

Comfortable Helplessness: Proxy Control and the Making of Dormant Psychological Needs in AI-Delegated Work

Shay Tsaban

shay.tsaban@gmail.com

Peres Academic Center

Research Article

Keywords: self-determination theory, psychological need satisfaction, perceived control, effort mobilization, algorithmic management

Posted Date: August 24th, 2026

DOI: <https://doi.org/10.21203/rs.3.rs-10628079/v1>

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Additional Declarations: No competing interests reported.

Abstract

Losing control over an outcome reduces willingness to invest effort, and part of that cost is carried by negative affect that makes the loss noticeable. This paper asks what happens when control is displaced not by an aversive environment but by a reliable one. It proposes comfortable helplessness: a reduction in psychological need satisfaction, produced by dependable automated control, that is not accompanied by a proportional affective signal. Five hypotheses were tested with six waves of the General Social Survey Quality of Worklife module matched to occupation-level indicators of automated work control. Automated control predicted lower satisfaction of autonomy, competence, and relatedness, yet showed no reliable association with work stress, exhaustion, or general happiness. Human supervisory support predicted needs and affect in near-equal proportion. Cluster bootstraps confirmed that affect-to-need ratios were significantly smaller for automated than for human control, and supportive supervision partly buffered the autonomy cost. Need costs from automated systems may therefore escape affect-based detection.

Introduction

Automated and algorithmic systems now allocate tasks, set the pace of work, and evaluate performance across a widening share of jobs (Autor, 2015; Kellogg et al., 2020). Organizations adopt these systems largely because they are dependable. A scheduling algorithm or a machine-paced production line keeps a process running to standard without requiring continuous judgment from the worker carrying it out. That dependability is the point of the technology, and it is also what makes its motivational consequences difficult to observe.

Research on effort and perceived control has established what happens when a person loses control over an outcome. Motivational intensity theory holds that effort is not a stable trait but a computed response to the relationship between what an action costs and what it returns (Brehm & Self, 1989). People mobilize resources in proportion to a goal's difficulty, up to the point at which success no longer appears attainable through their own action (Brehm et al., 1983; Wright & Kirby, 2001; Wright et al., 1984). Its central claim is narrower than it is often taken to be. Effort tracks the instrumental value of a person's own behavior, not the value of the outcome considered alone.

A recent experiment isolated this relationship directly. Michalik et al. (2026) removed participants' control over a learning task, then measured their willingness to switch to a more demanding but better-paid alternative. Uncontrollability reduced effort-based choice and raised the reward required to restore it. This effect operated through two channels at once, reduced motivation and heightened negative affect. That second channel is easy to treat as incidental, but it performs a specific function in their account. It is what makes a loss of control something a person registers rather than merely something a person undergoes.

Every study in this tradition shares a feature that has rarely required comment. Outcomes over which control is removed are aversive, or at best unpredictable. Uncontrollability in the laboratory means

unsolvable problems and noncontingent feedback. Outside the laboratory, a person's instrumental link to an outcome can weaken for the opposite reason. Something else may be working reliably in their place, and the outcome may remain good throughout. Nothing in the existing literature specifies what a person experiences under that arrangement.

This paper argues that such an arrangement produces a distinct motivational condition, which it terms comfortable helplessness, and tests its implications using six waves of national survey data on American workers. Its argument develops in four steps. Section two locates reliable delegation within existing accounts of perceived control and shows that its structure differs from the aversive uncontrollability those accounts describe. Section three explains, on affect-theoretical grounds, why a dependable constraint should fail to generate the emotional signal an aversive one generates. Section four connects both points to self-determination theory's recently described dormant need state and argues that reliable delegation constitutes a second, previously unexamined route into it. A final theoretical section derives the empirical signature this account predicts, namely a need cost unaccompanied by a proportional affective cost, and specifies how that signature can be distinguished from the pattern human supervision produces.

Perceived Control and Its Displacement

The lineage connecting perceived control to the value of acting runs from the expected value of control account of effortful cognition (Shenhav et al., 2013) back through the cognitive exhaustion hypothesis (Kofta & Sedek, 1998; Sedek et al., 1993). That hypothesis treats repeated futile effort, rather than the belief in uncontrollability by itself, as what erodes motivation after a person loses control. That lineage traces further back to the original demonstration that helplessness is a learned response to noncontingency rather than an automatic one (Maier & Seligman, 1976), later reformulated around how people explain a noncontingent outcome to themselves (Abramson et al., 1978).

A related literature shows that people can overestimate their own influence over outcomes governed by chance (Langer, 1975). That finding sharpens the present point rather than complicating it. Manipulations of the kind reviewed above operate by removing control that was genuinely available, not by correcting a control that was illusory from the outset.

Control is not a single construct. It ranges from direct, primary control over an environment to a family of secondary strategies through which a person aligns with a more powerful force when primary control is unavailable or too costly (Heckhausen & Schulz, 1995; Skinner, 1996). A comprehensive review established that reliance on a competent other is one distinct secondary strategy among several rather than a residual category (Morling & Evered, 2006). Rothbaum et al. (1982), who first organized this family, term it secondary or vicarious control. Bandura's (1989, 2001) account of proxy agency describes the same reliance in adult life, in which a person secures a desired outcome by influencing someone else able to produce it.

Both frameworks were developed around a particular type of proxy, such as a physician, a parent, or an expert colleague. Proxies of this type share three features. A person can see that they are relying on someone else. Such reliance usually costs something to arrange. Availability of the proxy is bounded. Together these features allow a person to notice and evaluate how far they have come to depend on another party, and they place proxy reliance within social norms of reciprocity and obligation.

An algorithmic proxy shares the basic structure of these accounts, in that a competent other performs work that previously required the person's own effort. It differs on all three features. A system that allocates a worker's tasks, paces their day, or monitors their output is usually competent enough that outcomes remain good, so the reliance carries none of the cost that asking a colleague for help carries. It requires no visible request, so there is no moment at which the person registers that they are relying on anything. It is continuously available, so no scarcity forces the person to ration its use. Each difference removes a condition that made human proxy reliance something a person could track.

An underused precedent in the effort literature concerns what happens when a reward continues to arrive independently of behavior. Engberg et al. (1972) found that pigeons reduced operant responding after a period of noncontingent reinforcement, without any signal that responding was futile. They argued that this reduction reflected diminished response strength rather than a belief about uncontrollability. That interpretation was contested at the time (Welker et al., 1973), but the structural observation survives the dispute. An organism can disengage from effortful responding for informational reasons unrelated to an aversive or unpredictable environment.

Why the Affective Signal Depends on the Source of Control

The claim that a need cost can arrive without an affective signal requires an account of where the signal comes from in the first place. Two established theories of affect supply one, and both imply that the signal depends on features an automated constraint lacks.

Control-process theory treats affect as the output of a monitoring system that tracks the rate of progress toward a goal, with negative affect arising when progress falls below the expected rate and positive affect arising when it exceeds that rate (Carver & Scheier, 1990). A dependable automated system is engineered to hold progress steady. Work paced by such a system rarely presents the interruptions, delays, and blocked intentions that the monitoring system converts into negative feeling. On this account, the very reliability that defines the technology keeps the affective monitor quiet, whatever is happening to the worker's own instrumental role.

Feelings-as-information theory makes a complementary point about how affect is used once it arises. People consult their momentary feelings as evidence when judging their situation, asking in effect how they feel about it (Schwarz & Clore, 1983). A worker under an erratic supervisor has abundant negative feeling to consult, and that feeling informs an unfavorable judgment of the job. A worker under a smooth automated process consults a calm affective state, and that calm is read as evidence that things are acceptable. Both routes lead to the same conclusion. An affective signal of lost control presupposes

friction somewhere in the experience, and a well-functioning automated constraint is precisely the removal of friction.

Occupational health research has long linked low control to strain, most prominently in the demand-control model, which predicts mental strain from the combination of high demands and low decision latitude (Karasek, 1979). The present argument qualifies rather than contradicts that model. Strain in the demand-control tradition arises where low latitude collides with pressing demands, an inherently frictional situation. Where an automated process absorbs the demands as well as the latitude, the collision that produces strain need not occur, even though the latitude is gone. Job design research similarly identifies autonomy as a core job characteristic that feeds experienced responsibility for outcomes (Hackman & Oldham, 1976). Automated control removes the characteristic while leaving the outcomes intact, which is exactly the configuration in which a psychological cost can accrue without an experiential marker.

Position Within Adjacent Literatures

Three literatures address neighboring questions, and distinguishing the present argument from each clarifies what it adds.

Cognitive offloading research shows that people readily transfer memory and computation to an external tool whenever the tool is available and costs less than performing the work internally (Risko & Gilbert, 2016). Ready access to search engines changes what people retain rather than only what they can retrieve (Sparrow et al., 2011). That literature concerns where information is stored. The present argument concerns whether effort is still mobilized once an outcome no longer depends on it, which is a motivational question rather than a memory question.

Human factors research has long warned that automating the routine components of a task degrades an operator's capacity to intervene when the automation fails. Automation introduced to reduce workload can instead produce a less capable operator (Bainbridge, 1983). An operator removed from the control loop loses situational awareness and skill even while everyday system performance appears sound (Endsley & Kiris, 1995). Automation research has documented a related risk under the heading of complacency, meaning insufficient monitoring of a system the operator has come to over-trust (Parasuraman & Manzey, 2010). These literatures ask what happens to competence when it is abruptly required. The present argument asks what happens to competence satisfaction on an ordinary day, whether or not the system ever fails.

An empirical literature has examined the algorithmic workplace directly. Algorithmic systems function as a genuine site of managerial control rather than a neutral scheduling instrument (Kellogg et al., 2020; Möhlmann et al., 2021). Algorithmic control carries measurable consequences for autonomy and job quality in platform work (Wood et al., 2018), and algorithmic management constitutes a distinct dimension of job design rather than a new delivery mechanism for familiar constraints (Parent-

Rocheleau & Parker, 2022). This literature documents what algorithmic systems do to jobs. It has not yet asked what a well-functioning system does to the worker's own need satisfaction.

Need States and the Dormant Condition

Self-determination theory provides the framework for that question. Basic psychological needs theory holds that autonomy, competence, and relatedness operate as universal requirements whose satisfaction or frustration shapes motivation and wellbeing across domains and cultures (Ryan & Deci, 2000; Vansteenkiste et al., 2020). This framework is under active extension along several lines. Recent work validates how need support and thwarting operate at the level of a team rather than the individual (Agate et al., 2026), and examines whether a candidate fourth need, a sense that one's actions benefit others, satisfies the framework's own criteria (Lubics et al., 2026). Other work shows that individuals themselves, and not only their social context, can support or undermine their own need satisfaction (Behzadnia et al., 2026), traces how autonomous and controlled motivation differentiate across development (Chanal & Paumier, 2026), follows how need frustration accrued at work carries into life outside it (Baierer et al., 2026), and dissociates autonomy from affective processing at the level of a single neural response (Kontaxi et al., 2026).

Jang et al. (2026) recently isolated a third need state alongside satisfaction and frustration. They term it dormant, and characterize it by energy depletion, emotional disengagement, and muted psychological activation. It arises when a need is neither supported nor thwarted but simply goes unexercised. They locate its origin in neglectful environments, in teachers and supervisors who are indifferent rather than controlling, and they show that a dormant need does not remain inert. Left unaddressed, it develops over time into frustration.

Their account explains why an unresponsive environment can impose a motivational cost without feeling aversive at the time. It does not address what happens in a responsive one. That distinction matters because the two environments differ in exactly the respect the present argument concerns. A neglectful environment supplies nothing. A reliable automated system supplies the outcome competently while removing the person's instrumental role in producing it.

An adjacent finding indicates that this displacement operates through attribution rather than through deprivation. Tran and Howard (2026) found that raising the cognitive salience of financial incentives, independent of income itself, frustrated all three basic needs. Its mechanism was a shift in the perceived locus of causality for good outcomes away from the self. Their result is instructive because the outcome in question was favorable. What produced the need cost was not a worse result but a changed attribution for it.

This attributional reading has deep support. Ryan (1982) showed that positive, informational feedback can either support or undermine intrinsic motivation depending on whether it is experienced as controlling. A meta-analysis of three decades of experiments confirmed that externally imposed rewards

undermine intrinsic motivation precisely when they are experienced as controlling rather than informative (Deci et al., 1999). This extended the original demonstration that rewarding an already-enjoyed activity reduces later interest in it (Lepper et al., 1973). This same logic applies to attribution generally, since how a person explains an outcome, and not only whether the outcome occurred, shapes subsequent motivation and emotion (Weiner, 1985). Its developmental root is the distinction between experiencing oneself as the origin of one's actions or as a pawn moved by outside forces (deCharms, 1992). That claim generalizes beyond any single workplace, since autonomous functioning depends on feeling like the source of one's actions across cultures that value independence very differently (Chirkov et al., 2003). It has been extended directly to work motivation (Gagné & Deci, 2005) and to the broader architecture of what people pursue (Deci & Ryan, 2000).

Comfortable Helplessness

Read together, these literatures leave a specific gap. Work on needs names what a neglectful environment produces over time, but its documented cause is an environment that does nothing rather than one that competently does the work. Work on control and effort specifies what an aversive, unreliable environment produces, and part of that specification is that the cost is carried by negative affect a person can notice and act on. Neither describes an environment that is responsive, dependable, and only indirectly the person's own doing.

This paper terms that condition comfortable helplessness. It is defined as a reduction in psychological need satisfaction, produced by reliable automated control, that is not accompanied by the proportional negative affect that ordinary control loss produces, because the outcome the system delivers remains acceptable. This paper's proposal is that reliable delegation constitutes a second route into the dormant need state, produced by accommodation rather than by neglect.

This account yields a distinctive and falsifiable prediction. If the affective signal ordinarily accompanying control loss depends on the loss being aversive, and if automated control removes autonomy without being aversive, then automated control should show a need cost that is disproportionately large relative to its affective cost. This prediction concerns a ratio rather than a magnitude, and it therefore requires a comparison condition. Human supervisory relationships supply that comparison. Low supervisory support removes a worker's control over their own work in much the same way an automated system does, but it does so through visible interpersonal exchanges that are themselves unpleasant. On the present account, human control should therefore transmit its need cost into felt experience far more completely than automated control does.

One further implication follows from the same mechanism. If the difference between the two forms of control lies in the visibility of the exchange, then adding a supportive human relationship on top of an automated constraint should partially restore what the constraint removes. A supervisor who explains, adjusts, and advocates reintroduces a human interlocutor into a process that otherwise has none.

Support of this kind should offset part of automated control's need cost, though not necessarily all of it, since no supervisor can return the task decisions the system has absorbed.

The Present Study

Five hypotheses were tested using six waves of the General Social Survey Quality of Worklife module matched to occupation-level indicators of automated work control.

The first hypothesis concerns need satisfaction. Self-determination theory ties need satisfaction to perceived self-causation regardless of what displaces it. Occupations whose work processes are governed more by an automated or mechanical system should therefore show lower satisfaction of autonomy, competence, and relatedness.

The second hypothesis concerns the affective signal. That same occupational variation should predict felt experience weakly, and this should hold across both proximal work affect, meaning stress and exhaustion, and distal wellbeing, meaning job satisfaction and general happiness. A dependable automated constraint delivers its outcome without the aversive experience that would otherwise make the loss noticeable.

The third hypothesis specifies the comparison that gives the second its meaning. Human supervisory support should predict need satisfaction and felt experience in far closer proportion, because supervisory control operates through interpersonal exchanges that are themselves affectively charged.

The fourth hypothesis states the resulting dissociation formally. A ratio of the affective association to the need association should be significantly smaller for automated control than for human supervisory support, across all four affect and wellbeing outcomes.

The fifth hypothesis concerns buffering. If the visibility of a human exchange is what carries the signal and part of the remedy, supportive supervision should offset part of the need cost of automated control, with the offset expected for autonomy in particular, since discretion is what a present, responsive supervisor can restore.

Methods

Participants

The analytic sample was drawn from the General Social Survey, a nationally representative repeated cross-sectional survey of American adults conducted by NORC at the University of Chicago (Smith et al., 2024). Analyses use the six waves that fielded the Quality of Worklife module, in 2002, 2006, 2010, 2014, 2018, and 2022, restricted to respondents employed full or part time at the time of interview (N = 10,392).

Occupation was recorded using the survey's harmonized occupation variable, coded consistently to 2010 Census occupation categories across all six waves, and matched to 2018 Standard Occupational Classification categories through the corresponding government crosswalk. This match succeeded for 95.6% of employed respondents. Analytic sample sizes range from 7,554 to 9,288 across models, reflecting listwise deletion and the fact that not every Quality of Worklife item was fielded to every respondent.

Measures

Automated work control. Each respondent's occupation was linked to an occupation-level composite built from the *ONET Work Context database maintained by the U.S. Department of Labor (National Center for ONET Development, 2024)*. Three items were used: freedom to make decisions, reverse-scored; degree of automation; and pace determined by the speed of equipment. Each was employment-weighted and standardized across the full 2018 Standard Occupational Classification, then averaged and re-standardized. Higher scores indicate occupations in which task pacing and decision authority are governed more by an automated or mechanical process and less by the worker. Because this measure derives from occupational job analysis rather than from respondent self-report, it does not share method variance with the survey outcomes.

Psychological need satisfaction. Competence satisfaction was measured with three items asking whether the respondent's job offers an opportunity to develop their abilities, allows use of their skills, and requires them to learn new things ($\alpha = .65$). Autonomy satisfaction used a single item asking whether it is true that the respondent has "a lot of freedom to decide how to do" their job. Relatedness satisfaction used a single item on whether the respondent is treated with respect at work. All items were oriented so that higher values indicate greater satisfaction, then standardized.

Human supervisory support. Four items formed a composite measure of supportive human supervision: whether the respondent's supervisor is helpful in getting the job done, whether the supervisor is concerned about the respondent's welfare, whether the respondent trusts management, and whether the respondent is likely to be praised by their supervisor ($\alpha = .76$). Higher scores indicate more supportive supervision.

Work affect and wellbeing. Two items measured proximal negative affect at work. Work stress asked how often the respondent finds work stressful, and exhaustion asked how often during the past month the respondent felt used up at the end of the day. Both were recoded so that higher values indicate more frequent negative affect. Job satisfaction used a four-point item and general happiness a three-point item, both scored with higher values indicating more favorable states. All four were standardized.

Covariates. All models include age, age squared, sex, educational attainment, occupational prestige, and survey-year fixed effects.

Analytic Strategy

Associations were estimated using ordinary least squares with standard errors clustered by four-digit occupation code, since the automated-control measure varies at the occupation rather than the individual level. All outcomes and continuous predictors were standardized, so coefficients are interpretable in standard-deviation units and are directly comparable across outcomes.

Testing the fourth hypothesis required a comparison of two ratios. For each predictor, a need coefficient was computed as the mean absolute standardized association with competence and autonomy satisfaction. A ratio was then formed by dividing the absolute affective association by that need coefficient. Differences between the two predictors' ratios were tested with a cluster bootstrap over occupations, resampling occupations with replacement and recomputing every coefficient and ratio within each of 2,000 replicates.

Hypothesis five was tested by adding the product of automated control and supervisory support to the main models. Supplementary analyses probed heterogeneity by education and sex, estimated the automated-control association separately within each survey wave, and examined its interaction with time.

Results

Automated Control and Need Satisfaction

Automated work control predicted lower satisfaction of each of the three needs, supporting the first hypothesis. A one standard deviation increase in occupational automated control was associated with a 0.130 standard deviation decrease in autonomy satisfaction ($SE = 0.020, p < .001, N = 8,364$), a 0.113 standard deviation decrease in competence satisfaction ($SE = 0.023, p < .001, N = 8,411$), and a 0.065 standard deviation decrease in relatedness satisfaction ($SE = 0.018, p < .001, N = 8,382$). Table 1 reports these estimates alongside the affect and wellbeing associations.

These associations were robust to controlling for the teleworkability of an occupation and for an independent occupation-level measure of exposure to artificial intelligence. With both added, the competence association was -0.108 ($SE = 0.023, p < .001$) and the autonomy association was -0.115 ($SE = 0.021, p < .001$). This pattern is therefore not an artifact of remote-work composition or of general task automatability.

The Missing Affective Signal

Automated control showed no reliable association with either measure of proximal negative affect, supporting the second hypothesis where it matters most. Its association with work stress was -0.021 ($SE = 0.022, p = .349, N = 9,288$), and its association with exhaustion was 0.006 ($SE = 0.014, p = .656, N = 8,382$). Workers in heavily automated occupations report less autonomy and competence, but they do

not report more stress or more depletion. Distal wellbeing followed the same pattern. Automated control's association with job satisfaction was -0.069 ($SE = 0.016$, $p < .001$, $N = 8,045$), roughly half the size of the autonomy association, and the association with general happiness, at -0.017 , did not differ reliably from zero ($SE = 0.014$, $p = .242$, $N = 8,060$).

Human supervisory support showed the opposite profile, supporting the third hypothesis. It predicted competence satisfaction at 0.385 ($SE = 0.013$, $p < .001$), autonomy satisfaction at 0.351 ($SE = 0.013$, $p < .001$), and relatedness satisfaction at 0.528 ($SE = 0.012$, $p < .001$). It also predicted every affective outcome strongly: work stress at -0.240 ($SE = 0.013$, $p < .001$, $N = 8,752$), exhaustion at -0.194 ($SE = 0.011$, $p < .001$, $N = 8,745$), job satisfaction at 0.352 ($SE = 0.013$, $p < .001$), and general happiness at 0.175 ($SE = 0.011$, $p < .001$).

Both predictors were close to orthogonal ($r = -.083$), and entering them simultaneously left both largely unchanged. In the joint model, automated control predicted autonomy satisfaction at -0.110 ($p < .001$) and general happiness at -0.006 ($p = .693$). Human supervisory support predicted autonomy satisfaction at 0.343 ($p < .001$) and general happiness at 0.173 ($p < .001$). These two forms of control therefore operate independently, and only one of them carries its need cost through to felt experience.

Formal Test of the Dissociation

Table 2 reports the ratio test for all four affective outcomes. For automated control, the affective association ranged from 0.054 (exhaustion) to 0.569 (job satisfaction) of the size of its need association. For human supervisory support, the corresponding ratios ranged from 0.474 to 0.953 .

Cluster bootstraps over 441 occupations confirmed that the ratios differ for every outcome, supporting the fourth hypothesis. Difference in the happiness ratio was 0.338 , 95% CI $[0.073, 0.487]$, $p = .014$. Difference in the job satisfaction ratio was 0.384 , 95% CI $[0.160, 0.606]$, $p = .002$. Difference in the work stress ratio was 0.533 , 95% CI $[0.055, 0.673]$, $p = .031$. Difference in the exhaustion ratio was 0.472 , 95% CI $[0.237, 0.550]$, $p = .001$. Because stress and exhaustion are self-reports collected in the same interview as the need items, these two comparisons also rule out the possibility that the dissociation merely reflects the automated measure's occupational rather than self-reported origin.

Buffering by Supportive Supervision

Table 3 reports the interaction models, which partially support the fifth hypothesis. Supportive supervision significantly buffered the autonomy cost of automated control (interaction $b = 0.031$, $SE = 0.013$, $p = .014$, $N = 8,351$): at high support the negative association weakened, and at low support it sharpened. Supervision also moderated the stress association ($b = -0.026$, $SE = 0.011$, $p = .016$, $N = 8,361$), such that the combination of automated control and unsupportive supervision was the configuration in which automated control did begin to predict stress. Buffering was not detected for competence ($b = 0.018$, $SE = 0.013$, $p = .167$) and was marginal for job satisfaction ($b = 0.023$, $SE = 0.013$, $p = .080$).

This split is theoretically interpretable. What a responsive supervisor can restore is discretion, the sense that there is a person who can adjust the process on request, and discretion is the content of the autonomy item. What a supervisor cannot restore is the skill use and development that the automated process has absorbed, which is the content of the competence composite. Support helps where the deficit is relational and procedural, not where it is structural.

Who Bears the Cost

Heterogeneity analyses located the autonomy cost. Its interaction with holding a four-year degree was positive and significant ($b = 0.099$, $SE = 0.033$, $p = .003$, $N = 8,364$), indicating that the association is concentrated among workers without a college degree. No such moderation appeared for competence ($b = 0.018$, $p = .538$), and neither cost differed by sex. The need cost of automated control therefore falls disproportionately on less-educated workers, who are also the workers with the fewest alternatives to automated-intensive occupations.

Stability Across Two Decades

Estimated within each wave separately, the autonomy association was negative and significant in all six waves, ranging from -0.187 in 2002 to -0.080 in 2022. A formal interaction with time confirmed gradual attenuation, for competence ($b = 0.006$ per year, $SE = 0.002$, $p < .001$) and for autonomy ($b = 0.006$ per year, $SE = 0.002$, $p < .001$). Attenuation of this kind is the opposite of what a naive account of intensifying automation would predict, and the Discussion takes it up directly.

Table 1

Automated Work Control and Human Supervisory Support as Predictors of Need Satisfaction, Work Affect, and Wellbeing

Outcome	Automated control <i>b</i>	SE	<i>p</i>	Human supervision <i>b</i>	SE	<i>p</i>
Autonomy satisfaction	-0.130	0.020	< .001	0.351	0.013	< .001
Competence satisfaction	-0.113	0.023	< .001	0.385	0.013	< .001
Relatedness satisfaction	-0.065	0.018	< .001	0.528	0.012	< .001
Work stress	-0.021	0.022	.349	-0.240	0.013	< .001
Exhaustion	0.006	0.014	.656	-0.194	0.011	< .001
Job satisfaction	-0.069	0.016	< .001	0.352	0.013	< .001
General happiness	-0.017	0.014	.242	0.175	0.011	< .001

Note. Each cell is from a separate ordinary least squares model. All outcomes and predictors are standardized. Work stress and exhaustion are coded so that higher values indicate more frequent negative affect. Models control for age, age squared, sex, educational attainment, occupational prestige, and survey-year fixed effects. Standard errors are clustered by four-digit occupation code. Analytic *N* ranges from 7,915 to 9,288.

Table 2

Affective Association as a Proportion of Need Association, by Type of Control

Affective outcome	Automated control	Human supervision	Difference	95% CI	<i>p</i>
General happiness	0.136	0.474	0.338	[0.073, 0.487]	.014
Job satisfaction	0.569	0.953	0.384	[0.160, 0.606]	.002
Work stress	0.119	0.651	0.533	[0.055, 0.673]	.031
Exhaustion	0.054	0.526	0.472	[0.237, 0.550]	.001

Note. The need association is the mean absolute standardized coefficient for competence and autonomy satisfaction. Ratios express the absolute affective coefficient as a proportion of that value. Confidence intervals and *p* values are from cluster bootstraps over 441 occupations with 2,000 replicates.

Table 3
Interaction of Automated Control and Human Supervisory Support

Outcome	Interaction <i>b</i>	<i>SE</i>	<i>p</i>	<i>N</i>
Autonomy satisfaction	0.031	0.013	.014	8,351
Competence satisfaction	0.018	0.013	.167	8,388
Job satisfaction	0.023	0.013	.080	7,562
Work stress	-0.026	0.011	.016	8,361
<i>Note.</i> Each row is from a separate model containing both main effects, their product, and the full covariate set. Positive interactions on satisfaction outcomes and negative interactions on stress indicate that supportive supervision offsets the association with automated control.				

Discussion

The results support the account this paper set out. Workers in occupations governed more heavily by automated processes report less autonomy, competence, and relatedness satisfaction. That deficit is invisible in their reports of work stress and exhaustion, absent from general happiness, and only partly visible in job satisfaction. Human supervisory support, by contrast, predicts felt experience at close to the same strength as it predicts need satisfaction. This formal ratio test confirms that the two forms of control differ in how completely a need cost is transmitted into how a worker feels, and the buffering analysis shows that reintroducing a supportive human relationship recovers part of what the automated constraint removes.

Implications for Research on Effort and Control

For research on effort and perceived control, the findings extend Michalik et al.'s (2026) demonstration that uncontrollability reduces effort investment through a channel involving negative affect. The present results indicate that this affective channel is not intrinsic to control loss as such. When the agent displacing control is dependable rather than aversive, the affective channel is substantially attenuated while the need cost remains. Negative affect documented in laboratory studies of uncontrollability may therefore be a feature of the aversive manipulations used to induce it rather than a necessary consequence of losing control.

This reading follows directly from the affect theories introduced earlier. If negative affect signals a shortfall in the rate of progress toward a goal (Carver & Scheier, 1990), then a constraint that maintains progress will not trigger it, however much instrumental involvement it removes. If people judge their situation partly by consulting how they feel (Schwarz & Clore, 1983), then workers whose days run smoothly will judge their situation acceptable even while their reported need satisfaction says otherwise. Both theories were developed without reference to automation, and the present setting turns out to be a nearly pure case of the conditions under which they predict a silent cost.

These findings also qualify the demand-control tradition in occupational health (Karasek, 1979). In that model, low decision latitude produces strain in combination with high demands, and decades of evidence support the prediction in frictional work settings. The present results identify the boundary of that mechanism. Where an automated process absorbs the demands together with the latitude, low control no longer manifests as strain, yet the need measurements show it has not become harmless. Strain-based surveillance of job quality, a direct legacy of the demand-control model, will systematically pass over exactly the occupations examined here.

Implications for Self-Determination Theory

For self-determination theory, the findings extend Jang et al.'s (2026) account of the dormant need state. They trace dormancy to environments that neglect a need rather than thwart it. Automated task control is not neglectful in that sense, since it actively directs the work. Yet its profile here resembles their dormant state, a real deficit without the intensity associated with frustration, more closely than it resembles active thwarting. This suggests that dormancy has at least two distinct antecedents, one arising from an indifferent environment and one from an accommodating one, and that the two may require different remedies. An indifferent environment is repaired by adding involvement of any kind. An accommodating one already involves the worker's tasks completely, and repairing it requires returning decisions, not attention.

The distinction matters for how the dormant state develops. Jang et al. (2026) show that dormancy spills over into frustration over time, which implies that the silent cost documented here is not necessarily stable. A need deficit that produces no affective signal today may still surface affectively later, at which point its origin in the automated work process will no longer be apparent to the worker or the organization. The present cross-sectional design cannot observe that trajectory, but the theoretical expectation is specific enough to test, and the per-wave stability of the need association across two decades indicates the deficit itself is persistent rather than transitional.

These results also speak to the attributional mechanism identified by Tran and Howard (2026). They showed that a favorable outcome, a higher income, can frustrate needs when its cognitive salience shifts the perceived locus of causality away from the self. Automated control appears to operate on the same principle from the opposite direction. It leaves the outcome favorable while removing the worker's instrumental role in producing it, and the resulting need cost arrives without the felt pressure that made incentive salience noticeable to the employees in their study. Salient incentives and silent automation may thus be two surfaces of one underlying process, the externalization of perceived causation, differing in whether the person notices it happening.

What Human Support Can and Cannot Restore

The buffering pattern adds a mechanism-level detail the main effects cannot supply. Supportive supervision offset the autonomy cost of automated control and the stress that accompanies its unsupported form, but it did not offset the competence cost. On the present account this is what should

happen. A responsive supervisor reintroduces a visible human interlocutor, someone who can explain an allocation, adjust a schedule, and register a complaint, and this restores discretion and its felt legitimacy. No supervisor, however supportive, can restore the skill use that an automated process has absorbed into itself, because that loss is structural rather than relational. Interventions that pair algorithmic systems with attentive human management should therefore be expected to help unevenly, easing the autonomy deficit while leaving the competence deficit intact.

For the literature on algorithmic management, the findings supply a specific psychological consequence to accompany what that literature has established about job structure. Algorithmic control is a genuine form of job design rather than a neutral delivery mechanism (Kellogg et al., 2020; Parent-Rochelleau & Parker, 2022). Findings here identify a distinctive cost profile that accompanies it, a need deficit substantially decoupled from felt experience, together with evidence about which halves of that deficit human management can reach.

Who Bears the Cost

The autonomy cost concentrated among workers without a four-year degree, with no corresponding difference by sex. Two readings are consistent with this pattern. Less-educated workers hold positions where automated control governs the work more completely, even within the broad occupational categories the composite scores, so their measured exposure understates their actual exposure less. They also have fewer outside options, which weakens the sorting process by which workers who most value discretion move away from automated-intensive jobs. On either reading, the population absorbing the largest need cost is the one with the least labor-market power to escape it, which gives the distributional finding a policy weight beyond its statistical size.

The Attenuating Trend

The association weakened across the six waves even though it remained significant in every one. A measurement explanation is the most plausible. This O*NET composite captures mechanical and equipment-paced automation, the dominant form when these items were designed. Over the period studied, employment shifted away from the machine-paced manufacturing and clerical occupations this composite scores highest, while newer forms of algorithmic coordination that the composite does not capture expanded. Attenuation is therefore consistent with the measure becoming a progressively less complete index of automated control rather than with the underlying relationship weakening. This interpretation is plausible but not tested here, and it is a direct motivation for the measurement work outlined below.

Alternative Explanations

Three alternative accounts deserve explicit treatment. Occupational sorting is the first. Workers are not randomly assigned to occupations, and those who least value discretion may select into automated-intensive work. Sorting of this kind would, however, produce the opposite of the observed pattern for the affective outcomes: workers matched to jobs they do not mind should report neither low need

satisfaction nor distress, yet the need deficit is robust. Selection would need to operate on need reports but not on affect reports to mimic the dissociation, and no plausible sorting process has that shape.

Hedonic adaptation is the second. Workers may have adapted affectively to conditions they cannot change, leaving stress and happiness at baseline while the need items continue to register the objective situation. Adaptation of this kind is a genuine rival for the null affective associations considered alone. It cannot, however, explain the comparison with human supervision, since workers under poor supervision have typically held their jobs just as long and show no equivalent affective adaptation. An adaptation account must explain why workers adapt to machines but not to managers, and the most natural answer, that machine control lacks the recurring interpersonal friction that renews the affective response, is the present account restated.

Common method variance is the third. Human supervisory support is self-reported while automated control is not, which inflates the supervisory coefficients relative to the automated ones and forbids direct comparison of raw magnitudes in Table 1. The ratio design addresses this, since method variance inflates a predictor's paths to all self-reported outcomes rather than selectively to affective ones. The stress and exhaustion comparisons carry particular weight here, because both are self-reports collected in the same instrument as the need items, and the dissociation holds within that shared method.

Limitations

Four limitations qualify these conclusions. First, the automated-control measure is occupational rather than individual. It describes the typical work process within an occupational category, not whether a given respondent's own tasks were directed by a computer program. Within-occupation variation in actual exposure is therefore treated as noise, which should attenuate rather than inflate the associations reported here.

Second, the measure captures automated work control broadly and predates the recent expansion of algorithmic and artificial-intelligence-based management. This mechanism concerns proxy control in general, of which algorithmic delegation is the newest instance, so the present test is best read as a test of that broader mechanism.

Third, autonomy and relatedness satisfaction are each measured with a single item, and the competence composite, while internally consistent, draws on items designed for a general labor-force survey rather than a validated needs instrument. Single items limit reliability and preclude latent-variable modeling of the need constructs.

Fourth, the design is cross-sectional and the estimates are associations. The alternative-explanations analysis above constrains the most likely confounds, but selection on unmeasured characteristics cannot be excluded, and no causal claim is made.

Future Directions

A direct test of the algorithmic case requires individual-level measures of algorithmic task allocation, pacing, and monitoring, paired with a validated needs instrument and a wellbeing battery. Instruments of this kind are now being fielded in large European surveys, and the design implemented here transfers to them without modification.

Three further extensions follow from the account rather than from its limitations. Because Jang et al. (2026) show that dormancy develops into frustration over time, a longitudinal design could test whether the need cost documented here eventually surfaces affectively, which would identify the delay between an unsignalled cost and its appearance. An experimental design could manipulate the reliability of an automated aid while holding its output quality constant, which would isolate dependability as the active ingredient rather than delegation itself. Finally, the buffering finding invites a field experiment in algorithmic workplaces, testing whether granting workers a contestation procedure, a human channel through which automated decisions can be questioned, restores autonomy satisfaction at the margin the observational interaction identifies.

Practical Implications

Three implications follow. First, organizations that monitor employee wellbeing through complaint rates, engagement surveys, stress inventories, or turnover are relying on indicators downstream of negative affect, and the present results indicate that a need cost can exist without moving any of them. A direct periodic measure of whether employees feel their work still allows them to use and develop their abilities would detect a problem these instruments are structurally unlikely to register.

Second, the buffering results identify a concrete design lever. Pairing automated allocation with supervisors who can explain, adjust, and contest the system's decisions offsets part of the autonomy cost and the stress that accompanies unsupported automated control. Contestation procedures are therefore not only a fairness measure but a motivational one, though they should not be expected to repair the competence deficit, which requires returning skill-relevant decisions to the work itself.

Third, occupational health screening built around burnout and distress inventories is unlikely to identify this condition, since its defining property is that distress is what does not appear. The same applies to strain-based job-quality surveillance in the demand-control tradition. A screening instrument would need to ask about competence and self-attributed effectiveness directly, independent of how workers report feeling.

Conclusion

Reliable delegation differs from neglect, and it differs from the aversive uncontrollability that has anchored effort research for four decades. Automated work control predicted deficits in every basic need examined, yet workers in those occupations reported no more stress, no more exhaustion, and no less happiness than others. Human supervisory support moved needs and feelings together; automated

control moved needs alone. A motivational cost that produces no proportional affective signal is not a smaller cost. It is a cost that the instruments organizations and clinicians ordinarily rely on are not designed to detect, borne mostly by workers with the fewest alternatives, and only partly reachable by the human relationships layered on top of the machine.

Declarations

Competing Interests:

On behalf of all authors, the corresponding author states that there is no conflict of interest.

Author Contribution

n/a - sole author

Data Availability

This study used secondary, publicly available data. The General Social Survey cumulative data file is available from NORC at the University of Chicago (<https://gss.norc.org>). The O*NET 30.3 database is available from the U.S. Department of Labor's Employment and Training Administration (<https://www.onetcenter.org>). Derived analysis data and code are available from the corresponding author upon reasonable request.

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