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It Listens to Me So I Feel Well and Connected: Investigating the Influence of TikTok users' Perceived Algorithm Responsiveness and (In)sensitivity on Well-Being Via Self-Determination

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Abstract

Social media has grown to be a large part of our virtual connectedness online. However, with this growth in digital connection, we have also become connected with digital entities that run them (social media). Borrowing from the concept of interpersonal responsiveness, researchers have found that users perceive their algorithm to be responsive to their needs and sensitive to their identity have a greater sense of well-being online and media enjoyment. However, the mechanisms for which these connect with one another (responsiveness predicting subjective well-being) remain to be disentangled. Guided by self-determination theory, this study examines whether autonomy, competence, and relatedness satisfaction through TikTok use mediate the associations between perceived algorithm responsiveness and insensitivity and satisfaction with life. With an online survey ($N = 385$), our study found that greater responsiveness is associated with greater life satisfaction mediated through greater relatedness satisfaction. However, greater competence satisfaction was associated with lower life satisfaction. Future research and current limitations in light of our findings are discussed.

Keywords

social media, perceived algorithm responsiveness, well-being, self-determination theory

Social media has become an integral part of our daily lives and remains a growing aspect of human social connection (Waterloo et al., 2018). Understanding the psychological effects of using social media is important because it can significantly impact users' mental health and well-being through various mechanisms, such as social comparison (Fardouly et al., 2015), addiction (Andreassen et al., 2017), self-disclosure (Bazarova & Choi, 2014), and social grooming (Ellison et al., 2014). These mechanisms manifest through users' behaviors or perceptions and suggest different psychological impacts of social media. In this study, we aim to investigate the psychological effect of social media by examining the role of users' perception of social media's foundational technological feature, algorithms. We further examine the mediating role of three basic psychological needs in the association between social media perception and psychological well-being.

Algorithms play a significant role in social media by determining what content users see in their feeds, search results, and recommendations (Bucher, 2017). Social media platforms use complex algorithms to analyze user data about their engagement (i.e., click, like, comment, swipe, or share) and use the information to personalize and curate content for each individual user. Thus, social media algorithms play an important part in affecting users' well-being and privacy at individual and social levels. For example, algorithms can make people feel closer to friends and acquaintances through frequent exposure to each other's posts on social media. On the contrary, algorithms can create filter bubbles or echo

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chambers (Flaxman et al., 2016), where users only see content that reinforces their existing beliefs and biases, which can lead to polarization and extremism (Bakshy et al., 2015). Yet, social media algorithms are intangible and constantly changing systems, which means that people only understand algorithms through their perceptions. To better capture these perceptions, Taylor and Choi (2022) have introduced the concepts of perceived algorithm responsiveness (PAR) and perceived algorithm insensitivity (PAI). PAR reflects the extent to which users feel that social media algorithms are attentive and responsive to their needs, goals, and sense of self. PAI captures perceptions that algorithms misinterpret, suppress, or undermine those same personal dimensions. Prior research has shown that PAR is associated with greater social media enjoyment (Taylor and Choi, 2022) and is negatively associated with loneliness through enhanced online relational maintenance behaviors (Taylor & Choi, 2023). On the contrary, PAI has been linked to increased loneliness (Taylor & Choi, 2023).

In this study, we argue that PAR is one of the many relevant aspects needed for understanding the psychological effects of social media by satisfying one's basic psychological needs. While we acknowledge that social media's effects on well-being are manifold and diverse (Dietrich et al., 2024; Meier & Reinecke, 2021), we focus on TikTok because it is highly algorithmic, with its algorithms determining videos users are likely to enjoy, and its algorithms are perceived as most responsive (Taylor & Choi, 2022).

Subjective Well-Being and Self-Determination Theory

Understanding the factors that shape subjective well-being is a central goal across disciplines concerned with human flourishing, mental health, and quality of life (Diener et al., 2003). In an increasingly digitized world, there is growing interest in how digital environments, including algorithmically curated platforms like TikTok, may influence users' well-being. Subjective well-being reflects individuals' evaluations of their lives and is often used as a key indicator of psychological functioning and life quality (Diener, 1984).

Subjective well-being is typically conceptualized as having two main components: a cognitive dimension, referring to judgments about life satisfaction, and an affective dimension, encompassing the presence of positive emotions and the absence of negative emotions (Diener, 1984; Diener et al., 1999). This study focuses on life satisfaction, a global and relatively stable assessment of one's overall life quality (Pavot & Diener, 2008). Life satisfaction is widely used in technology and media research because it provides a general benchmark for well-being that is not overly influenced by short-term mood fluctuations (Valkenburg et al., 2006; Verduyn et al., 2017).

To explain how interactions with algorithmic systems like TikTok might related to subjective well-being, we draw on self-determination theory (SDT), a broad theory of human motivation, personality development, and well-being (Deci & Ryan, 2008; Ryan & Deci, 2000). As a holistic psychological framework, SDT posits that individuals are active organisms inherently oriented toward psychological growth, and that well-being depends on the satisfaction of three basic psychological needs: autonomy, competence, and relatedness (Deci & Ryan, 2008; Ryan & Deci, 2000).

Autonomy refers to experiencing volition and self-endorsement—feeling that one's actions are self-chosen and aligned with personal values (Ryan & Deci, 2000). When people are free from pressure to behave in certain ways and can express themselves as they wish, satisfaction for autonomy is fulfilled. Competence is related to one's perception of effectively bringing about desired effects and outcomes, with a particular focus on the need to be able to demonstrate this effectiveness to others (Ryan & Deci, 2000). Relatedness is connected to one's feeling of closeness and connectedness to others (Reis et al., 2000). It encompasses feelings of belonging and the perception of being cared for, reflecting a fundamental aspect of our social bonds (Ryan & Deci, 2000). According to the theory, a basic need is a vitalizing state that promotes health and well-being when satisfied, but its lack of satisfaction can lead to poor well-being (Ryan & Deci, 2000). When these three needs are supported and satisfied within a social context, people usually experience a larger extent of vitality and self-motivation. When frustrations thwart these three basic needs, it is linked to diminished self-motivation and a larger scale of ill-being.

SDT has been used as a framework to understand how participation in various activities and the social contexts surrounding these activities can affect psychological well-being. For example, use of social media (i.e., Facebook) is associated with the satisfaction of basic psychological needs, especially relatedness, which in turn leads to well-being (Berezan et al., 2019; Lin, 2016; Reinecke et al., 2014; Sheldon et al., 2011) because people can engage with their social network, share experiences, and receive social support on social media. In addition to psychological needs fulfillment, how well a partner responds to an individual's disclosures is shown to positively impact their subjective well-being (Selcuk et al., 2016).

In sum, SDT provides a useful lens for understanding how digital environments like TikTok may shape well-being through the satisfaction of basic psychological needs. As algorithmic systems play a growing role in structuring user experiences, how users perceive these systems may influence their sense of autonomy, competence, and relatedness. We now turn to PAR and PAI as key constructs for capturing these perceptions.

Perceived Algorithm Responsiveness (PAR) and Insensitivity (PAI)

Algorithms are sets of programmed instructions that a computer follows to solve a mathematical problem or perform a

function (Knuth, 1997). On social media platforms, algorithms curate content feeds, predict user preferences, and shape what information users are exposed to (Beauvisage et al., 2023; Swart, 2021). They serve as gatekeepers that sort, filter, and personalize content based on users' behavioral cues (Dwivedi et al., 2021; Etter & Albu, 2021). While these algorithmic systems are designed to optimize engagement, users often develop psychological interpretations of how these systems respond to their behaviors, needs, and identities (Lee et al., 2022).

To capture these user-level perceptions, Taylor and Choi (2022) introduced the constructs: PAR and PAI. These constructs draw on the interpersonal process of responsiveness framework (Reis et al., 2004). The interpersonal responsiveness process suggests that self-disclosure and partner responsiveness are two key contributors to intimacy development. Intimacy grows when a person self-discloses to a partner and the partner is responsive to the self-disclosure in a supportive and attentive way that is understanding, validating, and caring (Reis & Shaver, 1988). What matters here is how a partner's responsiveness was *perceived* rather than enacted (Choi & Toma, 2022). This interpersonal process is used as an analogy to describe human–algorithm interplay on social media (Taylor and Choi, 2022). People disclose their personal information to algorithms through their interactive behaviors such as clicking, swiping, liking, and sharing content on social media. Algorithms can be seen as attentive and responsive in that they track user behaviors, infer preferences, and curate content accordingly. When the user *perceives* the algorithms as responsive to their identity, it may affect the user's psychological well-being.

While our framework does not adopt the computers as social actors (CASA) perspectives as its theoretical grounding, CASA (Reeves & Nass, 1996) provides a useful parallel in explaining why interpersonal analogies resonate in human–algorithm contexts. CASA research shows that users often apply social heuristics to machines when they exhibit cues like interactivity or adaptivity. This helps illuminate why constructs from interpersonal communication, such as responsiveness, are relevant even in interactions with nonhuman agents.

The concept of responsiveness (i.e., interpersonal responsiveness) is a two-dimensional construct directly pertaining to our human need for intimacy and relationships: perceived responsiveness and perceived insensitivity (Crasta et al., 2021). Similarly, algorithm responsiveness also encompasses two dimensions, PAR and PAI, as examined in the work of Taylor and Choi (2022). People feel greater PAR when they perceive their social media algorithm to be understanding, attentive, and responsive to their goals and interests on the social media platform. On the contrary, PAI concerns when the algorithm is perceived to be misinterpreting, suppressing, or undermining the user's needs and goals. People may feel higher PAI when they believe the algorithm-curated content does not reflect their interests and needs.

Research has shown that PAR can have a significant impact on users' psychological well-being and media enjoyment (Reis & Gable, 2015; Taylor & Choi, 2023). Users who perceive the algorithm as responsive are likely to experience greater enjoyment, a sense of connection, and fulfillment when engaging with the platform (Lee et al., 2022). This positive experience is possibly due to the algorithms affirming the user's identity and preferences, thereby reinforcing a sense of self through personalized content. Conversely, when algorithms are insensitive to users' identities and needs, users may engage in behavior aimed at modifying the algorithmic output, such as actively seeking and endorsing content that resonates more closely with their personal identity (Lee et al., 2022). This corrective action suggests that users are not passive recipients of content but rather active participants in a feedback loop seeking optimal personal relevance and satisfaction.

The dynamic of algorithm responsiveness is not confined to social media alone but extends to other domains of human–machine interaction. Empirical studies have demonstrated that when robots and chatbots exhibit responsiveness to user cues, they can mitigate stress, foster feelings of social support, and elevate self-esteem (Birnbaum et al., 2016; Meng & Dai, 2021). The implication is that responsive technology can serve as an extension of social and emotional support system, contributing to overall well-being. Conversely, perceived insensitivity may undermine these benefits, prompting feelings of neglect or invalidation.

Drawing from this literature, we can infer that algorithm responsiveness and insensitivity on TikTok may shape users' broader evaluations of well-being (i.e., life satisfaction). Hence,

Hypothesis 1 (H1): PAR is positively related to TikTok users' satisfaction with life.

Hypothesis 2 (H2): PAI is negatively related to TikTok users' satisfaction with life.

Need Satisfaction on TikTok as a Mediating Mechanism

Although PAR and PAI have been linked to individuals' well-being on social media—mechanisms for how and why this association occurs are important to investigate. We argue that psychological need satisfaction on TikTok is one of key mechanisms through which PAR and PAI are connected to users' subjective well-being.

The basic needs are also theorized to be associated with perceived partner responsiveness in interpersonal contexts (Ibarra-Rovillard & Kuiper, 2011). Previous work suggests that an individual's perception of how well their partner understands and supports their core defining features, including their needs, is crucial for both well-being and relationship quality (Reis, 2007). We extend this reasoning to

algorithmic contexts, proposing that PAR operates similarly: users who feel the algorithm recognizes and aligns with their identity-relevant goals and interests are more likely to experience satisfaction of their basic psychological needs on the platform.

Recent scholarship has further examined how digital technology use, including social media, relates to intrinsic need satisfaction, highlighting the nuanced ways in which platforms may support or frustrate psychological needs (Dietrich et al., 2024). In particular, Dietrich and colleagues identify two key dimensions, control and authenticity, that are relevant for understanding competence and autonomy in social media contexts. Control refers to the perception that one can influence the platform's environment and outcomes, potentially enhancing competence by enabling users to curate or interact with content effectively. Authenticity refers to the degree to which content feels personally resonant and aligned with users' values and self-expression, thus supporting autonomy. TikTok's personalized "For You" feed may exemplify both: by responding to engagement cues, the platform gives users a sense of control while delivering content that feels authentic and personally meaningful. In addition to autonomy and competence, social media platforms can also facilitate relatedness by enabling users to connect with others through shared interests, collaborative trends, and interactive comment threads—features that foster a sense of belonging and community (Nesi et al., 2018; Taylor & Choi, 2023). Even when not explicitly designed as social platforms, features that allow for indirect forms of social interaction (e.g., liking, commenting, and duetting) can contribute to users' perceptions of emotional connection and inclusion.

Building on these insights, we propose that when users perceive TikTok's algorithm as responsive, it suggests the system is successfully curating content aligned with their intrinsic motivations and identity. For autonomy, this may affirm users' preferences and expressions, fostering a sense of volition. For competence, responsiveness may reinforce their sense of effectiveness through engaging or goal-relevant content. For relatedness, algorithmic responsiveness can enhance emotional resonance, shared community values, or social inclusion, supporting the need for belong. This view is further supported by research in interpersonal communication, where perceived partner responsiveness—understood as attentiveness and adaptation to another's needs—has been linked to basic need satisfaction (Reis et al., 2017). Although algorithmic systems lack intentionality, users may still experience content adaptation as a form of responsiveness, bridging human–human and human–algorithm interaction in meaningful ways.

Conversely, PAI may thwart basic psychological needs. When algorithms are perceived to misinterpret, suppress, or ignore users' needs and preferences, the interaction may mirror a form of digital invalidation. For example, users who feel that the algorithm presents irrelevant, stereotyped, or identity-incongruent content may experience reduced autonomy, a diminished sense of competence in navigating the platform, and alienation from communities they care about. This misalignment can undermine the perceived relational quality between user and platform, reducing engagement and satisfaction.

Users often respond to these mismatches by attempting to retrain the algorithm—endorsing content that better reflects their identity or avoiding content that misrepresents them (Lee et al., 2022). This corrective behavior further suggests that users view their relationship with the algorithm as a co-constructed interaction in which agency and responsiveness are negotiated over time. TikTok, in particular, has been described as an "identity strainer," filtering user interactions through inferred markers of sexuality, gender, or body type (Karizat et al., 2021). When users feel that the algorithm successfully reflects their identity, it can enhance need fulfillment; when the algorithm fails to do so, users may feel misrepresented or unseen, potentially undermining their sense of autonomy, competence, or relatedness on the platform (Fisher & Mehozay, 2019; Gillespie, 2014).

Research has consistently demonstrated that the satisfaction of the three basic needs is linked to both psychological (Baumeister & Leary, 1995; Choi et al., 2009; Ryan & Deci, 2000) and physical well-being (Hull et al., 2016; Ryan & Patrick, 2009). Each of the three basic psychological needs has a distinct influence on well-being. Studies found that perceived autonomy enhances life satisfaction (Delhey & Steckermeier, 2016) and increases happiness (Maridal, 2017) and a reduction in negative effects such as depression (Chaves et al., 2018). Similarly, perceived competence has been found to correlate significantly with well-being, suggesting that the feeling of being effective and achieving one's goals is integral to an individual's psychological health (Choi et al., 2009; Sigmundsson et al., 2023). Finally, perceived relatedness, or feeling connected to others, is known to provide a buffer against stress and adversity (e.g., depression, anxiety, and loneliness; Ryan et al., 2022; Slemp et al., 2024), as individuals feel they have a supportive network to turn to.

Taken together, we propose that perceived need satisfaction on TikTok mediates the relationship between algorithmic perceptions (PAR and PAI) and users' subjective well-being, operationalized as life satisfaction. Specifically, when users perceive the algorithm as responsive and attuned to their psychological needs, they are more likely to experience autonomy, competence, and relatedness on the platform, which in turn may contribute to greater life satisfaction. Conversely, when users perceive the algorithm as insensitive or misaligned with their identity and preferences, this may frustrate their psychological needs and be associated with lower life satisfaction. We propose the following hypotheses and illustrate all hypotheses via the model found in Figure 1:

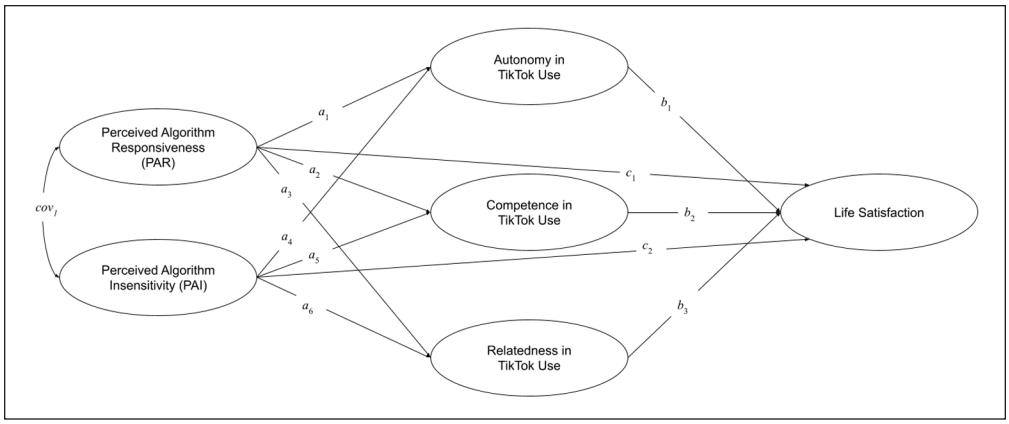

Figure 1. Theoretical mediation model of PAR and PAI predicting life satisfaction via autonomy, competence, and relatedness in TikTok use.
Note. The model indicates the mediated associations among variables detailed in the hypotheses and does not indicate the full measurement model.

Hypothesis 3 (H3): Perceived (a) autonomy, (b) competence, and (c) relatedness on TikTok will mediate the positive association between PAR and satisfaction with life.

Hypothesis 4 (H4): Perceived (a) autonomy, (b) competence, and (c) relatedness on TikTok will mediate the negative association between PAI and satisfaction with life.

Method

Participants

US residents over the age of 18 who had used TikTok at least once in the month before data collection were recruited in March 2023 using Prolific (https://www.prolific.co), an online opt-in panel of study participants. Prolific was chosen for participant recruitment given its high-quality participants (Douglas et al., 2023). Participants were recruited using sampling quotas designed to approximate the demographic makeup of TikTok users in the United States, based on data from the Pew Research Center (Auxier & Anderson, 2021) and the U.S. Census Bureau (2021). Census data on age, race, and sex were used to determine baseline proportions, which were then adjusted to reflect Pew's estimates of TikTok's user demographics—namely, a user base that is generally younger, more female, and less white than the broader US population. Our final sample closely aligned with these characteristics. After removing eight participants who failed at least one of two attention checks, the final sample consisted of 385 respondents. The sample included 55.84% self-identified female participants, was racially diverse (10.9% Asian, 13.8% Black, 14% Mixed/Other, 61% White), and reflected the expected age distribution of TikTok users (18–29: 38%; 30–49: 38%; 50–65: 21%; 65+: 3%). TikTok usage was frequent among participants, with a high mean usage score ($M = 5.99$, $SD = 1.27$) on a 7-point scale. Our sample size was determined based on practical constraints. Specifically, participants were recruited until the allocated financial resources for participant compensation were exhausted.

Procedures

After indicating their consent, respondents completed a questionnaire administered through Qualtrics (https://www.qualtrics.com). Participants were paid between US$2.10 and US$2.40 for completed responses. The median time to complete the study was just below 13 min. This means that participants earned a wage of US$10/hr to US$12/hr for their involvement in the study. Before data collection, the researchers' Institutional Review Board deemed that the study met the criteria (IRB Protocol Approval #XXX).

Measures

Perceived Algorithm Responsiveness and Insensitivity. PAR and PAI were measured using Taylor and Choi's (2022) 7-point Likert-type measures of algorithm responsiveness and insensitivity. Items for the measure presented a series of statements corresponding to the instructions asking users to think about posts, videos, and stories the algorithm curated for them that week they were taking the survey and indicate their level of agreement to the statements (1 = *strongly disagree*; 7 = *strongly agree*). The PAR measure consisted of eight items measuring the degree to which users felt TikTok's algorithm was responsive to them (e.g., "The TikTok algorithm responds to what I am thinking and feeling"; $M = 4.58$; $SD = 1.16$; $\alpha = .93$. Representing the perceived insensitivity of the social media algorithm, the PAI measure consisted of seven items which captured the extent to which users felt TikTok's algorithm was insensitive to them (e.g., "The

TikTok algorithm seems to ignore the things that are most important to me"; $M = 2.92$; $SD = 1.57$; $\alpha = .92$).

Basic Psychological Needs. Three basic psychological needs were measured using three subscales of the self-determination measure (Peters et al., 2018; Ryan & Deci, 2000) adapted into the context of TikTok's social media algorithm. All items were presented on a 7-point Likert-type scale in which participants indicated the truth to which statements pertaining to autonomy, competence, and relatedness were applicable to their own perceptions of TikTok algorithms: *Autonomy* (12 items; e.g., "The TikTok algorithm helps me do something important to me"; $M = 3.16$; $SD = .72$; $\alpha = .88$), *competence* (four items; e.g., "I am capable of managing the algorithm content on TikTok"; $M = 3.42$; $SD = .94$; $\alpha = .90$), and *relatedness* (eight items; e.g., "I really like the people I interact with on TikTok"; $M = 2.58$; $SD = .82$; $\alpha = .82$).

Subjective Well-Being. Subjective well-being was measured with Diener and colleagues' (1985) five-item measure of satisfaction with life (SWLS). Participants were asked to indicate the degree to which they strongly agree/disagree with statements pertaining to their satisfaction with life with 7-point Likert-type scale (e.g., "In most ways my life is close to my ideal."; $M = 21.74$; $SD = 7.99$; $\alpha = .92$). Higher scores suggested greater subjective satisfaction with one's life (Diener et al., 1985).

Results

Before analysis, data were first screened for missing data via calculating the percentage of data missing for each response and for each question collected. The original data set contained 385 observations. In reviewing missing responses, it was determined that missing data (one response for one item) were likely at random. Motivated by our use of SEM (i.e., maximize power by having a complete data set for maximum likelihood estimation), this missing datum was subjected to multiple imputation using fully conditional specification (FCS) via the multivariate imputation by chained equations (MICE) algorithm using R Stats MICE package (van Buuren et al., 2015). To test robustness, we re-estimated the main SEM using listwise deletion (excluding one case with missing data) instead of multiple imputation. Model fit slightly declined (CFI = .941 vs. .942; SRMR = .080 vs. .078), but regression results and conclusions remained virtually identical, indicating findings are robust to the method of handling missing data.

Structural Equation Modeling

For the data analysis, a two-step approach using structural equation modeling (SEM) was used. In the first stage, confirmatory factor analysis (CFA) was calculated to verify the theoretically specified measures are identified empirically. In the second stage, hypotheses were tested via fitting the hypothesized mediation model using latent path analysis (Bollen, 1989). A maximum likelihood (ML) estimator was used for estimating models in both steps via Lavaan package (Version 0.6–10 via CRAN; Rosseel, 2012) in R statistical software (R Core Team, 2023). The benefit of incorporating both the CFA and specifying each hypothesized path is that the estimated latent path model is assumed to be free of measurement error (Kline, 2015).

Before running the aforementioned analysis, assumptions for estimating the model were met via a series of assumption tests. We initially included TikTok use frequency as a covariate. However, controlling for use frequency did not alter the pattern of findings. For clarity and model parsimony, this variable was removed from the final analyses.

A priori fit indices were determined for sufficient global fit. Goodness of fit was evaluated via the use of both model chi-square test and comparative fit index (CFI). Badness of fit was evaluated using the root mean square error of approximation (RMSEA) in addition to PCLOSE, the poor fit hypothesis confidence intervals associated with RMSEA, and standardized root mean squared residual (SRMR). A nonsignificant chi-square, CFI ≥ .95, RMSEA ≤ .05, RMSEA CI not containing.10, and SRMR of <.08 would suggest a good fit between the identified model and the data.

Measurement Model. A combined CFA was conducted for the six multi-item measures. Although the arbitrary chi-square statistic obtained from fitting the measurement model suggests poor fit, $\chi^2\,(887) = 2014.025$, $p < .001$, we came to expect that given our large sample size that this would be significant regardless of model specification. However, all of the other fit indices taken together holistically indicated our identified model was of relatively poor fit, CFI = .901, RMSEA = .057, 95% RMSEA CI [.054, .061], PCLOSE ≤ .001, SRMR = .061. Six manifest items after reviewing each item's wording were identified as needing to be removed from the model. In addition, the six items were found to have a substantially low r^2, suggesting they had a high level of error unaccounted for. Fit of the respecified model was found to be reasonably fitting, $\chi^2\,(650) = 1330.343$, $p < .001$, CFI = .936, RMSEA = .052, 95% RMSEA CI [.048, .056], PCLOSE ≤ .001, SRMR = .048.Raykov's rho (Raykov, 1997) each of the latent variables in the measurement model were calculated and found to be greater than .07 suggesting the factors are reliable ($\rho_{PAR} = .933$; $\rho_{PAI} = .919$; $\rho_{Autonomy} = .911$; $\rho_{Competence} = .914$; $\rho_{Relatedness} = .876$; $\rho_{Satisfaction\ With\ Life\ Scale} = .926$). All measurement items, including those retained and removed during CFA, along with their standardized loadings, are documented in the appendix available via our Open Science Framework (OSF) repository [https://osf.io/q2ywg/?view_only=b60e9be4c6154272b7820843f5db8494].

Table 1. Likelihood Ratio Test for Model Comparison Between Structural Models 1 and 2.

	df	*AIC*	*BIC*	χ^2	$\Delta\chi^2$	*p*
Model 2	651	39,184	39,540	1272.9		
Model 1	653	39,395	39,743	1487.7	214.8	<.001

Structural Regression Model and Mediation Analysis. To test the proposed hypotheses, a structural regression model incorporating the measurement model and our hypothesized causal mediating paths was specified. Specifically, PAI and PAR were specified to be latent predictors of TikTok users' levels of three psychological needs (i.e., autonomy, competence, and relatedness) satisfied through TikTok which in turn would be associated with satisfaction with life, as an indicator of subjective well-being. Using the previously identified measurement model, the paths for testing the proposed hypotheses were added into a structural regression model and estimated with an ML estimator. Confidence intervals for evaluating direct and indirect effects of PAR and were constructed using 10,000 bootstrap resamples. The absence of zero in the resulting confidence interval suggests evidence toward the effect (direct and or the indirect effect).

Results of fitting the model (Model 1) suggest a relatively well-fitting model. As expected, the model chi-square statistic was found to be significant with a large sample size as ours, χ^2 (653) = 1487.73, $p < .001$. Whereas our respecified measurement model was well fitting, initial fit of the structural model was indicative of some global misspecification in the model, warranting further investigation was needed at the local level, CFI = .922, RMSEA = .058, 95% RMSEA CI [.054, .061], PCLOSE = .001, SRMR = .080. Examining the residual correlations for the fitted model suggested a need for allowing two different pairs of items to covary (relatedness Items 4 and 5; PAI Items 3 and 4), which was deemed appropriate given each item's wording (i.e., hence theoretically justified respecification). Fit for the respecified structural model (Model 2) was found to be adequately fitting, χ^2 (651) = 1272.93, $p < .001$, CFI = .94, RMSEA = .050, 95% RMSEA CI [.046, .054], PCLOSE < .001; SRMR = .080. To assess whether the inclusion of the two additional covariances improved model fit, a likelihood ratio test (LRT) comparing the two nested models was performed. Results of the LRT suggest the respecified model was substantially better fitting than Model 1 (see Table 1). When interpreting the entire respecified model concerning the total effect of the specified parameters, the total effect was found to be significant, β = .326, *SE* = .145, 95% CI = [.026, .595].

H1 predicted that PAR is positively related to TikTok users' satisfaction with life. Results suggested that PAR is positively associated with their life satisfaction, $\beta = .261$, *SE* = .097, 95% CI = [.064, .443]. As users feel their algorithm is responsive, the greater their perceived satisfaction with life. Thus, H1 was supported. H2 predicted that PAI would be negatively related to users' subjective well-being. PAI was not found to be related to life satisfaction, $\beta = .009$, *SE* = .080, 95% CI = [−.154, .162]. Thus, H2 was not supported.

H3 argued that the positive associations between users' PAR and their satisfaction with life would be mediated via satisfaction of the three psychological needs on TikTok: autonomy (H3a), competence (H3b), and relatedness (H3c). Results suggest that autonomy was not indirectly mediated the associations between PAR and life satisfaction, $\beta = .021$, *SE* = .04, 95% CI = [−.062, .101]. Further exploration of the associations indicated that autonomy was not associated with satisfaction with life ($\beta = .043$, *SE* = .080, 95% CI = [−.119, .197]). PAR, however, was found to be positively associated with perceived autonomy, $\beta = .492$, *SE* = .101, 95% CI = [.274, .676]. Thus, H3a was not supported.

Although autonomy was not found to be a significant mediator, competence and relatedness significantly mediated the associations between PAR and life satisfaction. Competence was found to significantly mediate the associations between PAR and life satisfaction; however, as users' perceived competence increased, their perceived satisfaction with life was significantly lower, $\beta = -.117$, *SE* = .049, 95% CI = [−.214, −.021]. Thus, H3b was not supported. Finally, greater PAR led to greater perceived relatedness on TikTok, which was associated with greater life satisfaction, *B* = .129, *SE* = .064, 95% CI = [.064, .314]. H3c was supported.

H4 suggested that the negative association between user's PAI of TikTok's algorithm and life satisfaction would be mediated through users' perceived autonomy (H4a), competence (H4b), and relatedness (H4c) on TikTok. Results from fitting the hypothesized model suggest that autonomy was not a significant mediating variable ($\beta = -.007$, *SE* = .016, 95% CI = [−.043, .023]), nor was competence ($\beta = .007$, *SE* = .02, 95% CI = [−.03, .051]), or relatedness ($\beta = .024$, *SE* = .022, 95% CI = [−.014, .072]). H4a–c was not supported. Further analyses showed that PAI was not significantly associated with any of the three basic psychological needs—autonomy, competence, or relatedness. Although competence and relatedness were significantly associated with life satisfaction, their lack of association with PAI indicates that they did not mediate the relationship between PAI and life satisfaction. Table 2 contains the loadings, regression weights, and R^2 statistics. Figure 2 shows the standardized coefficients for the structural model.

Table 2. Regressions for Results

		Path	*B*	*SE*	*LL*	*UL*
Regressions						
Autonomy in TikTok use						
	PAR	a1	.492	.101	.274	.676
	PAI	a4	−.157	.101	−.371	.030
Competence in TikTok use						
	PAR	a2	.557	.084	.381	.715
	PAI	a5	−.031	.090	−.212	.142
Relatedness in TikTok use						
	PAR	a3	.571	.086	.391	.732
	PAI	a6	.108	.086	−.065	.275
Life satisfaction						
	AUT	b1	.043	.080	−.119	.197
	COMP	b2	−.210	.082	−.363	−.040
	REL	b3	.225	.070	.083	.362
	PAR	c1	.261	.097	.064	.443
	PAI	c2	.009	.080	−.154	.162
Covariances						
	PAR and PAI	cov1	−.735	.050	−.822	−.629
	REL_4 and REL_5	cov2	.555	.048	.460	.645
	PAI_3 and PAI_4	cov3	.500	.090	.299	.650
Latent variables						
Perceived algorithm responsiveness (PAR)						
	PAR_1		.846	.021	.802	.884
	PAR_2		.707	.038	.627	.777
	PAR_3		.822	.026	.767	.868
	PAR_4		.732	.037	.655	.797
	PAR_5		.855	.019	.816	.890
	PAR_6		.792	.030	.729	.846
	PAR_7		.799	.027	.742	.846
	PAR_8		.814	.035	.737	.876
Perceived algorithm insensitivity (PAI)						
	PAI_1		.819	.029	.756	.871
	PAI_2		.722	.050	.619	.813
	PAI_3		.724	.049	.623	.812
	PAI_4		.635	.060	.516	.747
	PAI_5		.857	.027	.799	.903
	PAI_6		.834	.028	.775	.885
	PAI_7		.850	.023	.802	.891
Autonomy (AUT)						
	AUT_1		.453	.049	.355	.544
	AUT_2		.771	.027	.716	.819
	AUT_3		.804	.022	.759	.844
	AUT_4		.765	.025	.713	.809
	AUT_5		.679	.034	.608	.742
	AUT_7		.777	.031	.712	.834
	AUT_9		.711	.031	.644	.768
	AUT_10		.814	.021	.770	.853
	AUT_12		.783	.024	.733	.828
Competence (COMP)						
	COMP_1		.906	.015	.874	.934
	COMP_2		.892	.021	.846	.928
	COMP_3		.903	.018	.865	.933
	COMP_4		.706	.037	.627	.773

(continued)

Table 2. (continued)

		Path	B	SE	LL	UL
Relatedness (REL)						
	REL_1		.827	.035	.750	.888
	REL_2		.809	.033	.739	.867
	REL_4		.629	.038	.549	.699
	REL_5		.663	.040	.576	.733
	REL_8		.825	.031	.761	.880
Satisfaction with life (SWLS)						
	SWLS_1		.924	.013	.895	.948
	SWLS_2		.852	.020	.811	.889
	SWLS_3		.891	.016	.858	.920
	SWLS_4		.862	.020	.820	.899
	SWLS_5		.723	.029	.664	.777

*$p < .05$. **$p < .01$. ***$p < .001$.

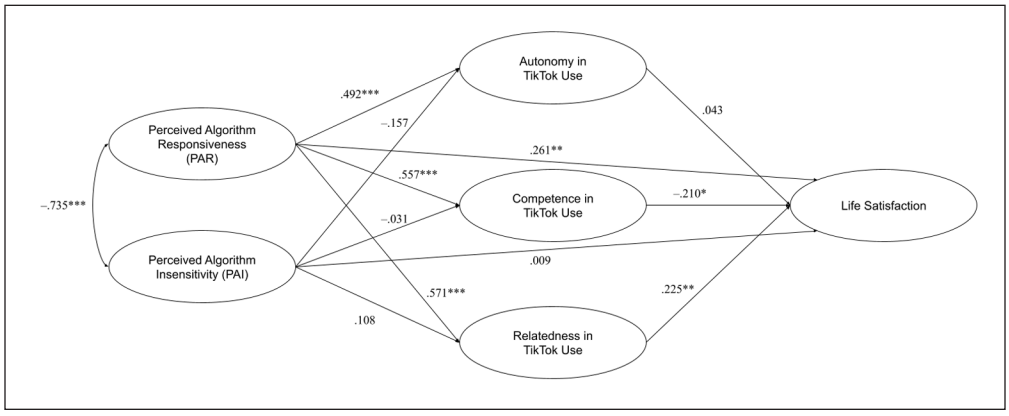

Figure 2. Fitted structural of PAR and PAI predicting life satisfaction, operationalized as life satisfaction via autonomy, competence, and relatedness in TikTok use.
Note. Standardized coefficients are reported.
*$p < .05$. **$p < .01$. ***$p < .001$.

Discussion

In our research, we aimed to examine how the facets of basic psychological needs, specifically those central to SDT—autonomy, competence, and relatedness—might mediate the relationship between users' perceptions of algorithm responsiveness (PAR) and insensitivity (PAI) on TikTok and their satisfaction with life.

Results of our study contribute to the growing work in identifying how user's perceptions of their algorithm are linked to difference in psychological well-being in several ways. In the human-to-human context, interpersonal responsiveness has been shown to have a positive effect on our relationships and subjective well-being (Crasta et al., 2018; Reis & Shaver, 1988). Our study confirms previous work that extended interpersonal responsiveness into the human–algorithm context such that greater PAR is associated with to a positive impact on users' subjective well-being (Taylor & Choi, 2022, 2023). The more responsive users perceive their algorithm to be (i.e., attentive to their need, seeing where the user is coming from, and listening to them), the greater satisfaction participants reported with their life. In essence, when algorithms resonate more deeply with our needs, passions, and self-concept, we experience a heightened sense of well-being.

Although previous work has shown that algorithm insensitivity is correlated with psychological well-being (e.g., loneliness; Taylor & Choi, 2023), our study found that users do not always feel less satisfied with life when they perceive TikTok's algorithms as insensitive. This suggests that users might employ various compensatory behaviors when interacting with TikTok, such as proactively seeking content or modifying their engagement strategies, which potentially offset any negative effects of algorithmic insensitivity. Furthermore, the concept of co-production of user identity (Lee et al., 2022) in the context of social media algorithms,

where users actively shape and are shaped by algorithmic responses over time, emerged as significant. It involves users' active participation in shaping their digital experience, which in turn reflects and informs their identify, thereby influencing their sense of well-being. Our findings suggest that encounters with less responsive algorithms could inadvertently foster a deeper self-examining among users, leading to an expanded exploration of their own identities through exposure to diverse content. However, the implications of PAI for life satisfaction across different user identities remain unclear, opening avenues for future research. Future research should aim to dissect the nuances of how PAI interacts with varying degrees of life satisfaction among distinct subgroups, seeking to illuminate how different identity groups might be affected differently by PAI.

A broad goal for our study was to propose and empirically test the possible mechanisms for PAR and PAI to impact subjective well-being. In particular, we sought to identify how facets of basic psychological needs (i.e., self-determination, Deci & Ryan, 2008) of autonomy, competence, and relatedness satisfied by TikTok use operate as mediators between PAR and PAI and TikTok users' satisfaction with life. Our findings indicated that PAR was associated with higher levels of perceived autonomy on the platform; however, this perceived autonomy was not significantly associated with greater satisfaction with life. The significant association between PAR and perceived autonomy on TikTok highlights the nuanced ways users may experience a sense of volition in algorithmic environments. Prior work by Sundar and Marathe (2010) distinguishes between machines/algorithms that personalize content (driven by algorithmic inference) and actively customize (initiated by user control). However, user–algorithm interaction on platforms like TikTok may be better conceptualized as a co-constructive process: users shape the algorithm through engagement behaviors (e.g., liking, skipping, and rewatching), and the algorithm responsively adapts to those patterns. This reciprocal dynamic may contribute to users' subjective perception of autonomy, even when explicit customization options are limited.

Nonetheless, while users may feel autonomous within the context of their platform use, this perceived autonomy did not show a significant association with overall life satisfaction. One possible explanation is that the importance of autonomy may vary across different user subgroups (Ryan & Deci, 2006; Wichmann, 2011), potentially influenced by factors such as the users' level of engagement with the platform (e.g., if power users) and their familiarity with the platform (Silva et al., 2022). Another possibility is that this pattern reflects the scope of the need satisfaction measure used in the study. Specifically, TikTok-related need satisfaction is domain-specific, and prior research has shown that domain-specific experiences often account for only a modest proportion of variance in broader well-being outcomes (Chen et al., 2015; Sheldon et al., 1996). In addition, the autonomy items used in this study may reflect the socially embedded nature of volition on social platforms like TikTok, where self-directed engagement often involves responding to algorithmic recommendations and social cues. In such contexts, autonomy may not be experienced as purely individual choice but rather as volitional participation in socially shaped trends and interactions. This interpretation suggests that the null finding may stem less from a lack of autonomy per se and more from the contextualized form of autonomy that characterizes algorithmic media environments. Future research could refine autonomy measures to capture this relational and socially informed sense of volition.

Our results showed that satisfaction of competence mediates the association between PAR and life satisfaction, although the direction was reversed. Greater responsiveness led to greater satisfaction of competence on TikTok, which in turn was associated with low levels of life satisfaction. TikTok is a platform that known to be popular for information seeking and entertainment purposes (Elsner et al., 2022; Song et al., 2022). Greater competence on the platform may lead to more time spent on TikTok, which can escalate into overuse. Despite being skilled at navigating the platform, users might face diminishing returns in terms of happiness when their usage begins to encroach on other vital areas of life. It is also possible that greater competence might come with greater awareness of the manipulative nature of algorithms. This awareness could lead to disillusionment with the platform, as users recognize the contrived nature of their online experiences, which might lead to diminished sense of well-being. Understanding the interplay between these factors is complex and suggests that high competence on a social media platform does not unequivocally translate to enhanced satisfaction with life. This nuanced perspective demands further research to unravel the specific dynamics at play.

Finally, we found that the satisfaction of need for relatedness on TikTok significantly mediates the association between PAR and life satisfaction. We speculate that users who feel a stronger connection with others on TikTok—perhaps through personalized content that fosters a sense of community or belonging—report higher well-being (Song et al., 2022). This connection could be due to algorithms that accurately reflect users' interests and introduce them to like-minded individuals or groups, thereby enhancing their sense of relatedness and, consequently, their satisfaction with life. Our finding suggests that social media platforms, and TikTok in particular, could benefit from refining their algorithms to focus not only on individual user preferences but also on facilitating and strengthening community bonds (see Taylor & Choi, 2022, 2023).

Our study found that PAI was not significantly associated with any of the three psychological needs or with life satisfaction, whereas PAR showed significant associations with all. This asymmetry suggests that PAI may operate differently from how PAR impacts users. Given that PAI was not associated with lower life satisfaction yet has been found to

be associated with higher levels of loneliness (Taylor & Choi, 2023), this could indicate that the effects of algorithm insensitivity may be domain-specific and are more complex than a simple inverse of algorithm responsiveness. The association between PAI and loneliness was previously examined on Instagram, a platform heavily centered on social connection and relational maintenance. In contrast, TikTok is heavily used for entertainment and content discovery (Song et al., 2022). However, TikTok is not devoid of sociality—users actively engage in comment threads, remix content through duets and stitches, and participate in communities shaped by shared interests and identities. These hybrid affordances, combining entertainment with sociability, may shape how users experience and respond to algorithmic insensitivity. For example, if TikTok content feels misaligned with a user's identity, the social consequences may feel less acute than on more relationally anchored platforms. At the same time, these social features remain relevant: users often attempt to retrain the algorithm by endorsing more representative content or avoiding content that feels misaligned (Lee et al., 2022). This suggests that users may engage in adaptive behaviors that buffer the potential negative effects of PAI on well-being, even if such behaviors do not eliminate experiences of misrecognition or alienation. Taken together, these findings point to the importance of treating PAR and PAI as distinct constructs with potentially divergent pathways and outcomes. Future work should further explore the boundary conditions under which algorithmic responsiveness and insensitivity exert their psychological effects, and how these processes are moderated by platform use patterns and sociotechnical affordances.

In addition, our findings provide implications for platform design and user experience. Specifically, we found that PAR was positively associated with users' life satisfaction, and that this relationship was mediated solely by the satisfaction of relatedness—not autonomy or competence. It reflects how users interpret algorithmic responsiveness on platforms like TikTok as a signal of being seen, understood, and connected—core elements of relatedness. In this sense, PAR may foster relatedness not only by mimicking interpersonal dynamics but also by enabling social affordances such as shared content and algorithm-curated communities that help users feel socially embedded. Social media companies are increasingly positioning algorithmic design as a tool to foster social connection; for example, Facebook (now Meta) announced in 2018 that its News Feed algorithm would be redesigned to "bring people closer together" (Mosseri, 2018). Although TikTok is primarily used for entertainment, its social features, such as sharing, commenting, and community engagement, remain psychologically salient. Social media companies can support users' well-being by designing algorithmic systems that promote this sense of connection, particularly by reinforcing signals of relatedness. For researchers, our findings highlight the importance of examining how perceptions of algorithm responsiveness, not just behavioral metrics, shape user experiences through basic psychological needs.

Limitations

Our study contributes valuable insights into the field of algorithm perception; however, we must also consider several limitations. First, the cross-sectional nature of our study design precludes the establishment of causality. While our findings suggest correlations and potential mediatory relationships, we cannot claim that PAR or PAI causes changes in life satisfaction. Longitudinal or experimental designs would be necessary to ascertain causal relationships. Second, although we focused on life satisfaction as a cognitive indicator of subjective well-being, this is only one possible outcome of user–algorithm interaction. Future research could explore more specific and proximal outcomes such as emotional responses, identity affirmation, or perceived social support that may be more directly shaped by PAR and PAI. Relatedly, future work should consider external factors that might interact with algorithm sensitivity to influence these outcomes, such as algorithm transparency or user motivations. Third, while we drew from interpersonal communication constructs like responsiveness and insensitivity, we acknowledge that relying on human–human interaction as a benchmark may overlook the distinct dynamics of human–AI relationships. As algorithms increasingly exhibit traits like autonomy and adaptive personalization, future work could develop AI-specific frameworks better suited to capture these unique relational dimensions.

Conclusion

In the contemporary digital landscape, algorithms are deeply entwined with our virtual interactions. Users engage with social media platforms, not only merely as passive consumers but also as active participants, offering glimpses of their identities through their interactions. Our study explored how perceived algorithmic responsiveness and insensitivity on TikTok influence life satisfaction as a cognitive indicator of subjective well-being, considering the psychological need satisfaction of autonomy, competence, and relatedness on the platform as mediators. Our findings shed light on nuanced ways in which PAR and PAI relate to well-being. We observed that user satisfaction with an algorithm's responsiveness was associated with not only their sense of efficacy on the platform but also their sense of connection to others within the digital realm. While one might assume that higher competence would naturally enhance subjective well-being, our results show a different picture—indicating that increased platform mastery may paradoxically diminish perceived well-being. This complex dynamic suggests that while users may seek—and even find—a digital resonance with their identities and preferences, the impact on happiness and well-being warrants a careful, critical examination. As we

navigate our digital lives, it is crucial to understand the subtle yet significant ways our interactions with algorithms can shape our sense of self and our overall satisfaction with life.

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The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Data Availability Statement

All materials associated with this study, including the data set, analysis code (R), and full survey measures, are openly available on the Open Science Framework (OSF): [https://osf.io/q2ywg/?view_only=b60e9be4c6154272b7820843f5db8494].

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