indonesian consumers. The findings demonstrate that financial vulnerability within digital credit environments is influenced not only by access to credit facilities but also by persuasive interface design and emotional decision-making processes. Dark pattern exposure significantly increased impulsive buying tendency and perceived usefulness while reducing perceived risk, indicating that BNPL platforms can shape users' cognitive and affective evaluations through manipulative digital cues. The results further show that impulsive buying tendency, perceived usefulness, and attitudes toward BNPL positively contribute to over-indebtedness intention, which subsequently increases repayment distress. Compared with perceived risk, perceived usefulness exerted a stronger influence on attitudes toward BNPL, suggesting that consumers are more strongly guided by convenience, accessibility, and emotional appeal than by rational assessments of financial consequences. These findings highlight the dominant role of affective processes in BNPL borrowing behavior and reinforce the importance of examining digital finance through behavioral and psychological perspectives.

The study also offers several theoretical and practical implications. Theoretically, it extends behavioral finance and technology acceptance research by integrating dark pattern exposure into models of financial decision-making and over-indebtedness. The findings demonstrate that interface-level manipulation functions as an important antecedent of borrowing behavior, expanding existing discussions beyond conventional cognitive and economic determinants. The moderating role of Islamic financial literacy further contributes to the literature by showing that culturally embedded financial knowledge can serve as a moral and cognitive safeguard against impulsive and excessive borrowing. Consumers with stronger Islamic financial literacy were less likely to translate impulsive tendencies and favorable attitudes into risky borrowing intentions, suggesting that ethical reasoning and self-regulatory capacity play an important role in digital financial behavior. From a practical standpoint, the findings emphasize the need for fintech providers and regulators to pay greater attention to ethical interface design, transparent disclosures, and responsible consumer engagement. Financial education initiatives may also benefit from integrating Islamic financial literacy with broader behavioral awareness, particularly among younger consumers who dominate BNPL usage in Indonesia.

Despite these contributions, several limitations should be acknowledged. The cross-sectional design limits causal interpretation, while the reliance on self-reported responses may introduce social desirability and recall bias. In addition, the study focused exclusively on Indonesian BNPL users, which may restrict the generalizability of the findings to other cultural and regulatory contexts. Future research could strengthen the framework by incorporating additional

dimensions of religiosity, such as religious centrality, adherence intensity, or moral identity, either as moderating or control variables. These dimensions may provide deeper insight into how strongly internalized Islamic values influence financial decision-making and self-regulation. Longitudinal and mixed-method approaches may also help capture how borrowing behavior evolves over time and how consumers negotiate tensions between convenience, ethical principles, and financial responsibility. As digital financial services continue to expand, responsible fintech development should align technological innovation with ethical literacy, psychological awareness, and the lived realities of consumers to support inclusive and sustainable financial well-being.

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