Social contagion in new product trial and repeat

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Research Questions

- Not only trial but also repeat?
- Who is most influential at each stage?
- Who is most influenceable at each stage?
Peer influence can be informational or normative (Deutsch and Gerard 1955)

Informational influence
- Affects beliefs about what is -- risks and benefits
  - Increases with sources’ credibility or expertise
  - Decreases with decision maker’s self-confidence

Normative influence
- Affects beliefs about how one should behave
  - Higher within than across groups
  - Middle-status conformity
Additional premises

- **Informational influence**
  - Greater uncertainty in trial than repeat.
  - **Trial > Repeat**

- **Normative influence**
  - As time progresses, social acceptability becomes more important than functionality (Westphal et al. 1997).
  - Deviations from the norm are easier to condone for trial than for repeat (Bosk 2003).
  - **Trial < Repeat**
## In a nutshell

<table>
<thead>
<tr>
<th></th>
<th>Trial</th>
<th>Repeat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanism</td>
<td>Informational</td>
<td>Normative</td>
</tr>
<tr>
<td>Source</td>
<td>Trusted peers</td>
<td>Group members</td>
</tr>
<tr>
<td>Moderator</td>
<td>Self-confidence</td>
<td>Status</td>
</tr>
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</table>
Hypotheses

- **H1**: New product adoption is affected by social contagion from trusted peers, and people with low confidence in their judgments are more susceptible to it.

- **H2**: Social contagion from trusted peers and that is negatively moderated by the recipients’ self-confidence is more pronounced in trial than in repeat.

- **H3**: New product repeat behavior is affected by social contagion from group members, and people with middle-status are more susceptible to it.

- **H4**: Social contagion from group members and that is non-monotonically moderated by the recipients’ status is more pronounced in repeat than in trial.
Research Setting

Product
- New prescription drug.
- Chronic but life threatening disease.
- Different from prior two drugs in therapeutic class.
- Uncertainty about long-term clinical benefits.

Marketing effort
- Only sales calls.
- No samples, no direct to consumer advertising, no price cuts.
Data

- Physician Survey
  - Who prescribed in the category before launch
  - 185 physicians; 65 adopted new drug
  - Discussion & referral ties vs. Immediate colleagues
  - Confidence (SRL) vs. Status (Indegree)
  - Demographic data such as city, solo practice, univ hospital, etc.

- Physician-level prescription data
  - 17 months, starting with time of launch of focal drug (trial and repeat).
  - Prescription data of the other two drugs before launch.

- Physician-level detailing data
  - 17 months, starting with time of launch.
Contagion Variables

For physician $i$ at time $t$,

- Contagion from discussion and referral ties
  - Volume of prescription of the drug at $t-1$ by physicians named as discussion or referral tie by physician $i$.

- Contagion from immediate colleagues
  - Share of prescription of the drug at $t-1$ among immediate colleagues of physician $i$. 
Model

Two binary probit equations

Trial

\[ U_{it}^a = \beta_{0i}^a + X_{it}^a \beta_1^a + \varepsilon_{it}^a \]

where \( \beta_{0i}^a \sim N(\bar{\beta}_0^a, \sigma_a^2) \) and \( \varepsilon_{it}^a \sim N(0,1) \)

\( X_{it}^a \) consists of contagion variables, their interactions with confidence and status, sales calls, period-fixed effect, and other control variables.

Repeat

\[ U_{it}^r = \beta_{0i}^r + X_{it}^r \beta_1^r + \varepsilon_{it}^r \]

where \( \beta_{0i}^r \sim N(\bar{\beta}_0^r, \sigma_r^2) \) and \( \varepsilon_{it}^r \sim N(0,1) \)

\( X_{it}^r \) consists of all variables included in \( X_{it}^a \) and physician \( i \)'s prescription volume at \( t-1 \).
Controls

- Time
  - Monthly dummies.

- Heterogeneity
  - Physician specific random intercept (allowing for correlation between trial and repeat equation).
  - Nonparametric baseline (for trial)
  - Lagged prescription volume (for repeat).

- Endogeneity
  - Control function approach for sales calls
  - Lagged prescription volume (for repeat).
## Main Results

<table>
<thead>
<tr>
<th>Variables</th>
<th>Trial Hazard</th>
<th>Repeat Probability</th>
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</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-2.069 ***</td>
<td>-0.333</td>
</tr>
<tr>
<td></td>
<td>(0.312)</td>
<td>(0.467)</td>
</tr>
<tr>
<td>SRL</td>
<td>0.133</td>
<td>-0.088</td>
</tr>
<tr>
<td></td>
<td>(0.069)</td>
<td>(0.157)</td>
</tr>
<tr>
<td>Ln(Indegree + 1)</td>
<td>0.106</td>
<td>0.073</td>
</tr>
<tr>
<td></td>
<td>(0.228)</td>
<td>(0.425)</td>
</tr>
<tr>
<td>Ln(Indegree + 1)^2</td>
<td>0.020</td>
<td>0.126</td>
</tr>
<tr>
<td></td>
<td>(0.132)</td>
<td>(0.299)</td>
</tr>
<tr>
<td>Contagion from Dis / Ref Ties (00s)</td>
<td>0.056</td>
<td>-0.067</td>
</tr>
<tr>
<td></td>
<td>(0.344)</td>
<td>(0.423)</td>
</tr>
<tr>
<td>Contagion from Dis / Ref Ties (00s) × SRL</td>
<td>-0.677 **</td>
<td>0.390</td>
</tr>
<tr>
<td></td>
<td>(0.250)</td>
<td>(0.260)</td>
</tr>
<tr>
<td>Contagion from Colleagues</td>
<td>0.759 *</td>
<td>0.479</td>
</tr>
<tr>
<td></td>
<td>(0.377)</td>
<td>(0.257)</td>
</tr>
<tr>
<td>Contagion from Colleagues × Ln(Indegree + 1)</td>
<td>0.625</td>
<td>2.533 ***</td>
</tr>
<tr>
<td></td>
<td>(0.917)</td>
<td>(0.686)</td>
</tr>
<tr>
<td>Contagion from Colleagues × Ln(Indegree + 1)^2</td>
<td>-0.787</td>
<td>-0.840 *</td>
</tr>
<tr>
<td></td>
<td>(1.213)</td>
<td>(0.305)</td>
</tr>
</tbody>
</table>
Social Contagion in Trial

- Contagion from ref/dis ties
  - Significant for lower SRL

- Contagion from colleagues
  - Not moderated by Status
Social Contagion in Repeat

- Contagion from ref/dis ties
  - Insignificant

- Contagion from colleagues
  - Middle-status conformity
Contagion from discussion/referral ties
- Not significantly different b/w trial and repeat ($p > 0.1$).
- ~ Credence good

Contagion from immediate colleagues
- Significantly different b/w trial and repeat ($p < 0.01$).
Threats to Internal Validity

- Instrumentation bias
  - SF: Before launch
  - LA/NYC: 10 months after launch

- Endogeneous tie formation
  - Discussion/referral ties: SF vs. LA/NYC
  - Immediate colleagues: Trial vs. Repeat

- Reflection / Simultaneity

- Truncation bias

- Correlated unobservables

- Mere duration dependence in usage
Robustness Checks

- Different operationalization of contagion
  - Volume-weighted vs. Share-weighted

- Different specification of models
  - Adding additional interactions

- Carry-over of Salescalls

- Correlation b/w status and status-squared

- Spatial variation in demand within cities
Conclusion

- Not only **trial** but also **repeat**?
  - Yes
  - Mechanisms: most likely informational v. normative

- Who is most **influential** at each stage?
  - Trusted peers v. Group members

- Who is most **influenceable** at each stage?
  - Low-confidence v. Middle-status