Social Comparison and the Value of Performance Trajectory Information
A Field Experiment in the Workplace

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Research Motivation

• Upward social comparison: Workers compare themselves to high-performing coworkers
  • Organizations often highlight their high performers
  • People want to become high performers
• Social comparison can impose substantial costs on firms and workers
  • Stressful environment, distort behaviors...
Research Motivation

• Incomplete information in upward social comparison
  • Easy to know high achievers’ current performance, hard to know their past
  • Especially for new workers
• Incomplete info can exacerbate upward social comparison costs

What to attribute coworkers’ high performance to?

- Experience
- Innate ability
- Feeling of inferiority, lost hope...
Research Question

• Can firms mitigate the costs of performance comparison by sharing information about the past performance of high-achievers?
Preview

• 28-week field experiment at a Chinese spa chain
  • 160 stores, 7000 workers

• Main treatment
  • Disclosing the performance trajectories of high-performing senior workers

• Main outcomes
  • Attrition, productivity, well-being

• Mechanisms
  • Social comparison or career concern?
Literature

• Peer effects on performance and performance transparency
  • Mas and Moretti 2009; Bandiera et al. 2010; Blanes i Vidal and Nossol 2011; Breza et al. 2018

• Career concerns and salary dynamics
  • Lazear and Rosen 1981; Harris and Holmstrom 1982; Cullen and Perez-Truglia 2021

• Stress in the workplace
  • Bhagat 1983; Kocher et al. 2012; Cahlíková et al. 2020; Kaur et al. 2021
Theoretical Framework
• Performance$_{it}$ = InnateAbility$_i$ + ReturnsToExp$_i$ × Experience$_{it}$

• Information
  • New workers know senior workers’ period-1 performance, but not their period-0 performance
  • Fundamental attribution bias
    • New workers overattribute senior workers’ performance to their innate ability

• Decision: stay for period 2 or quit
  • EU(stay) = InnateAbility$_N$ + E$_N$(ReturnsToExp$_N$) - λE$_N$(InnateAbility$_S$)

Effect of performance trajectory information

Expected monetary payoff  Social comparison cost

↑ If ReturnsToExp are correlated  ↓
Hypotheses

• Effects of performance trajectory information on new workers
  • Belief about senior workers’ early-stage performance: ↓
  • Stress: ↓
  • Expectation of own future performance: maybe ↑
  • Attrition: ↓
• No effect of peer performance information on new workers
• No effect of information treatments on senior workers
Field Experiment
Setting: a spa chain in China

• 13 regions, 160 stores, 7000 workers
Setting: a spa chain in China

- 13 regions, 160 stores, 7000 workers
- Worker performance
  - Two key measures: sales and customer picks
  - Pay is linear in both measures
  - Mostly reflect individual skills and efforts
- Information environment
  - Workers are organized into teams of 10-20 for administrative reasons
  - Team managers discuss members’ performance in team meetings
  - High performers are highlighted
Performance comparison in the company

Do you often compare your performance to your coworkers?

Who do you compare yourself to in terms of performance?

- 29% of respondents said yes.
- 71% of respondents said no.

- 46% of respondents compare themselves to coworkers with similar tenure.
- 15% compare to coworkers with similar performance.
- 12% compare to high-performing coworkers of the same team.
- 11% compare to high-performing coworkers of the store.
- 6% compare to coworkers at a similar age.
- 10% compare to others.
Performance Trajectory Treatment

- Twice-weekly messages sent to workers through company’s app
- Message content
  - The performance trajectory of an anonymous high-performing senior worker in the same region
  - “To help you know your coworkers better, today we introduce you to the performance trajectory of Xiaomei (alias).
  - “Xiaomei joined our company in your region in [year and month].
  - For $t = 1^{st}, 3^{rd}, 6^{th}, 12^{th}, \text{ last}$:
    - “In [her/his] $t$ month at the company, she had $n$ customer picks, and her sales is ¥$y$.”
- Treatment group
  - All workers from 40 treated stores (randomly chosen, well balanced)
- Treatment period
  - 2019.06-2019.12
An Auxiliary Treatment

• Does the early-stage performance info have to be about senior high-performing workers?

• Peer Performance Treatment
  • 40 stores, same treatment period, same message frequency

• Message content
  • The last-month performance of an anonymous worker in the same region with similar tenure
  • “To help you know your coworkers better, today we introduce you to the recent performance of Xiaomei (alias).
  • “Xiaomei joined our company in your region in [year and month].
  • “Last month, she had $n$ customer picks, and her sales is ¥$y$.”
Summary of Treatments

• Performance trajectory of high-performing senior workers (40 stores)
• Current performance of peers (40 stores)
• No performance information (80 stores)
• Stratified randomization
Outcome Variables

• Attrition
  • Attrition_{it} = 1 if employee i leaves during month t

• Productivity
  • Customer picks, sales, days of attendance, salary

• Store revenue

• Survey measures
  • Subjective well-being and beliefs

• Elicited before, during, and after treatments
Outcome Variables: Subjective Well-being

• Stress
• Mental health
  • Warwick-Edinburgh Mental Wellbeing Scales
• Job satisfaction
  • overall job satisfaction, trust, sense of belonging, willingness to recommend the company as a workplace, willingness to stay
• Evaluation of managers
  • perceived care, skills, helpfulness, fairness, leniency
• Elicitation
  • 5-point likert scale
Outcome Variables: Beliefs

• Forecast on own sales in the next month
• Forecast on own sales in three months
• Belief about senior coworkers’ early-stage sales performance
• Belief about peers’ recent sales performance

• Elicitation
  • Unincentivized
  • Point estimates
  • Confidence in beliefs
  • Changes in beliefs caused by treatments
Results
Econometric Analysis

Treatment vs. control difference

\[ Y_{ijt} = \beta_1 \times T_{1i} + \beta_2 \times T_{2i} + \tau_t + \gamma_j + \varepsilon_{ijt} \]

\( Y_{ijt} \): turnover, productivity, or subjective well-being
\( T_{1i} \): = 1 if in trajectory information group
\( T_{2i} \): = 1 if in peer information group
\( \gamma_j \): region fixed effect
\( \tau_t \): month fixed effect
Treatment effects on attrition

- Performance trajectory information lowers new workers attrition

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>New Workers (1)</th>
<th>New Workers (2)</th>
<th>Senior Workers (3)</th>
<th>Senior Workers (4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trajectory</td>
<td>-2.429**</td>
<td>-2.200**</td>
<td>0.917</td>
<td>1.009</td>
</tr>
<tr>
<td></td>
<td>(1.110)</td>
<td>(1.114)</td>
<td>(0.805)</td>
<td>(0.700)</td>
</tr>
<tr>
<td>Peer</td>
<td>-0.065</td>
<td>-0.326</td>
<td>0.130</td>
<td>0.110</td>
</tr>
<tr>
<td></td>
<td>(1.276)</td>
<td>(1.171)</td>
<td>(0.870)</td>
<td>(0.716)</td>
</tr>
<tr>
<td>Month fixed effects</td>
<td></td>
<td>✓</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Region fixed effects</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Mean DV if Treatment=0</td>
<td>20.31</td>
<td>20.31</td>
<td>9.70</td>
<td>9.70</td>
</tr>
<tr>
<td>Number of observations</td>
<td>10171</td>
<td>9579</td>
<td>21799</td>
<td>18448</td>
</tr>
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</table>
Treatment effects on attrition

- Performance trajectory information *lowers* new workers attrition (especially for high-performing ones)

<table>
<thead>
<tr>
<th>Table 5: Do High-performing Employees Stay? (New Workers)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dependent Variable</td>
</tr>
<tr>
<td>Worker Type</td>
</tr>
<tr>
<td>Trajectory</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Peer</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

- Month fixed effects: ✓ ✓
- Region fixed effects: ✓ ✓
- Mean DV if Treatment=0: 31.97 9.70
- Number of observations: 3761 5818
Treatment effects on well-being

- Performance trajectory information lowers stress and improves mental health of new workers

Table 7: Average Treatment Effects on Individual Survey Outcomes

<table>
<thead>
<tr>
<th>Dependent Variables</th>
<th>Job Satisfaction</th>
<th>Evaluation of Managers</th>
<th>Low Stress</th>
<th>Mental Health</th>
</tr>
</thead>
<tbody>
<tr>
<td>Worker Type</td>
<td>New (1)</td>
<td>Senior (2)</td>
<td>New (3)</td>
<td>Senior (4)</td>
</tr>
<tr>
<td>Trajectory</td>
<td>-0.040 (0.067)</td>
<td>-0.037 (0.046)</td>
<td>0.016 (0.076)</td>
<td>-0.021 (0.040)</td>
</tr>
<tr>
<td>Peer</td>
<td>-0.104 (0.081)</td>
<td>-0.012 (0.051)</td>
<td>-0.053 (0.069)</td>
<td>-0.034 (0.048)</td>
</tr>
<tr>
<td>Month fixed effects</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Region fixed effects</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Mean DV if Treatment=0</td>
<td>3.93</td>
<td>3.87</td>
<td>3.99</td>
<td>3.89</td>
</tr>
<tr>
<td>Number of observations</td>
<td>36891</td>
<td>69415</td>
<td>35519</td>
<td>73726</td>
</tr>
</tbody>
</table>
Treatment effects on well-being

- Performance trajectory information lowers stress and improves mental health of new workers

Table A10: The Effect of Coworkers’ Performance Trajectory Information on Stress of New Workers

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Low Stress</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coworkers’ performance in the 1st month</td>
<td>-0.521**</td>
</tr>
<tr>
<td></td>
<td>(0.251)</td>
</tr>
<tr>
<td>Coworkers’ performance in the last month</td>
<td>0.0886</td>
</tr>
<tr>
<td></td>
<td>(0.134)</td>
</tr>
<tr>
<td>lagged (Stress Score)</td>
<td>0.294***</td>
</tr>
<tr>
<td></td>
<td>(0.0197)</td>
</tr>
<tr>
<td>Store fixed effects</td>
<td>✓</td>
</tr>
<tr>
<td>Number of observations</td>
<td>5576</td>
</tr>
</tbody>
</table>
Association between well-being and attrition

- Low stress and good mental health are negatively associated with attrition

### Table 8: The Effect of Stress and Mental Health on Attrition

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Worker Type</th>
<th>Attrition</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>New (1)</td>
</tr>
<tr>
<td>Low Stress</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>-2.047***</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.499)</td>
</tr>
<tr>
<td>Mental Health</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Month fixed effects</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Region fixed effects</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Mean DV if Treatment=0</td>
<td>20.31</td>
<td>9.70</td>
</tr>
<tr>
<td>Number of observations</td>
<td>8149</td>
<td>15885</td>
</tr>
</tbody>
</table>
Summary

- Effects of performance trajectory information on new workers
  - Lower attrition
  - Improved mental health and stress level
  - The two effects are associated
Summary

• Effects of performance trajectory information on new workers
  • Lower attrition
  • Improved mental health and stress level
  • The two effects are associated

• What is the mechanism?
  • Career concern
    • “If she could improve, I can too.”
    • Should expect higher future performance (given same effort) or lower effort (required to achieve the same future performance)
## Career concern: Treatment effects on own performance forecasts

### Table A11: Average Treatment Effects on New Workers’ Forecasts on Own Future Performance

<table>
<thead>
<tr>
<th>Dependent Variables</th>
<th>log (forecast on next month’s sales)</th>
<th>log (forecast on sales in three months)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
</tr>
<tr>
<td>Trajectory</td>
<td>0.153</td>
<td>0.0473</td>
</tr>
<tr>
<td></td>
<td>(0.0976)</td>
<td>(0.0766)</td>
</tr>
<tr>
<td>Peer</td>
<td>-0.125</td>
<td>-0.128</td>
</tr>
<tr>
<td></td>
<td>(0.0913)</td>
<td>(0.0806)</td>
</tr>
<tr>
<td>log (sales)</td>
<td>0.419***</td>
<td>0.332***</td>
</tr>
<tr>
<td></td>
<td>(0.0289)</td>
<td>(0.0241)</td>
</tr>
<tr>
<td>Month fixed effects</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Region fixed effects</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Number of observations</td>
<td>3023</td>
<td>3088</td>
</tr>
</tbody>
</table>
Performance forecasts are associated with attrition

Table A12: Effects of Individual Performance Forecasts on Attrition

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Worker Type</th>
<th>New Workers</th>
<th>Senior Workers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>log (forecast of next month’s sales)</td>
<td></td>
<td>-2.13**</td>
<td>0.156</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.909)</td>
<td>(0.582)</td>
</tr>
<tr>
<td>log (forecast of sales in three months)</td>
<td>1.13</td>
<td>-0.902*</td>
<td>(1.17)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.536)</td>
<td></td>
</tr>
<tr>
<td>log (sales)</td>
<td>-1.74*</td>
<td>-1.26***</td>
<td>(1.03)</td>
</tr>
<tr>
<td></td>
<td>(1.03)</td>
<td>(0.343)</td>
<td></td>
</tr>
<tr>
<td>Month fixed effects</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Region fixed effects</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Number of observations</td>
<td>1508</td>
<td>4583</td>
<td></td>
</tr>
</tbody>
</table>
Career concern: Treatment effects on effort and performance

### Table 4: Average Treatment Effects on Individual Labor Supply and Productivity

<table>
<thead>
<tr>
<th>Dependent Variables</th>
<th>Attendance</th>
<th>Customer Pick</th>
<th>log (sales)</th>
<th>log (compensation)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>New (1)</td>
<td>Senior (2)</td>
<td>New (3)</td>
<td>Senior (4)</td>
</tr>
<tr>
<td>Trajectory</td>
<td>0.530</td>
<td>-0.359</td>
<td>-0.033</td>
<td>-0.160</td>
</tr>
<tr>
<td></td>
<td>(0.434)</td>
<td>(0.345)</td>
<td>(1.529)</td>
<td>(2.997)</td>
</tr>
<tr>
<td>Peer</td>
<td>-0.456</td>
<td>-0.209</td>
<td>-1.083</td>
<td>-8.094*</td>
</tr>
<tr>
<td></td>
<td>(0.393)</td>
<td>(0.369)</td>
<td>(1.033)</td>
<td>(4.183)</td>
</tr>
<tr>
<td>Month fixed effects</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Region fixed effects</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Mean DV if Treatment=0</td>
<td>22.17</td>
<td>25.68</td>
<td>17.27</td>
<td>57.01</td>
</tr>
<tr>
<td>Number of observations</td>
<td>9573</td>
<td>18408</td>
<td>9413</td>
<td>17983</td>
</tr>
</tbody>
</table>

*Significant at the 0.01 level.
Summary

• Effects of performance trajectory information on new workers
  • Lower attrition
  • Improved mental health and stress level
  • The two effects are associated

• What is the mechanism?
  • Career concern
    • “If she could improve, I can too.”
    • Should expect higher future performance (given same effort) or lower effort
      (required to achieve the same future performance) ✗
  • Social comparison
    • “She also started low. We are not that different!”
Social comparison: excerpt from interview

• “Senior workers have been like god since I joined the firm, and it was beyond imagination to surpass them. Now that I know many of them accomplished that step by step, they are also ordinary human beings. My current performance is still much lower than the top worker’s in my store, but I have a higher tolerance for myself.”
Summary

• Effects of performance trajectory information on new workers
  • Lower attrition
  • Improved mental health and stress level
  • The two effects are associated

• What is the mechanism?
  • Career concern
    • “If she could improve, I can too.”
    • Should expect higher future performance (given same effort) or lower effort (required to achieve the same future performance) 
  • Social comparison
    • “She also started low. We are not that different!”

• Other mechanisms
  • No treatment effects on performance uncertainty, perceived performance volatility, and competitiveness
Conclusion

- Information about high-performing senior workers’ past performance improves the retention of new workers
  - Social comparison mechanism
- A new aspect of upward social comparison: comparing to the past of high-performing senior workers
- Information friction exacerbates social comparison costs
Thank you! Comments or suggestions are welcome: ycliang@cmu.edu