

THE PERSONALIZATION PARADOX: THE INTERPLAY OF PSYCHOLOGICAL MECHANISMS AND CONTEXTUAL FACTORS IN EXCESSIVE SHORT-VIDEO USE IN CHINA'S AGEING POPULATION

*Liu YingYing

**Manual Selvaraj Bexci

Paper Received: 08.07.2024 / **Paper Accepted:** 30.07.2024 / **Paper Published:** 02.08.2024

Corresponding Author: Liu YingYing; doi:10.46360/cosmos.et.620242006

Abstract

Short-video platforms (e.g., Douyin, Kuaishou) have become central to media use among China's "silver-haired" users. While algorithmic personalization increases perceived relevance and enjoyment, it may also encourage excessive use. This study proposes and tests a mediated-moderated model in which immersion (flow), mood repair/loneliness alleviation, and cue-reactivity mediate the association between perceived algorithmic personalization and excessive short-video use, while digital literacy, family support/joint media engagement, and urban-rural context moderate these pathways. Using a multi-site survey of Chinese older adults (≥ 60 ; $N \approx 800$) with device-logged usage and partial least squares structural equation modeling (PLS-SEM), we estimate direct, indirect, and conditional effects; qualitative interviews ($n \approx 40$) deepen interpretation. We expect personalization to predict excessive use predominantly via immersion and mood repair, with buffering by higher digital literacy and stronger family support. Findings aim to inform dignity-preserving, family-integrated interventions that rebalance use without sacrificing valued social functions.

Keywords: Older Adults, China, Algorithmic Personalization, Immersion, Loneliness, Digital Literacy, Family Support, PLS-SEM.

Introduction

Short-video platforms deliver a rapid sequence of personalized clips optimized for engagement. Among Chinese older adults, such feeds provide entertainment, information, and intergenerational connection, yet growing evidence links overuse to sleep disruption, attentional carryover, and reduced physical activity. Personalization is a plausible upstream driver of overuse, but how it translates into excessive consumption - and for whom - remains under-specified. We integrate psychological mechanisms (immersion/flow, loneliness alleviation, cue-reactivity) with contextual moderators (digital literacy, family support/joint media engagement, urban-rural setting) to explain variability in susceptibility. Grounding our approach in Self-Determination Theory (SDT) and the Differential Susceptibility to Media Effects Model, we propose that personalization heightens immersive experiences and short-term mood regulation, which, under certain contexts, can escalate time-on-platform (Ntoumanis et al., 2021; Takeuchi & Stevens, 2011).

Objectives

(a) Estimate indirect effects from perceived algorithmic personalization to excessive use via immersion, loneliness alleviation, and cue-reactivity;

(b) test moderation by digital literacy, family support/joint media engagement, and urban-rural context;

(c) integrate qualitative accounts to clarify lived experiences and boundary conditions.

Literature Review and Hypotheses

Algorithmic Personalization and Excessive Use

Personalized feeds increase perceived relevance and reduce search costs, reliably boosting engagement. In older adults, personalization may be particularly potent where mobility barriers restrict offline alternatives.

H1: Perceived algorithmic personalization is positively associated with excessive short-video use.

Psychological Mediators

Immersion/flow:- Algorithmic sequencing promotes uninterrupted attentional absorption (flow), associated with time loss and binge-like patterns.

H2: Immersion mediates the relationship between personalization and excessive use.

Loneliness alleviation/mood repair:- Short videos can serve as convenient, low-effort mood repair or companionship substitutes; for some seniors, this may reinforce prolonged viewing.

*.**Faculty of Social Science and Humanities, Lincoln University College, Malaysia.

*Shandong Urban Construction Vocational College, China.

H3: Loneliness alleviation mediates the relationship between personalization and excessive use.

Cue-reactivity/urge to continue:- Repeated exposure to salient cues (autoplay, novelty, intermittent rewards) can heighten urges to continue scrolling.

H4: Cue-reactivity mediates the relationship between personalization and excessive use.

Contextual Moderators

Digital literacy. Skills in configuring settings, evaluating credibility, and managing notifications may weaken the pathway from immersion/repair to overuse.

H5: Digital literacy attenuates indirect effects from personalization to excessive use.

Family support and joint media engagement:-

Family routines (co-viewing, after-view reflection) and supportive communication can create co-regulation, reducing unplanned overuse (Takeuchi & Stevens, 2011; Olson, Gorall, & Tiesel, 2006).

H6: Family support/joint media engagement attenuates indirect effects.

Urban-rural context:- Differences in bandwidth, social opportunities, and caregiving norms may amplify or dampen vulnerability.

H7: The strength of indirect effects differs by urban vs. rural residence.

Exploratory:- Age band (60-69 vs. 70+), sex, and baseline loneliness may further condition effects.

Method

Design and Setting

Explanatory-sequential mixed methods: cross-sectional survey with device-logged usage and PLS-SEM, followed by semi-structured interviews. Sites include one Tier-1 city district, one provincial capital, and two rural counties to capture diversity.

Participants

Community-dwelling adults ≥ 60 who report using short-video apps ≥ 4 days/week; able to consent; with a family member in weekly contact. Target $N \approx 800$ (stratified urban/rural). A subset $n \approx 40$ dyads (senior + caregiver) participate in interviews.

Measures

- Perceived algorithmic personalization (four items; e.g., “The app quickly learns what I like”).
- Immersion/flow (Flow Short Scale - adapted to short-video).
- Loneliness alleviation/mood repair (three items referencing viewing to feel less lonely/bored).

- Cue-reactivity/urge (momentary urge items; “hard to stop at one more clip”).
- Excessive use
 - (a) device-logged minutes/day;
 - (b) problematic short-video use (adapted Problematic TikTok Use Scale; Günlü & Ceyhan, 2023).
- Moderators: Digital literacy (performance-based + self-efficacy), family support/joint media engagement (FACES IV cohesion + a three-item JME index), urban-rural (registered residence).
- Covariates: Age, sex, education, self-rated health, smartphone years, living arrangement.
- Well-being/sleep (secondary): WHO-5 (Topp, Østergaard, Søndergaard, & Bech, 2015); PSQI (Buysse, Reynolds, Monk, Berman, & Kupfer, 1989).

Procedures and Ethics

Fieldworkers obtain consent, assist with scales, and - where permitted - capture OS-level usage summaries. Ethics approval is obtained in China; only aggregate usage metrics are collected; content is never accessed.

Analysis

We use PLS-SEM (smartPLS/R) with bias-corrected bootstrapping (5,000 resamples) to estimate indirect effects. Moderated mediation is evaluated via product-indicator or orthogonalizing approaches. Model quality: reliability (α , ω , ρ_A), convergent validity (AVE), discriminant validity (HTMT), collinearity (VIF), and predictive relevance (Q^2). Robustness checks: CB-SEM on covariance matrices, and regressions with device-logged minutes as DV. Qualitative interviews are analyzed via reflexive thematic analysis; joint displays integrate themes (e.g., “rituals over restrictions,” “repair without rabbit holes”) with subgroup effects.

Results

We will present path coefficients with 95% confidence intervals (CIs) for all direct, indirect, and total effects in the proposed model. Indirect effects will be examined specifically for the three hypothesized psychological mediators - immersion, loneliness alleviation/mood repair, and cue-reactivity - to assess the extent to which these mechanisms explain the relationship between perceived algorithmic personalization and excessive short-video use.

In addition, conditional indirect effects will be calculated across strata of the key contextual moderators:

- Digital literacy (high vs. low skill levels)

- Family support/joint media engagement (strong vs. weak)
- Geographic context (urban vs. rural)

These subgroup analyses will clarify whether personalization effects are uniformly experienced across demographic and contextual conditions or whether certain profiles are more vulnerable to overuse.

Objective usage data - device-logged minutes/day - will be analyzed alongside self-reported problematic-use scores to triangulate patterns and validate self-reports. Associations with secondary health outcomes such as sleep quality (PSQI scores) and subjective well-being (WHO-5) will be summarized to explore potential downstream impacts.

The qualitative component will yield thematic insights that help explain quantitative patterns. Anticipated themes include:

- “Why immersion becomes sticky” - seniors’ descriptions of autoplay sequences, endless novelty, and emotional engagement late at night.
- “Mood repair as companionship” - accounts of using short videos to alleviate loneliness, boredom, or sadness, especially in rural or solitary-living contexts.
- “Family rituals as natural limiters” - examples of shared routines, such as co-viewing after dinner, where family members naturally guide and end viewing sessions (“stop at enough”).

These themes will be integrated into joint displays that combine statistical effects with illustrative quotes, clarifying both the *mechanisms* and *practical levers* for intervention.

Discussion

The findings from this planned study are positioned to deepen understanding of how algorithmic personalization functions as a proximal catalyst for excessive short-video use -operating less through sheer exposure time and more through its activation of psychological mechanisms. In China’s ageing population, immersion/flow and loneliness alleviation emerge as plausible “bridges” linking personalization to overuse, particularly when offline social contact is infrequent or when mobility constraints limit alternative activities.

Equally important, the results are expected to reinforce the principle that context matters. Higher digital literacy and stronger family support/joint media engagement (JME) appear to weaken these bridges. In such cases, solitary, open-ended scrolling

is often replaced by bounded, socially meaningful viewing routines, and seniors are better equipped to configure platform settings, curate watchlists, and resist autoplay triggers.

Theoretical Implications

If supported, these findings would extend Self-Determination Theory (SDT)-informed media research by demonstrating how autonomy-supportive contexts - where seniors are guided rather than controlled - can moderate mediated pathways to overuse (Ntoumanis et al., 2021). The study would also contribute to the Differential Susceptibility to Media Effects Model by specifying mechanism-level targets such as flow disruption points and mood-repair alternatives that can be directly addressed in interventions.

Practical implications. The model suggests clear screening strategies: identifying seniors with high personalization sensitivity (“the feed feels made for me”) combined with elevated loneliness and low digital literacy as an at-risk profile. Interventions could combine micro-design changes - such as periodic pause points, notification bundling, and bedtime lockouts - with family rituals like brief co-viewing sessions followed by conversation, to preserve the social and entertainment value while limiting overuse.

Community health workers and senior-center facilitators could integrate brief coaching on both technical skills (managing personalization settings) and family-based co-regulation into existing wellness programs. Such an approach aligns with China’s emerging “healthy ageing” policy agenda, providing scalable, culturally sensitive solutions that address overuse without undermining older adults’ sense of autonomy or enjoyment.

Limitations and Future Work

The present study has several limitations that should be acknowledged. First, the cross-sectional mediation design restricts our ability to confirm temporal precedence between perceived algorithmic personalization, psychological mediators, and excessive short-video use. While the inclusion of device-logged usage data and sensitivity analyses can strengthen plausibility, only longitudinal or experimental designs can fully disentangle cause and effect. Future studies should employ prospective panel data or lagged mediation models, and where feasible, controlled interventions that directly manipulate personalization exposure to test causal pathways.

Second, self-reported constructs such as immersion, loneliness alleviation, and cue-reactivity are susceptible to social desirability bias and recall errors, particularly in older adult populations. The

use of device analytics partially offsets these risks by providing objective behavioral measures, but it does not capture qualitative aspects of engagement (e.g., emotional tone of viewing, perceived meaning of content). Future research could integrate experience sampling methods (ESM) or ecological momentary assessments to capture in-the-moment psychological states during use.

Third, platform feature volatility presents a moving target for measurement. Changes in algorithms, interface designs, and control tools (e.g., time-limit prompts, autoplay defaults) can alter personalization strength and cue-reactivity over time, necessitating regular updates to survey instruments and intervention manuals. Researchers should maintain version control of measurement tools and create adaptable frameworks that can be re-calibrated as platforms evolve.

Fourth, urban-rural disparities in infrastructure, device quality, and social norms may confound observed effects. Differences in bandwidth stability, availability of offline leisure activities, and family co-residence patterns could explain part of the variation in vulnerability to overuse. Stratified analyses in this study aim to shed light on such differences, but future work should incorporate context-sensitive measures of technological access and social capital.

Finally, future research directions include:

- Testing adaptive interventions tailored to high-risk profiles (e.g., low literacy + high loneliness + strong personalization sensitivity), potentially using sequential multiple assignment randomized trials (SMART).
- Evaluating micro-randomized just-in-time prompts to disrupt flow at strategic moments without harming enjoyment.
- Comparing coach delivery modes - in-person, telephonic, and asynchronous messaging - for effectiveness, acceptability, and cost.
- Embedding pragmatic trials in senior centers and universities for the elderly to assess real-world reach, adoption, implementation fidelity, and cost-effectiveness.
- Extending the model to related media behaviors (e.g., livestreaming, algorithmic news feeds) to determine whether similar psychological and contextual dynamics apply.

Conclusion

“Beyond personalization” requires shifting the research lens from the algorithm as an abstract driver to the human mechanisms and contexts that

mediate and moderate its impact. Our model emphasizes that the path from algorithmic personalization to excessive short-video use in older Chinese adults is shaped by psychological routes - immersion in content flow, the use of media for mood repair and loneliness alleviation, and cue-reactivity to engagement triggers - and is further conditioned by contextual factors such as digital literacy, family support, and the socio-geographic setting.

For China’s ageing population, this perspective reframes digital well-being not as a matter of restricting technology, but as designing autonomy-supportive, family-integrated, and mechanism-targeted solutions. Such solutions can harness the social and emotional value that short-video platforms provide - maintaining connection with family, staying informed, and finding entertainment - while reducing the risk of sliding into unplanned, prolonged use.

The implications extend beyond individual users to household practices, community programming, and policy design. Interventions grounded in this framework can be implemented through community health networks, family education programs, and platform-level features that promote self-regulation over enforced control. Ultimately, dignified, culturally aligned strategies that balance enjoyment and restraint can help ensure that digital engagement enhances rather than undermines healthy ageing in China.

Conflict of Interest

There is no conflict of interest between the authors in this manuscript.

References

1. Buysse, D. J., Reynolds, C. F., Monk, T. H., Berman, S. R., & Kupfer, D. J. (1989). The Pittsburgh Sleep Quality Index: A new instrument for psychiatric practice and research. *Psychiatry Research*, 28(2), 193-213.
2. Günlü, A., & Ceyhan, E. (2023). Reliability and validity of the Problematic TikTok Use Scale. *Current Psychology*, 42, 20638-20649.
3. Michie, S., Richardson, M., Johnston, M., Abraham, C., Francis, J., Hardeman, W., ... Wood, C. E. (2013). The behavior change technique taxonomy (v1) of 93 hierarchically clustered techniques: Building an international consensus for the reporting of behavior change interventions. *Annals of Behavioral Medicine*, 46(1), 81-95.
4. Ntoumanis, N., Ng, J. Y. Y., Prestwich, A., Quested, E., Hancox, J. E., Thøgersen-Ntoumani, C., ... Williams, G. C. (2021). A meta-analysis of self-determination theory-informed intervention studies in the health

- domain: Effects on motivation, health behavior, physical, and psychological health. *Health Psychology Review*, 15(2), 214-244.
5. Olson, D. H., Gorall, D. M., & Tiesel, J. W. (2006). *FACES IV Package: Administration Manual*. Minneapolis, MN: Life Innovations, Inc.
 6. Patrick, H., & Williams, G. C. (2012). Self-determination theory: Its application to health behavior and complementarity with motivational interviewing. *International Journal of Behavioral Nutrition and Physical Activity*, 9, 18.
 7. Takeuchi, L., & Stevens, R. (2011). *The new coviewing: Designing for learning through joint media engagement*. New York, NY: Joan Ganz Cooney Center.
 8. Topp, C. W., Østergaard, S. D., Søndergaard, S., & Bech, P. (2015). The WHO-5 Well-Being Index: A systematic review of the literature. *Psychotherapy and Psychosomatics*, 84(3), 167-176.