Learning from those who leave: Intrinsic and extrinsic satisfaction as determinants of employee retention

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June 2026

Abstract

A central challenge in turnover research is that employees who exit the firm are no longer observed, leaving a blind spot regarding the factors that drive actual turnover behavior. This study overcomes this limitation by capturing the perspectives of workers who have left their respective employers. Using a unique dataset of Glassdoor reviews from U.S. listed firms between 2015 and 2022, we analyze over 700,000 employee reviews to quantify whether and how intrinsic and extrinsic satisfaction influences employees' decisions to voluntarily leave their firms. Leveraging AI models, we generate distinct intrinsic and extrinsic satisfaction scores for employees, allowing for assessment of satisfaction drivers across occupational and organizational contexts. Our findings reveal that intrinsic satisfaction linked to autonomy, recognition, and meaningful work is significantly associated with lower voluntary turnover, while extrinsic satisfaction plays a weaker, context-dependent role, significant primarily for blue-collar employees and labor-intensive firms. These results stress the growing importance of meaningful work design in sustaining labor stability whereas the effectiveness of extrinsic satisfaction in retaining employees remains confined to more traditional settings.

JEL classification: E24, J30, J33, J28, J63
Keywords: Blue-collar workers, Employee turnover, Extrinsic satisfaction, Intrinsic satisfaction, White-collar workers.

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1. Introduction

Employee turnover is a critical and multifaceted determinant of firm performance, influencing productivity, innovation capacity, and recruitment costs (Hom et al., 2017). Understanding what drives voluntary turnover is therefore a central question in labor and organizational economics. Traditionally, turnover is linked to employee satisfaction, which shapes individuals' willingness to remain with their employer (Griffeth et al., 2000; Hom et al., 2017). Within this realm, intrinsic and extrinsic satisfaction are argued to be core drivers of voluntary exit behavior (Kuvaas et al., 2017; Malik and Malik, 2024; Ryan and Deci, 2000).

However, a critical limitation of this literature is its reliance on self-reported turnover *intentions* rather than actual exit behavior — a gap that is well documented but rarely addressed empirically (Hom et al., 2017). Our work overcomes this limitation by using Glassdoor reviews covering U.S. listed firms between 2015 and 2022, where employees self-report whether they are current or former employees. This distinction provides an observable proxy for the employee's retention decision, allowing us to directly examine *realized* turnover behavior and assess whether intrinsic and extrinsic satisfaction affect employees' actual decision to leave.[1] We acknowledge, however, that the direction of causality between satisfaction scores and turnover cannot be established with certainty, and our findings should be interpreted as associations.

We find that intrinsic satisfaction emerges as the dominant predictor of retention: higher intrinsic satisfaction is significantly associated with lower likelihood of voluntary turnover across employee and firm types. Extrinsic satisfaction shows weaker and more selective patterns, predicting lower turnover only among blue-collar employees and within labor-intensive firms. In innovation-oriented firms, only intrinsic satisfaction retains its strong negative association with turnover, indicating that in dynamic, high-skill environments, meaningful and self-directed work is a key retention mechanism.

This study contributes in two ways. First, we provide large-scale evidence on how intrinsic versus extrinsic satisfaction predicts voluntary exit behavior by observing employees who have actually left the company. Second, by distinguishing occupational and organizational contexts, we show that intrinsic satisfaction is universally associated with higher retention,

[1] To ensure our measure captures voluntary exits, we exclude all reviews mentioning layoffs, terminations, or forced dismissals. The resulting variable measures observable retention behavior and proxies for the employee's decision to (dis)continue employment.

though its magnitude varies across jobs and firms. Extrinsic satisfaction plays a more secondary, context-dependent role, primarily for blue-collar workers in labor-intensive settings.

2. Background

Satisfaction in the workplace tends to be separated into an intrinsic and an extrinsic dimension (Amabile, 1993; Ryan and Deci, 2000). Intrinsic satisfaction refers to engagement in work for its inherent interest and enjoyment, whereas extrinsic satisfaction reflects effort driven by external rewards such as pay, promotion, or status. The two-factor theory of Herzberg (1966) relatedly distinguishes between "motivators" (intrinsic factors) that foster satisfaction and "hygiene" factors (extrinsic conditions) that primarily prevent dissatisfaction. In essence, intrinsic motivators such as recognition, responsibility, and meaningful work are argued to drive long-term commitment, whereas extrinsic rewards are assumed to influence short-term satisfaction.

Recent empirical evidence corroborates these predictions: intrinsic motivation tends to foster long-term engagement, while extrinsic incentives exhibit more context-dependent effects (Aljumah, 2023; Kuvaas et al., 2017; Pandya, 2024). Collectively, these studies point to intrinsic satisfaction as the more robust retention mechanism, while extrinsic satisfaction plays a selective role that varies across settings.

Moreover, differences in job characteristics between white- and blue-collar employees arguably shape how satisfaction factors influence retention. White-collar workers, typically in knowledge-intensive roles, are known to value intrinsic aspects of their work (Centers and Bugental, 1966; Mottaz, 1985), whereas blue-collar employees place greater emphasis on extrinsic conditions (Lee and Wilbur, 1985). Organizational contexts reinforce these differences: in labor-intensive firms, extrinsic motivators may play a stronger role, whereas innovation-driven firms require cognitive engagement and problem-solving (Helper and Henderson, 2014), potentially amplifying the role of intrinsic motivators. We therefore examine whether this relationship depends on occupational and organizational context.

3. Data and methods

We use employee reviews for US listed firms from 2015 to 2022 gathered from Glassdoor, a platform where employees provide textual reviews of their work environment Table 1 summarizes the sample-selection procedures.

[Insert Table 1 around here]

To examine how intrinsic and extrinsic satisfaction relates to turnover decisions, we estimate the following Linear Probability Model (LPM):

$$Turnover_{ift} = \alpha + \beta_1 Extrinsic_{ift} + \beta_2 Intrinsic_{ift} + \beta_3 Recom_{ift} + \beta_4 Outlook_{ift} + \beta_5 CEO\_perf_{ift} + \beta_6 Size_{ft} + \beta_7 ROA_{ft} + \beta_8 SalesGrowth_{ft} + \mu_f + \lambda_t + \varepsilon_{ift} \quad (1)$$

where i denotes the individual employee review, f refers to the firm, and t represents the year. $Turnover$ equals one if the review is written by a former employee and zero if by a current employee.[2] Because satisfaction scores and the turnover outcome are measured contemporaneously, strong causal claims are precluded, motivating our associational framing. We used LLM to generate the *Intrinsic* and *Extrinsic* scores (see Appendix A for the prompt)[3] To validate the AI-generated scores, we exploit the overall star rating that each reviewer independently assigns on the Glassdoor platform as an external criterion. Reviews that do not mention keywords related to a given dimension receive a score of 0 for that dimension, as specified in the prompt (Appendix A). To validate the scores, we exploit the overall star rating each reviewer independently assigns on Glassdoor. As shown in Figure B1 (Appendix B), both scores increase monotonically across all five rating categories, confirming that they capture genuine variation in employee satisfaction. To further illustrate how the model assigns scores in practice, Appendix C presents illustrative examples of Glassdoor review excerpts alongside their corresponding AI-generated intrinsic-oriented and extrinsic-oriented satisfaction scores (Figure C1).

Prior research shows that employee perceptions of organizational stability and leadership quality are related to turnover intentions (Griffeth et al., 2000; Hom et al., 2017). Hence, we control for *Recom* (recommendation to a friend), *Outlook* (business outlook), and *CEO_perf* (CEO performance). At the firm level, we control for *Size*, *ROA*, and *SalesGrowth*.

[2] This variable serves as a proxy for voluntary turnover status based on self-reported reviewer identity on the Glassdoor platform, rather than a direct HR-record-based turnover measure.

[3] Following self-determination theory, we define intrinsic satisfaction as arising from the fulfilment of employees' psychological needs for autonomy, relatedness, and meaning at work, covering leadership, communication, culture, inclusion, work-life balance, and CSR, whereas pay, benefits, job security, and career advancement are externally provided rewards and thus extrinsic (Deci et al., 2017).

To examine heterogeneity, we construct subsamples based on employee type[4] (white- versus blue-collar) and firm characteristics. Labor intensity is measured as the ratio of employees to total assets, with firms above the median classified as labor-intensive (Tian and Wu, 2022). Innovation-oriented firms are identified by R&D-to-sales ratios above the sample median (Bah and Dumontier, 2001). Descriptive statistics are in Table 1. The average *Turnover* is 0.41, reflecting that 41% of our reviews come from employees who have voluntarily left the firm (see Appendix D for a discussion of the reviewing sample). *Extrinsic* and *Intrinsic* scores are moderate, at 2.79 and 3.26 on a five-point scale, respectively. Variables are defined in Appendix E.

[Insert Table *2* around here]

4. Results

In Table 3, intrinsic satisfaction is consistently negative and significant for all employees (column 1) as well as for white- (column 2) and blue-collar workers (column 3). In the full sample, the coefficient of -0.025 implies that a one-unit increase in intrinsic satisfaction is associated with a 2.5 percentage point reduction in the probability of voluntary turnover — a relative reduction of approximately 6.1% against the baseline turnover probability of 41%. Extrinsic satisfaction is only significantly negative for blue-collar employees (p-value<0.01). The R-squared values (0.049–0.109) are consistent with individual-level behavioral models with substantial unobserved heterogeneity.

In labor-intensive firms (columns 4 to 6), intrinsic satisfaction remains consistently negative and significant across all employee groups. Extrinsic satisfaction is also significant for the full labor-intensive sample (column 4, p-value<0.05), with the effect driven by blue-collar employees (column 6, p-value<0.05). In innovation-oriented firms (columns 7 to 9), intrinsic satisfaction is again consistently negative and significant for all employee groups, whereas extrinsic satisfaction is not significant in any specification, suggesting it does not play a role in these firms.[5]

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[4] White- and blue-collar employees are classified based on self-reported job titles from Glassdoor reviews, matched to the Bureau of Labor Statistics Standard Occupational Classification (SOC) system, which categorizes occupations based on job functions, required skills, education, training, and credentials. Unrecognized or ambiguous titles were manually reviewed and assigned to the most appropriate SOC category based on the closest matching job function and description. For further details, see https://www.bls.gov/bls/occupation.htm.

[5] As additional robustness checks, we re-estimated the baseline model i) using a Poisson pseudo-maximum likelihood estimator with high-dimensional fixed effects (PPML-HDFE), ii) excluding reviews in the bottom and top 5% of the word count distribution, and iii) controlling for review length and sentiment intensity. The results

While prior literature suggests blue-collar employees prioritize extrinsic rewards (Centers and Bugental, 1966; Mottaz, 1985), self-determination theory posits that the needs for autonomy, competence, and relatedness are universal across occupational categories (Amabile, 1993; Ryan and Deci, 2000). Our intrinsic satisfaction variable captures culture, leadership, and work-life balance — dimensions equally salient to all workers — suggesting that the quality of the work environment drives the retention decision regardless of collar color. The absence of a significant extrinsic effect in innovation-oriented firms reflects a compensation floor effect: these firms systematically offer above-market pay, compressing variance in extrinsic satisfaction and leaving intrinsic satisfaction as the dominant differentiator (Bena et al., 2021; Helper and Henderson, 2014).

[Insert Table 3 around here]

5. Conclusion

This study shows that intrinsic and extrinsic satisfaction are meaningfully associated with employee turnover. Prior literature suggests that blue-collar employees prioritize extrinsic factors (Centers and Bugental, 1966; Mottaz, 1985), while intrinsic satisfaction has mainly been linked to retention among white-collar and knowledge workers (Alvesson, 2000; Dutordoir and Struyfs, 2024; Krausert, 2014). Our findings extend this literature by showing that intrinsic satisfaction is significantly associated with lower turnover for blue-collar workers as well, challenging the traditional view that extrinsic factors dominate in this group. Several limitations should be acknowledged. First, our analysis is associational. Potential reverse causality is a concern: employees who have decided to leave may report lower satisfaction. Nevertheless, if former employees are more likely to review when dissatisfied, this would compress satisfaction variation among leavers and bias estimates toward zero. Omitted variable concerns similarly preclude causal inference. Second, measurement error in the LLM-based scores is inherent, and our coefficients should be interpreted as conservative estimates.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding

The authors declare no financial support was received for this work.

are qualitatively consistent with the baseline findings across all specifications. These results are available upon request.

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Table 1. Sample selection.

	Observations
Initial Glassdoor reviews	1,418,118
Less: temporary, part-time, and seasonal employees	(382,245)
Less: reviews with zero intrinsic or extrinsic scores	(98,865)
Less: reviews mentioning layoffs, terminations, or forced dismissals	(31,244)
Less: reviews with missing review-level controls	(132,768)
Less: reviews with no matching firm-year financial data	(54,655)
Final regression sample	718,341

The table presents the sequential sample selection procedure used in the analysis.

Table 2. Descriptive statistics.

	Mean	St. Dev	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*
(1) Turnover	0.41	0.49	1.00								
(2) Extrinsic	2.79	0.93	-0.06***	1.00							
(3) Intrinsic	3.26	1.00	-0.14***	0.08***	1.00						
(4) Recom	0.66	0.47	-0.21***	0.14***	0.44***	1.00					
(5) Outlook	0.37	0.79	-0.21***	0.14***	0.40***	0.65***	1.00				
(6) CEO_perfor	0.38	0.75	-0.20***	0.13***	0.40***	0.60***	0.61***	1.00			
(7) Size	10.23	2.08	-0.04***	0.15***	-0.00***	0.05***	0.06***	0.03***	1.00		
(8) ROA	5.14	10.41	0.01***	0.01***	-0.01***	0.03***	0.05***	0.02***	0.24***	1.00	
(9) Sales_Growth	1.34	68.38	0.00	-0.01***	0.00	0.00**	-0.00***	0.00	-0.02***	-0.02***	1.00

The table shows the descriptive statistics and pairwise correlations. All continuous variables winsorized at the 1st and 99th percentile. *, ** and *** represent significance at the 10%, 5% and 1% level respectively. Variables are defined in Appendix D.

Table 3. Regression analysis.

Dependent variable	*Turnover*								
	Full sample			Labor-intensive			Innovation-oriented		
	All	*White_collar*	*Blue_collar*	*All*	*White_collar*	*Blue_collar*	*All*	*White_collar*	*Blue_collar*
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Extrinsic	-0.002	0.001	-0.005***	-0.005**	-0.003	-0.006**	0.002	0.003	-0.002
	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Intrinsic	-0.025***	-0.025***	-0.019***	-0.025***	-0.025***	-0.019***	-0.027***	-0.027***	-0.019***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)	(0.002)	(0.003)
Recom	-0.089***	-0.104***	-0.077***	-0.083***	-0.112***	-0.069***	-0.093***	-0.096***	-0.091***
	(0.004)	(0.004)	(0.005)	(0.006)	(0.005)	(0.007)	(0.006)	(0.007)	(0.008)
Outlook	-0.041***	-0.044***	-0.033***	-0.040***	-0.042***	-0.033***	-0.044***	-0.044***	-0.033***
	(0.002)	(0.002)	(0.003)	(0.003)	(0.004)	(0.003)	(0.003)	(0.004)	(0.008)
CEO_perfor	-0.041***	-0.053***	-0.018***	-0.031***	-0.044***	-0.011**	-0.060***	-0.061***	-0.042***
	(0.003)	(0.002)	(0.004)	(0.005)	(0.003)	(0.005)	(0.003)	(0.004)	(0.006)
Size	-0.010	-0.016**	-0.003	-0.014	-0.020	-0.010	0.006	0.001	0.011
	(0.007)	(0.008)	(0.008)	(0.010)	(0.012)	(0.013)	(0.010)	(0.009)	(0.011)
ROA	-0.000	0.000	-0.001***	0.000	0.001**	-0.001**	-0.001*	-0.000	-0.001**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Sales_Growth	0.000	0.000	0.000***	0.000	0.000	0.000***	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	0.679***	0.707***	0.643***	0.735***	0.740***	0.728***	0.455***	0.494***	0.429***
	(0.075)	(0.078)	(0.082)	(0.098)	(0.112)	(0.132)	(0.106)	(0.094)	(0.122)
Observations	718,341	431,629	286,530	345,413	160,532	184,814	206,382	159,806	46,500
R-squared	0.092	0.101	0.063	0.082	0.109	0.049	0.086	0.093	0.068
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES	YES	YES	YES

The table presents the estimates of the Eq (1). Standard errors clustered at the firm level are reported in parentheses. Columns (1) to (3) examine the results for the full sample where Columns (2) and (3) split the full sample into white- and blue-collar employees, respectively. Columns (4) to (6) examine the labor-intensive subsample, while columns (7) to (9) focus on the innovation-oriented subsample. *, ** and *** represent significance at the 10%, 5% and 1% level respectively. Variables are defined in Appendix E.

Online Appendix

Appendix A. Instruction prompt.

We utilize DeepInfra APIs to generate the Intrinsic and Extrinsic scores. The Mistral-7B-Instruct-v0.3 model, with its 7 billion parameters, operates similarly to models like GPT, enabling it to comprehend complex language structures and provide nuanced responses. To extract scores from low (1) to high (5), we craft specific prompts guiding the model to assess intrinsic and extrinsic sentiments expressed in the reviews. Our prompt instructs the model:

"In the Excel file I provided, you will find employee reviews about their employer and workplace. The reviews consist of at least intrinsic or extrinsic factors, or both. Please consider the extrinsic and intrinsic keywords that I have provided for intrinsic and extrinsic factors.

The extrinsic keywords include compensation, benefit, salary, pay, career development, career opportunity, reward, money, wage, earnings, incentive, bonus, profit sharing, allowance, overtime pay, commission, gratuity, severance pay, perks, employee discounts, stock options, equity, fringe benefits, holiday pay, sick pay.

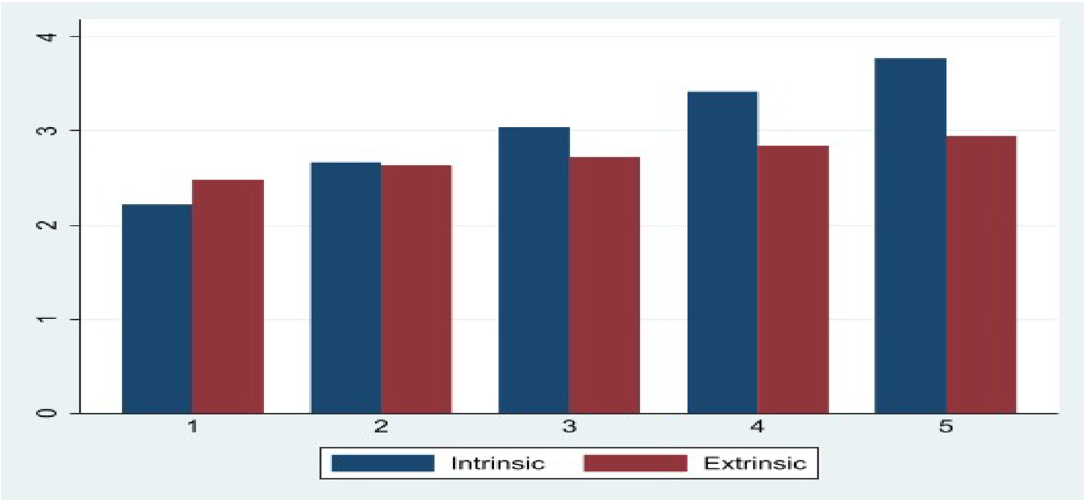
The intrinsic keywords include diversity, inclusion, work life balance, culture, value, culture and values, leadership, communication, company culture, senior leadership, supervision, teamwork, co-work, workplace atmosphere, organizational culture, company values, mission, vision, core values, organizational behavior, corporate social responsibility, employee engagement, employee morale

Then, based on these keywords or equivalent keywords (if you think they are interchangeable), assign a score for extrinsic and intrinsic. The score should be between 1 to 5, where 1 is very negative, 2 is negative, 3 is neutral, 4 is positive, and 5 is very positive. I provided the keywords to make it clear what the intrinsic and extrinsic factors are, intrinsic factors are usually non-financial and extrinsic are financial and factors that you expect a reward or promotion. If the comment does not mention extrinsic or intrinsic factors, consider 0 as the score. Use the keywords to guide your scoring, considering both direct mentions and equivalent terms. Ensure each factor is scored accurately based on the context and sentiment of the review".

Appendix B. Validation of AI-generated scores.

To evaluate the validity of the AI-generated scores, we exploit the overall star rating that each reviewer independently assigns on the Glassdoor platform as an external criterion, entirely independent of our AI scoring procedure. Figure B1 plots the mean intrinsic and extrinsic satisfaction scores across the five overall rating categories. Both measures exhibit a strict monotonic increase with no reversals at any step, demonstrating that the AI-generated scores consistently track an independent satisfaction signal in the theoretically predicted direction. We acknowledge that since the overall star rating is itself a subjective platform-based measure, this validation primarily establishes internal consistency rather than external validation.

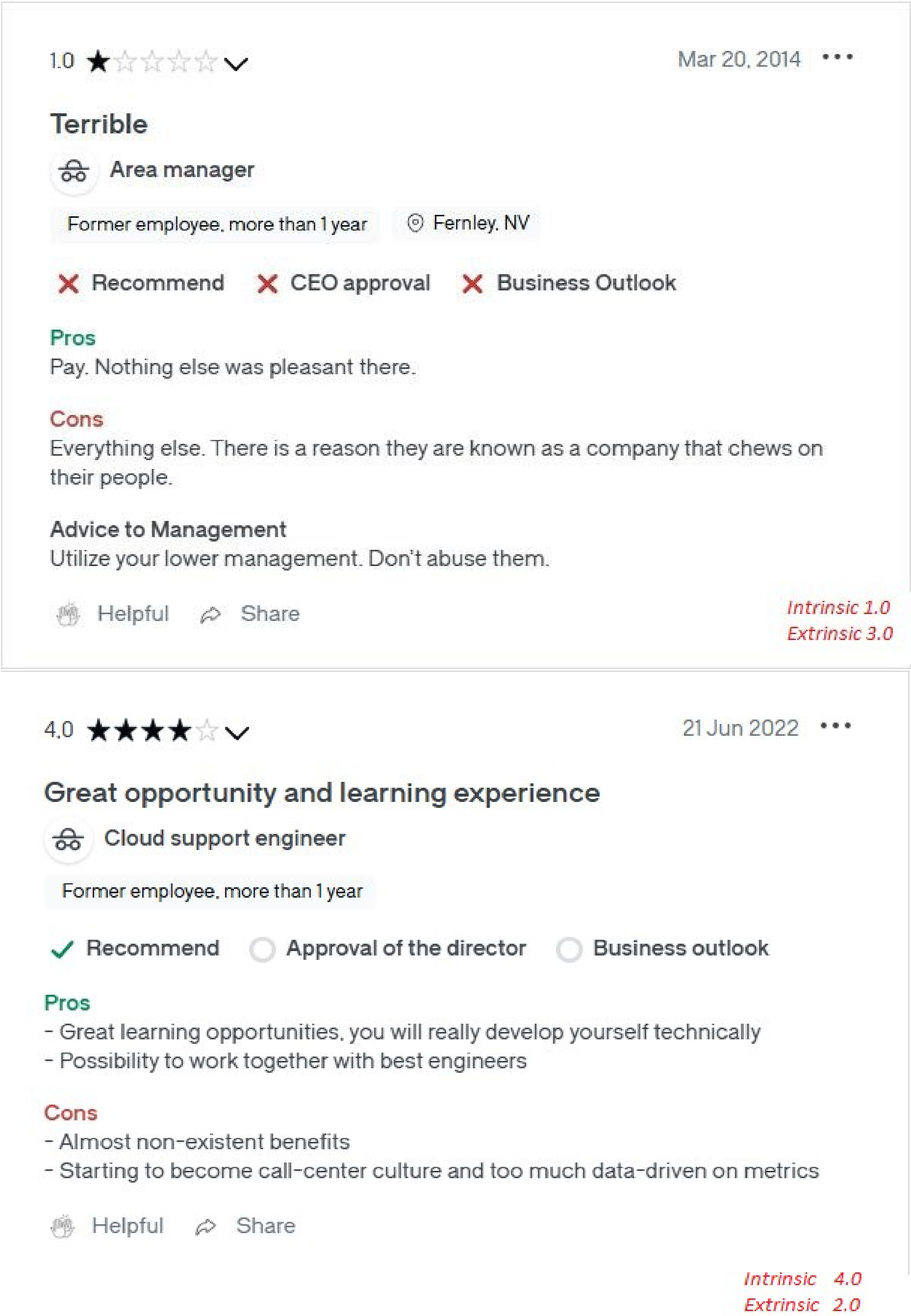
Figure B1. Average intrinsic and extrinsic satisfaction scores across overall rating categories.



This figure demonstrates the average of intrinsic and extrinsic satisfaction scores by overall star rating. The x-axis shows the overall star rating assigned independently by the reviewer on the Glassdoor platform. The y-axis shows the mean AI-generated intrinsic (blue) and extrinsic (red) scores.

Appendix C. Illustrative examples of AI-Generated scores for Glassdoor reviews.

Figure C1. Average intrinsic and extrinsic satisfaction scores across overall rating categories.



Each panel displays a Glassdoor review excerpt. The corresponding AI-generated intrinsic and extrinsic satisfaction scores assigned by model are shown in red in the bottom right corner of each panel. Scores range from one (very negative) to five (very positive).

Appendix D. Composition of the reviewing sample.

The 41% figure reflects who writes reviews on Glassdoor, not the actual turnover rate of the firms in our sample. Former employees can write reviews for up to five years after leaving, so their reviews naturally accumulate over time. Given that the U.S. annual voluntary quit rate averaged approximately 27–28% over 2015–2022, after two to three years of normal departures the former-employee share of the review pool naturally reaches around 40%. Furthermore, a potential selection bias concern arises from the fact that employees who choose to write reviews may not be representative of the broader workforce. Glassdoor's "give-to-get" mechanism mitigates this by requiring users to submit a review before accessing others', ensuring participation is driven by information access rather than expressive motivation alone (Marinescu et al., 2018).

For U.S. voluntary quit rate data, see https://fred.stlouisfed.org/series/JTSQUR.
For Glassdoor's review eligibility policy, see https://help.glassdoor.com/s/article/Writing-a-Company-Review.

Marinescu, I., Chamberlain, A., Smart, M., & Klein, N. (2021). Incentives can reduce bias in online employer reviews. *Journal of Experimental Psychology: Applied*, *27*(2), 393.

Appendix E. Variable definitions.

Turnover	Captures the employee's decision to leave the firm voluntarily, excluding layoffs and forced separations.1 if the review is written by a former employee, 0 if by a current employee.
Extrinsic	Measures employee sentiment toward extrinsic satisfaction factors (pay, bonuses, benefits, job security, external recognition). Reflects satisfaction from material/external rewards, measured on a one-to-five scale, where 1 indicates very negative, 2 negative, 3 neutral, 4 positive, and 5 very positive. Higher scores correspond to greater satisfaction with extrinsic aspects of the job.
Intrinsic	Measures sentiment toward intrinsic satisfaction factors (personal growth, purpose, autonomy, task enjoyment, meaningful work). Reflects satisfaction from internal fulfillment, measured on a one-to-five scale, where 1 indicates very negative, 2 negative, 3 neutral, 4 positive, and 5 very positive. Higher scores correspond to greater satisfaction with intrinsic aspects of the job.
Recom	Signals organizational advocacy and general satisfaction.1 if the employee would recommend the company to a friend, 0 otherwise.
Outlook	Reflects perception of organizational prospects and stability. This variable is derived directly from a standardized rating field on the Glassdoor platform, where reviewers independently select their business outlook assessment. -1 if employee perceives a negative firm future, 0 if neutral, 1 if positive.
CEO_perfor	Employee approval of CEO's leadership indicates trust in leadership and managerial competence. This variable is derived directly from a standardized CEO approval rating field on the Glassdoor platform, where reviewers independently indicate their level of approval. -1 if the employee perceives the CEO's performance negatively, 0 if neutral, 1 if positively.
Size	Firm size, natural log of total assets or number of employees.
ROA	Return on Assets: net income divided by total assets.
Sales_Growth	Reflects the absolute change in a firm's sales from one year to the next.