

A Conceptual-Methodological Research Design for Testing The Algorithmic Alienation Index and Systemised Self Hypothesis v1

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Abstract

Algorithmic Alienation is an established theoretical construct with partial qualitative empirical grounding in the published work of Kanbay, Akçam, and Arkan (2026) and Arkan, Kanbay, and Akçam (2026). This document does not reconstruct that foundation. It examines the next research problem: operationalising Algorithmic Alienation through the proposed Algorithmic Alienation Index (AAI) and testing the Systemised Self as a hypothesised terminus. The AAI is a theory-derived model comprising Diminished Autonomy, Identity Ambiguity, Eroded Decision-Making, Emotional Disconnection, and Algorithmic Resistance. Its weights and thresholds remain provisional. Because an advanced subject may experience algorithmic dependence as liberation rather than estrangement, self-report cannot independently verify the Systemised Self. A dual-evidence design is therefore proposed, combining subjective phenomenology with backend behavioural traces, experimental friction shocks, and cognitive reaction measures. Testable hypotheses, falsification criteria, four worked participant scenarios, and boundary conditions are provided to guide future empirical research and theoretically disciplined use.

Keywords: *Algorithmic Alienation, Algorithmic Alienation Index, Systemised Self, phenomenological inversion, algorithmic resistance, behavioural dependency, digital traces, falsification*

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1. Introduction: Purpose, Rationale, and Research Necessity

Algorithmic Alienation (AA) has been developed theoretically by Kanbay et al. (2026) and partially grounded empirically by Arkan et al. (2026). Their work identifies experiences of algorithmic steering, diminished deliberation, ambiguity about preference authorship, emotional detachment, and resistance. The present document neither reinvents AA nor claims independent validation of it. Its purpose is to consolidate the research architecture connecting this established construct to two newer contributions: the proposed Algorithmic Alienation Index (AAI) and the hypothesised Systemised Self (SS) (Galu & Kairos, 2026).

The AAI translates AA into a multidimensional, testable measurement proposal. The SS extends the trajectory by proposing a terminal condition in which algorithmic heteronomy is experienced as authentic self-determination. This creates a methodological circularity: a severely alienated subject may report estrangement, but an absorbed subject may report flourishing because dependence no longer feels external. Absence of self-reported alienation could consequently indicate either genuine autonomy or phenomenological inversion. Digital-use self-reports often diverge from logged behaviour (Ellis et al., 2019; Parry et al., 2021), reinforcing the need for independent verification.

Research is necessary to validate or revise the AAI, calibrate its weights and boundaries, determine whether SS is distinguishable from severe AA, and prevent the framework from becoming self-confirming. Every hypothesis must identify evidence that would support, fail to support, or contradict it.

2. Conceptual Foundations

AA is a multidimensional psychosocial process through which sustained algorithmic mediation may weaken autonomous intention, obscure the authorship of preferences, encourage

automatic decision-making, and reduce emotional connection. Kanbay et al. (2026) theorise four dimensions. Arkan et al.'s (2026) focus groups provide partial empirical grounding: algorithmic steering and pre-engineered options support Diminished Autonomy (DAu); externally shaped interests support Identity Ambiguity (IAm); cognitive inertia supports Eroded Decision-Making (EDm); detachment and being 'present yet absent' support Emotional Disconnection (EDc); and intentional searching or digital detox supports Algorithmic Resistance (RA).

The AAI is not identical to AA: it is a new operational proposal that organises these dimensions into an instrument.

The SS is a further theoretical hypothesis: a configuration in which high algorithmic dependence and resistance collapse coexist with phenomenological inversion. AA concerns a process that may remain visible as estrangement; SS concerns the proposed point at which this critical visibility disappears. The sequence is therefore:

Established AA → proposed AAI operationalisation → hypothesised SS.

3. The Proposed Algorithmic Alienation Index

The theory-derived formula is:

$$AAI_base = 0.30(DAu) + 0.25(IAm) + 0.25(EDm) + 0.20(EDc)$$

$$AAI_adjusted = AAI_base \times (1 - RA)$$

All variables are normalised from 0 to 1. DAu receives 0.30 because compromised self-direction is treated as the enabling condition: if algorithms substantially structure the field of intention, identity and deliberation are subsequently affected. IAm and EDm receive 0.25 each because altered self-authorship and automated choice are theorised as mutually reinforcing. EDc receives 0.20 because it may be less specific and partly downstream; numbness can also

arise from fatigue, depression, anxiety, or loneliness. RA is multiplicative because resistance is proposed to moderate the entire alienation profile rather than one dimension.

These values express theoretical centrality, not proven percentages. Both base and adjusted scores must be reported because strong resistance could otherwise conceal high underlying alienation. The proposed weights should be compared with equal, factor-derived, regression-derived, and expert-calibrated alternatives using out-of-sample prediction. AA should be tested as four correlated first-order factors, a second-order latent construct, and competing cognitive–affective structures. Multicollinearity, reliability, measurement invariance, and discriminant validity must be assessed.

The original SS boundary - $AAI \geq .95$ and $RA \leq .05$ - remains a candidate threshold, not a validated diagnosis. It should screen participants for further investigation rather than independently establish SS.

4. Dual-Evidence Measurement and Verification

Self-report remains necessary because phenomenological inversion concerns experienced freedom, authenticity, and estrangement. It is insufficient because the report may itself be shaped by the condition under investigation. Validation must therefore combine subjective and structural evidence.

Passive digital traces should measure recommendation-initiated actions, manual searches, direct navigation, source diversity, and behavioural variance. A path dependency metric could calculate recommendation led actions as a proportion of relevant actions. Longitudinal linguistic analysis may test reduced within person novelty, but education, genre, language, and platform conventions must be controlled.

Experimental friction shocks should temporarily disable personalisation, autoplay, and recommendations. The relevant outcome is not simply lower engagement; a rational participant may reject a degraded service. Researchers must assess whether the participant can still pursue previously stated goals through deliberate search and alternative pathways.

Cognitive reaction mapping should compare latency, alternative consideration, and acceptance across personalised, non-personalised, and self-generated options. It operationalises, without claiming to exhaust, Searle's (2001) 'Gap' between reasons and action. 'Zero latency' should be replaced by comparatively reduced deliberative latency. Familiarity, expertise, motor differences, and task difficulty require control. Evidence that user-selected limits can reduce problematic smartphone use, while monitoring alone is insufficient, also supports testing effective resistance behaviour rather than awareness alone (Olson et al., 2022).

Backend access is therefore methodologically necessary for the proposed terminal hypothesis, subject to informed consent, data minimisation, security, platform cooperation, and research ethics.

5. Research Hypotheses and Falsification Criteria

- H1 - Dimensional structure: AA will be represented more adequately by distinguishable correlated dimensions than by one undifferentiated factor. This is falsified or revised if adequately powered factor analyses cannot distinguish the dimensions or a simpler model consistently fits better.
- H2 - Weighting: The proposed weights will predict behavioural dependence at least as well as equal or empirically derived alternatives. They are revised if another model produces materially better cross-validated prediction.

- H3 - Exposure gradient: Intensive personalised-system users will show higher AAI and behavioural dependency after demographic, occupational, digital-literacy, and screen-time controls. A replicated null or reverse gradient contradicts the prediction.
- H4 - Path dependency: Higher AAI_base will predict more recommendation-led action, less manual search, and lower behavioural diversity. Equivalent or greater independent activity among high scorers falsifies the predicted relationship.
- H5 - Friction shock: High-dependency, low-resistance participants will show less capacity to reconstruct purposeful activity without curation. Successful adaptation comparable to low-AAI participants contradicts the hypothesis.
- H6 - Resistance moderation: At similar exposure and AAI_base levels, stronger RA will predict greater adaptability, independent search, and recommendation rejection. No independent behavioural effect would require revising RA or its multiplicative role.
- H7 - Phenomenological inversion: Felt estrangement will rise through severe AA but decline among some participants with independently verified extreme dependence and resistance collapse, who instead report liberation or authenticity. If the most dependent participants consistently report equal or greater estrangement, the proposed inversion is falsified.
- H8 - Distinctiveness: The AAI will relate to but remain distinguishable from social-media addiction (Andreassen et al., 2012), AI anxiety, persuasion susceptibility, and psychological-needs satisfaction. If it adds no validity beyond existing measures or screen time, its distinctiveness is falsified.

For SS, high AAI and low RA are treated as necessary but not sufficient. Candidate classification additionally requires independently verified behavioural dependence and evidence consistent with phenomenological inversion.

6. Worked Participant Scenarios

The following hypothetical cases illustrate calculation and inference; they are not validated profiles.

	Scenario	DAu	IAm	EDm	EDc	AAI_base	RA	AAI_adjusted
1	Low AA	0.2	0.15	0.2	0.1	0.168	0.75	0.042
2	Moderate AA, active resistance	0.55	0.45	0.5	0.35	0.473	0.55	0.213
3	Severe AA	0.9	0.8	0.9	0.75	0.845	0.1	0.761
4	Candidate SS structural profile	0.98	0.96	0.99	0.94	0.97	0.02	0.950

- Scenario 1: Self-report and logs agree: the participant searches manually, rejects unsuitable recommendations, and adapts easily when personalisation is removed. Low AA is supported.
- Scenario 2: Recommendation reliance and identity uncertainty are evident, but the participant recognises them and deliberately diversifies sources. High RA explains the lower adjusted score. This case shows why exposure and base alienation do not equal SS.
- Scenario 3: Logs show heavy recommendation dependence, low diversity, and substantial friction-shock disruption. The participant nevertheless feels constrained and wants greater control. Severe AA is supported, but continuing estrangement means phenomenological inversion is absent.

- Scenario 4: Structural indicators produce the illustrated high profile: more than 95% of relevant actions follow curated pathways, independent searching is minimal, and friction removal produces marked inability to pursue prior goals. Yet conventional self-report may yield deceptively low alienation because the participant describes curation as freedom and flourishing. The discrepancy, not the numerical score alone, makes this a candidate SS. Alternative explanations, including disability accommodation, occupational necessity, and rational delegation, must still be excluded.

7. Boundary Conditions and Epistemic Status

High use, rapid acceptance, recommendation dependence, or low resistance cannot independently establish AA or SS. Intensive automation may enhance autonomy for disabled users, reduce cognitive burden in demanding work, or reflect informed delegation. Participants retain meaningful agency when they can explain their reasons, reject unsuitable outputs, access alternatives, and recover when curation is removed. Perceived control can itself influence technology acceptance even when nominal control does not, showing why felt agency cannot substitute for structural verification (Princi & Krämer, 2020).

Culture, age, socioeconomic position, digital literacy, platform architecture, and mental health may modify observed relationships. Linguistic convergence is not specific to absorption; friction-shock disengagement is not necessarily paralysis; and rapid decisions may reflect expertise. Longitudinal and cross-cultural replication is therefore required.

The epistemic hierarchy must remain explicit. AA has theoretical and partial qualitative empirical grounding. The AAI is an empirically informed but unvalidated operational proposal. Its weights, bands, and resistance function are hypotheses. SS and phenomenological inversion are falsifiable but currently unconfirmed. The Hollow Society and Hollow Absolute, features within the Systemised Self thesis and theoretical framework (Galu & Kairos, 2026), remain

higher-order philosophical extrapolations, not consequences demonstrated by individual AAI data.

8. Summary Methodology & Conclusion

Methodology

This proposed study outlines a sequential mixed-methods design to validate the Algorithmic Alienation Index and test the Systemised Self hypothesis. Participants will complete the AAI, producing separate dimensional, base, resistance, and adjusted scores. Quantitative analysis will assess reliability, factor structure, multicollinearity, measurement invariance, and distinction from social-media addiction, AI anxiety, psychological distress, and general technology use. Alternative weighting models will be compared using a separate validation sample.

Self-report will be triangulated with authorised backend behavioural data because advanced algorithmic absorption may be experienced as freedom rather than alienation. Digital traces will measure recommendation-led actions, manual searches, behavioural diversity, and path dependency. Experimental friction shocks will temporarily remove personalisation, recommendations, and autoplay to determine whether participants can pursue previously stated goals through deliberate search or alternative pathways. Cognitive reaction mapping will compare decision latency and evaluation of curated, non-curated, and self-generated options.

A purposive qualitative subsample will then be interviewed about autonomy, identity, resistance, estrangement, and liberation. The decisive comparison will be between severe Algorithmic Alienation, where dependency remains consciously distressing, and candidate Systemised Self cases, where independently verified dependency is experienced positively. All hypotheses and falsification criteria will be preregistered. Accessibility, occupation, rational

delegation, culture, mental health, and platform differences will be assessed as alternative explanations.

Conclusion

This framework requires the proposed AAI and SS to be tested without circular reasoning. The AAI supplies a provisional bridge from established qualitative findings to multidimensional measurement; dual evidence protects the terminal hypothesis from dependence on self-report; and explicit falsification criteria prevent every outcome from confirming the theory. The decisive research comparison is between severe AA, where dependence remains felt as estrangement, and candidate SS, where independently verified dependence is experienced as liberation. Until replicated evidence supports that distinction, the Systemised Self should be presented as a research hypothesis rather than a diagnosis.

Technical Glossary

Algorithmic Alienation (AA): An established multidimensional construct describing estrangement associated with sustained algorithmic mediation.

Algorithmic Alienation Index (AAI): The proposed instrument operationalising AA across four dimensions and resistance.

AAI_base: The weighted dimensional score before resistance is applied.

AAI_adjusted: The base score multiplied by $(1 - RA)$.

Algorithmic Resistance (RA): Effective practices that preserve independent activity or disrupt algorithmic absorption.

Behavioural path dependency: The proportion of activity initiated through algorithmically curated pathways.

Boundary condition: A condition limiting when a theoretical claim or classification applies.

Cognitive reaction mapping: Comparison of decision latency and alternative consideration across curated and non-curated choices.

Diminished Autonomy (DAu): Weakening of unprompted intention within algorithmically structured option sets.

Emotional Disconnection (EDc): Detachment, numbness, or reduced affective connection associated with mediated activity.

Eroded Decision-Making (EDm): Movement from reflective choice toward habitual acceptance.

Experimental friction shock: Temporary removal of curation to test independent behavioural adaptability.

Falsification criterion: A pre-specified outcome that contradicts or requires revision of a hypothesis.

Identity Ambiguity (IAm): Difficulty distinguishing self-authored from algorithmically cultivated preferences.

Latent variable: An unobserved construct inferred from multiple measured indicators.

Phenomenological inversion: The proposed experience of algorithmic heteronomy as authentic freedom.

Systemised Self (SS): The hypothesised terminal configuration combining extreme dependence, resistance collapse, and phenomenological inversion.

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