

Application of Signal Detection Theory (SDT) in Recruitment Decision-Making: From Intuition to Evidence-Based Selection

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Abstract: *Background:* Recruitment remains the most critical yet error-prone predictive function. This study applies Signal Detection Theory (SDT) to model recruiter accuracy distinguishing true competence (Signal) from bias (Noise). *Objectives:* To evaluate intuition vs data reliance, familiarity with SDT, and propose SDT framework for bias reduction. *Methods:* Descriptive mixed-methods, RDMQ (20 items) administered to N=60 professionals (45% Hiring Managers, 30% Recruiters, 25% HR) across sectors in Bengaluru. *Results:* 58% Unconfident/Neutral, 65% intuition-based decisions, 46.67% use standardized criteria, 55% report hire fit $\leq 60\%$, 50% unfamiliar with SDT, yet 43.33% likely to adopt SDT. 40% view structured interviews ineffective (Control Illusion). *Conclusions:* Unstructured interviews create high-noise ($d' \approx 0.2-0.3$); structured SDT-based processes achieve $d' \geq 0.6$, recalibrate β , reduce racial/age/affinity biases. Readiness indicates tipping point from Art to Science.

Keywords: Signal Detection Theory, Recruitment, Sensitivity d' , Criterion β , Bias, Structured Interviews, Talent Acquisition

1. Introduction

Recruitment is the highest-stakes prediction task. Yet it relies on gut feeling (Highhouse, 2008). Signal Detection Theory

(Green & Swets, 1966) separates Sensitivity (d')- ability to distinguish signal from noise- from Criterion (β)- threshold to say 'yes'. In recruitment, Signal = true competence, Noise = Halo, affinity, name, age. SDT yields four outcomes: Hit, Miss, False Alarm, Correct Rejection. See Figure 1.

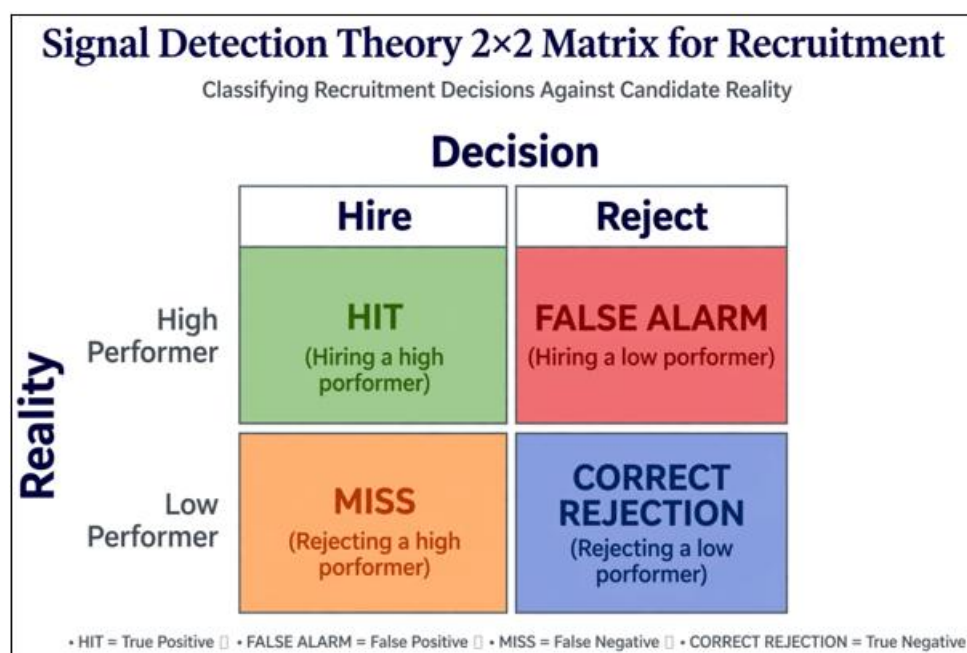


Figure 1: SDT 2x2 Matrix Applied to Recruitment

2. Literature Review

2.1 SDT Evolution

From WWII radar to psychophysics (Green & Swets, 1966) to medicine to organizational psychology (Human Radar). ROC curve visualizes Hit vs False Alarm tradeoff.

2.2 Noise Variables

Thorndike (1920) Halo Effect, Rivera (2012) Affinity Bias-cultural matching, Confirmation Bias- decisions in 90 seconds, Posthuma & Campion (2009) Age stereotypes- 5 domains.

2.3 Intuition vs Data

Schmidt & Hunter (1998) meta-analysis 85 years: unstructured $r=0.10-0.20$, structured $r=0.50+$. Levashina et al. (2014) 15 components of structure. Unstructured $d'=0.20-0.30$, structured $d'=0.60+$.

2.4 Landmark Studies

Bertrand & Mullainathan (2004) 5,000 resumes, 1,300 ads, White names 50% more callbacks, Name = pure Noise shifting β . Rivera (2012) 9-month ethnography, 'looking-glass merit'. Posthuma & Campion (2009) integrative review.

3. Methodology

Design: Descriptive mixed-methods. Target: Indian corporate, Bengaluru tech hubs. Sampling: Purposive non-probability stratified Entry 0-2y, Junior 2-5y, Mid 5-10y, Senior 10+y to test Seniority Paradox. $N=60$. Inclusion: Role with hiring authority, Sector Tech/ Finance/ Healthcare/ Education/ Manufacturing, ≥ 1 full cycle in last 6 months, access to ATS. Instrument: RDMQ 20 items, 6 sections measuring d' and β . Validity: Mapped to 15 structure components, pilot 3 HR. Ethics: Consent, anonymized. Demographics: Hiring Manager 45% (27), Recruiter 30% (18), HR 25% (15). Experience 0-2y 33.33% (20), 5-10y 33.33% (20), 2-5y 15% (9), >10y 18.33% (11). Industry Other 40% (24), Education 21.67% (13), Tech 20% (12), Manufacturing 18.33% (11).

4. Results

Sensitivity: Standardized criteria Often 31.67% (19), Always 15% (9), Never 21.67% (13). Volume >10 per role 33.33% (20) = overload. New hire fit >60% only 45%, $\leq 60\%$ 55% (33)=high False Alarm. Analytics Always 21.67% (13), Rarely 28.33% (17). SDT Familiarity Very 25% (15), Somewhat 25% (15), Not very 20% (12), Not at all 30% (18). Training Yes 48.33%, No 51.67%. Threshold: Structured Very effective 16.67% (10), Somewhat 28.33% (17), Neutral 15% (9), Somewhat ineffective 20% (12), Not effective 20% (12)=40% resistance = Control Illusion. Confidence Very 15% (9), Somewhat 26.67% (16)=41.67% confident; Neutral 28.33% (17), Somewhat unconfident 13.33% (8), Very 16.67% (10)= 58.33% low. Behavioral Always 28.33% (17), Often/Sometimes 36.66% (22), Rarely/Never 35% (21). Intuition 61-80% 25% (15), 41-60% 23.33% (14); >40% intuition ~65%. Noise: High volume 26.67% (16), Reducing bias 25% (15), Candidate experience 23.33% (14). D&I Very 20% (12), Somewhat 20% (12)=40%, Somewhat unimportant 28.33% (17), Not at all 16.67% (10)= 45% low. Blind hiring Yes 48.33% (29), No 51.67% (31). Readiness: Adoption Likely 43.33% (26), Neutral 26.67% (16), Unlikely 30% (18). Tech Very likely 18.33% (11), Somewhat 8.33% (5)=26.66% willing.

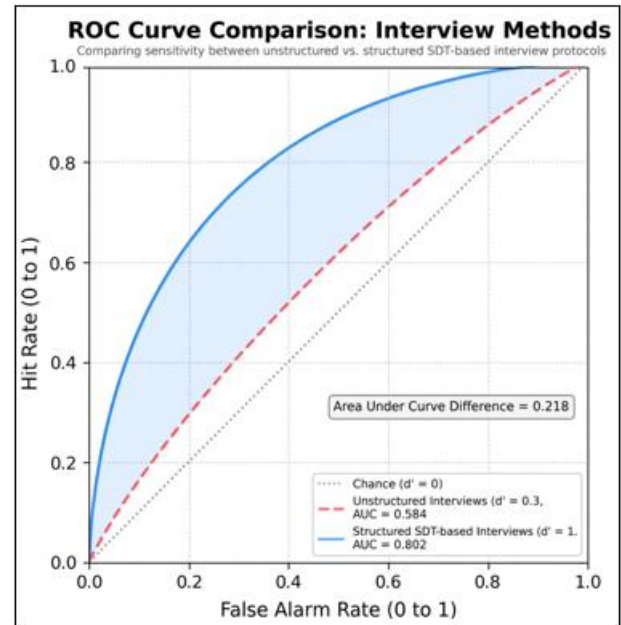


Figure 2: ROC Curve Comparison - Unstructured vs Structured SDT-based Interviews (AUC Difference = 0.218)

5. Discussion

Figure 2 shows validity gap. Unstructured near diagonal ($d'=0.3$, $AUC=0.584$). Structured bow to top-left ($d'=1.2$, $AUC=0.802$). This quantifies Levashina gap. Confidence Gap 58% reflects absent feedback loop- radar gets immediate feedback, recruiters don't track long-term Hit/Miss. Intuition Trap explains False Alarms: rapport mistaken for competence. Criterion Bias: name/age/hobby shifts β ; blind hiring addresses. Control Illusion: overestimate d' despite fit $\leq 60\%$. D&I as accuracy problem: biased β increases Misses and False Alarms, reducing ROC.

6. Recommendations

- 1) Scorecards 1-5 anchored before discussion.
- 2) β Calibration conservative for high-risk, liberal but structured for growth.
- 3) Blind filter hide name/photo/age/college.
- 4) Full 15-component structure.
- 5) Work-sample tests filter age/prestige noise.
- 6) ROC Tracking interview $\rightarrow$ performance $\rightarrow$ retention compute d' , β quarterly.
- 7) Gamified SDT de-bias training.
- 8) Augmented Detection AI liberal first pass, human structured final.
- 9) Financial utility cost False Alarm 30-200% salary.

7. Conclusion

Recruitment is high-noise, low-sensitivity, liberal intuition criterion. SDT provides diagnosis and calibration path. Contribution: Quantified Confidence Gap 58%, Intuition Trap 65%, Control Illusion 40%, Readiness 43%. Limitations $N=60$ pilot self-report Bengaluru-centric cross-sectional. Future longitudinal tracking, AI vs human Sensitivity, cultural dimensions, neuroimaging, blind hiring RCT, utility functions. Organizations investing in calibration achieve higher Hits, fewer False Alarms, lower litigation, genuine diversity as accuracy.

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