TECHNION
Israel Institute of Technology

BIG DATA AND CUSTOMER EMOTION DYNAMICS: AUTOMATED ANALYSES IN CHAT SERVICES

Yom-Tov, Ashtar, Altman, Natapov, Barkay, Westphal, & Rafaeli. *Companion of the The Web Conference 2018.*

LIVEPERSON

CUSTOMER EMOTION

- Emotions prevail in service interactions (Grandey, 2004; Groth & Grandey, 2012)

Presumption.

High frequency of emotions, and specifically of negative emotions

„Your service is awful. I‘m an angry customer. Solve my problems and make me feel better!“

CUSTOMER EMOTION DYNAMICS

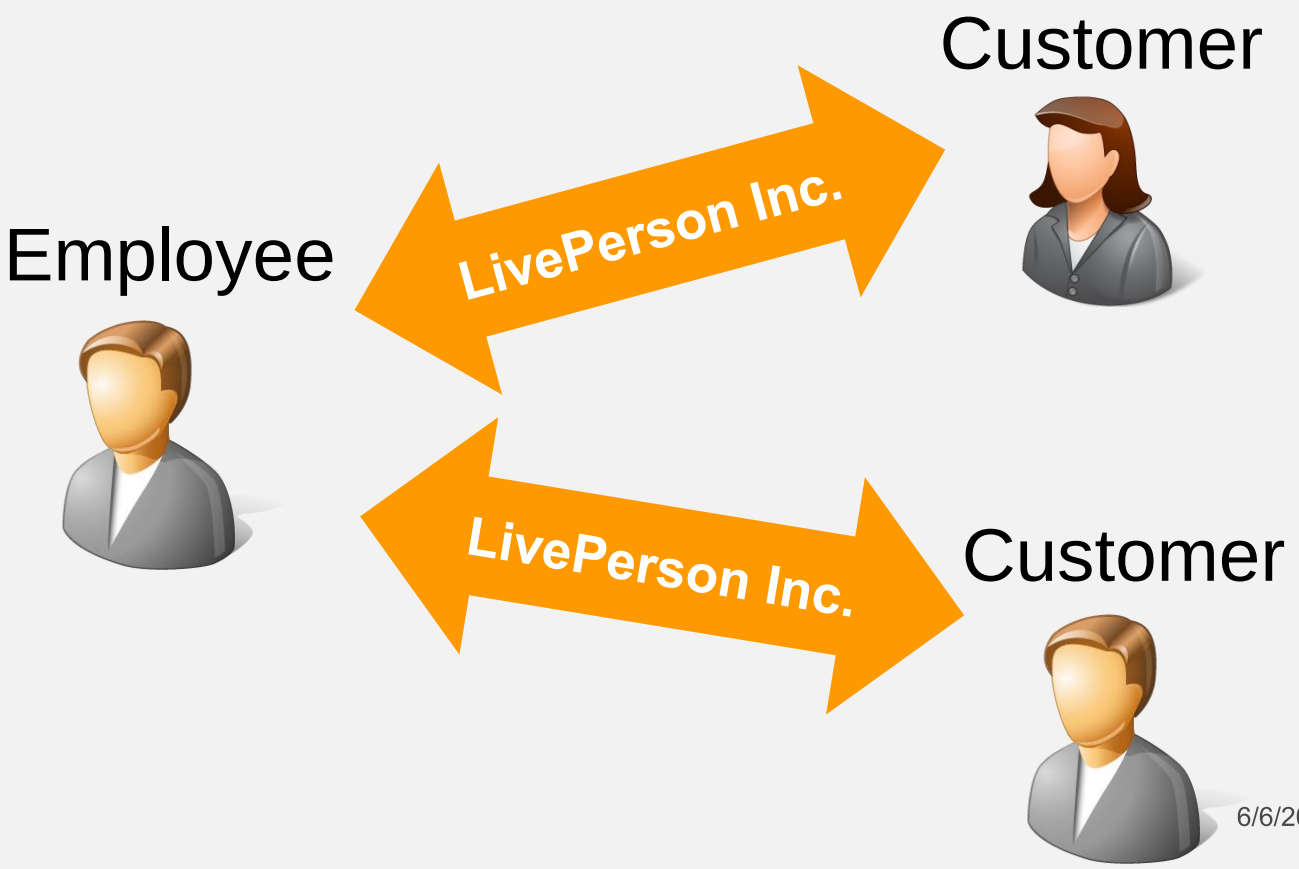
- Emotions are dynamic (Hareli & Rafaeli, 2008; van Kleef, 2014; Weiss & Cropanzano, 1996)

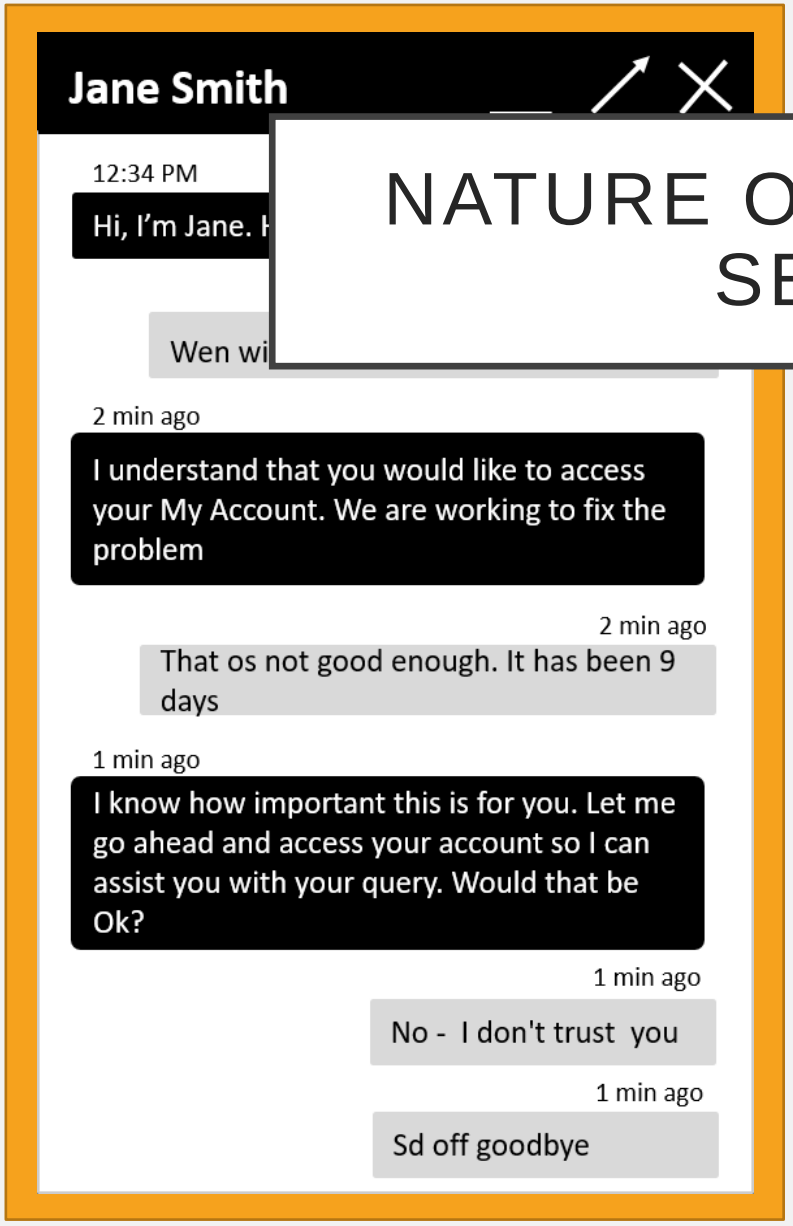
…but…

- Emotion measurements are static (Donaldson & Grant-Vallone, 2002)

Technology-Mediated Service Creates Opportunities!

THE FRAMEWORK: CHAT-BASED SERVICE





NATURE OF CHAT-BASED SERVICE

Multiple levels of analysis:

I. Atomic (message) level

II. Cumulative level (interaction/subset)

RESEARCH GOALS

Need to design new model for detection of customer emotion in chat interactions

1. Tool development and validation

Need to understand customer emotion dynamics and their connection to service outcomes

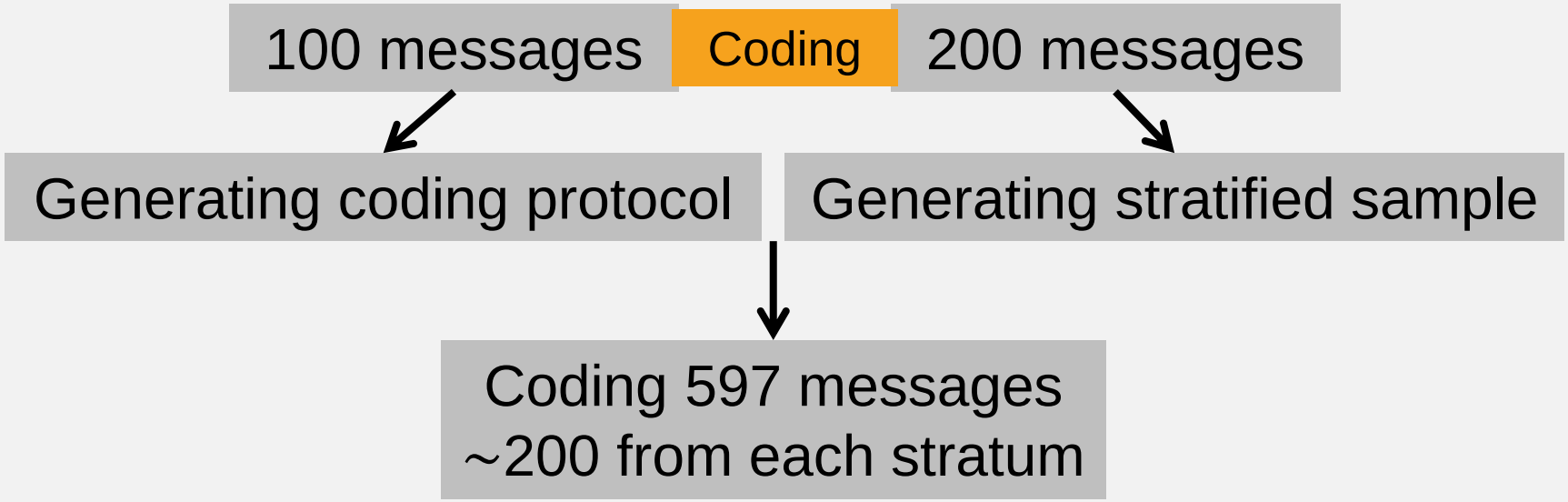
2. Tool application

PART I.I: TOOL DEVELOPMENT

- Lexicon-based approach
- Chat data, provided by LIVEPERSON
- ☹ 😐 ☺ score for each customer message
- Tool adjustments:
  - (1) Service, (2) Brand, (3) Customer language

PART I.2: TOOL VALIDATION

Human coding (Larsson, 1993; Amabile et al., 2004)



PART I.2: TOOL VALIDATION

Negative emotion class

Model	*Precision*	*Recall*	F_1	$F_{0.5}$
CustSent	**0.719**	0.236	0.355	**0.51**
Stanford	0.335	**0.509**	**0.404**	0.36
LIWC	0.479	0.115	0.186	0.294
SentiStrength	0.494	0.216	0.3	0.393

Positive emotion class

Model	*Precision*	*Recall*	F_1	$F_{0.5}$
CustSent	**0.866**	0.569	0.687	**0.784**
Stanford	0.546	0.339	0.418	0.486
LIWC	0.491	**0.717**	0.583	0.524
SentiStrength	0.813	0.677	**0.739**	0.781

PART II:
TOOL APPLICATION

Sample:

- 390,438 Telecom interactions, 8,526,814 messages (October to December 2016)

Variables:

- Customer
- Service quality measures:
- Operational Data

First Call Resolution (FCR): "Was your service need resolved in this interaction?"

CUSTOMER EMOTION DYNAMICS & SERVICE QUALITY

- Cognitive Appraisal Theory & Justice Theories (Folkman et al. 1986; Folger & Cropanzano, 1998)

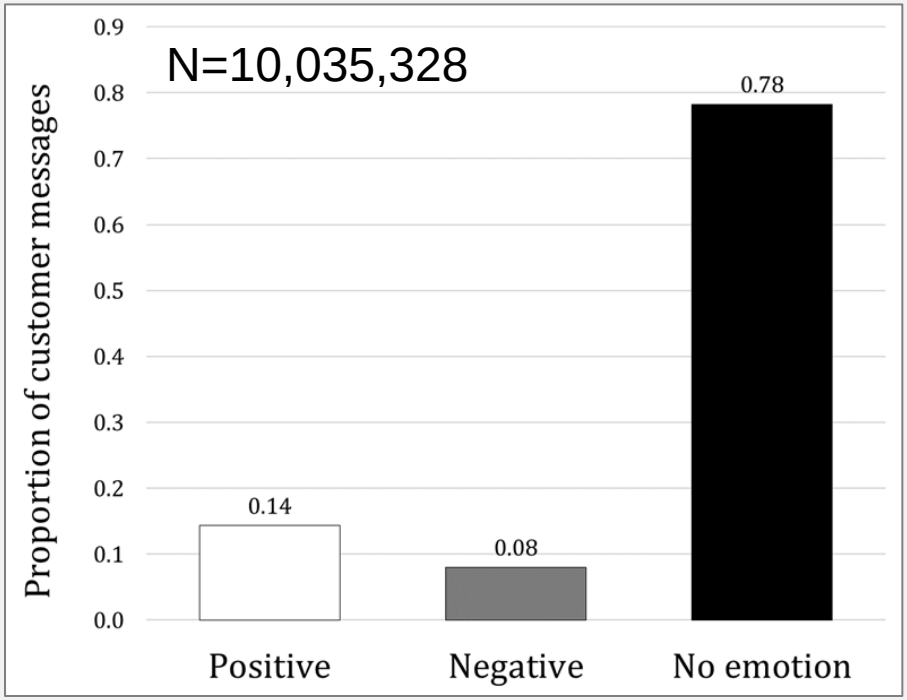
Hypothesis 1. *Customer emotions during interactions are dynamic, evolving from initial negative into more positive emotions*

- Service failure and recovery logic (e.g. DeWitt et al. 2008; Casidy & Shin, 2015)

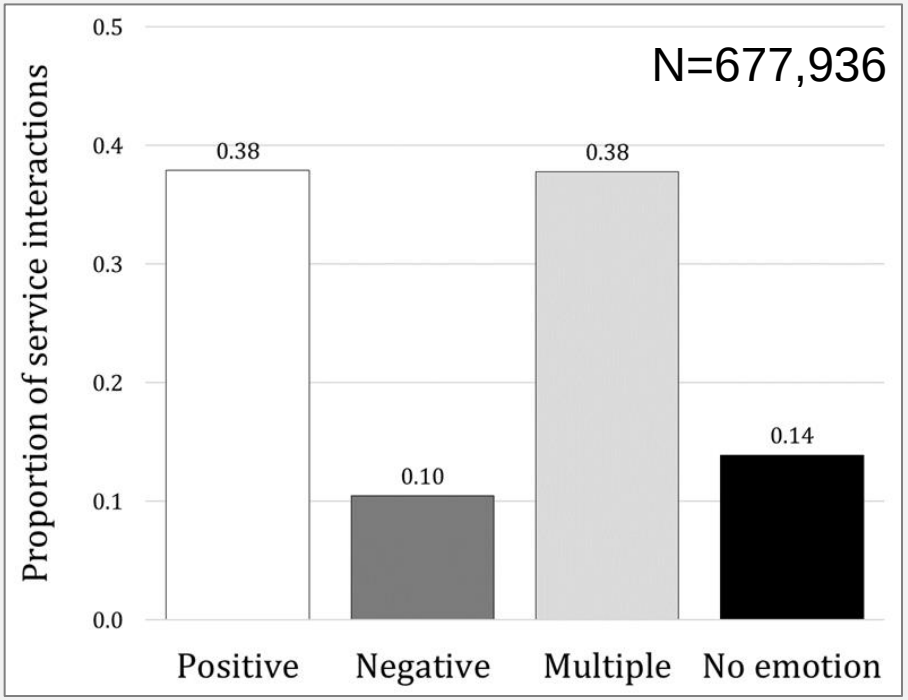
Hypothesis 2. *The magnitude of change in emotion from negative to positive reflects service quality*

Findings

CUSTOMER EMOTION TYPE AND FREQUENCY



Frequency of emotion in customer messages

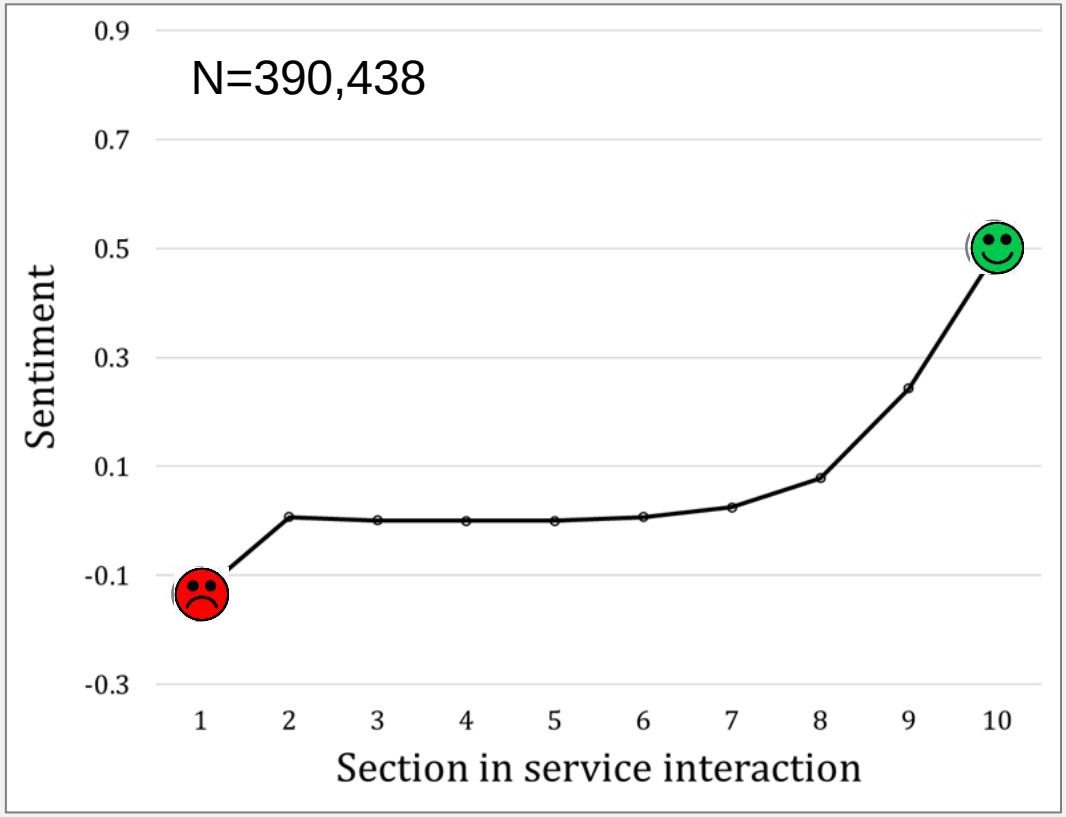


Frequency of emotion in full service interactions

Findings

CUSTOMER EMOTION DYNAMICS

Hypothesis 1



Paired sample t-test:
$M_{difference}$=0.63,
t(390437)=450.52,
p<0.001

Single sample t-test:
t(390437)=-138.72,
p<0.001

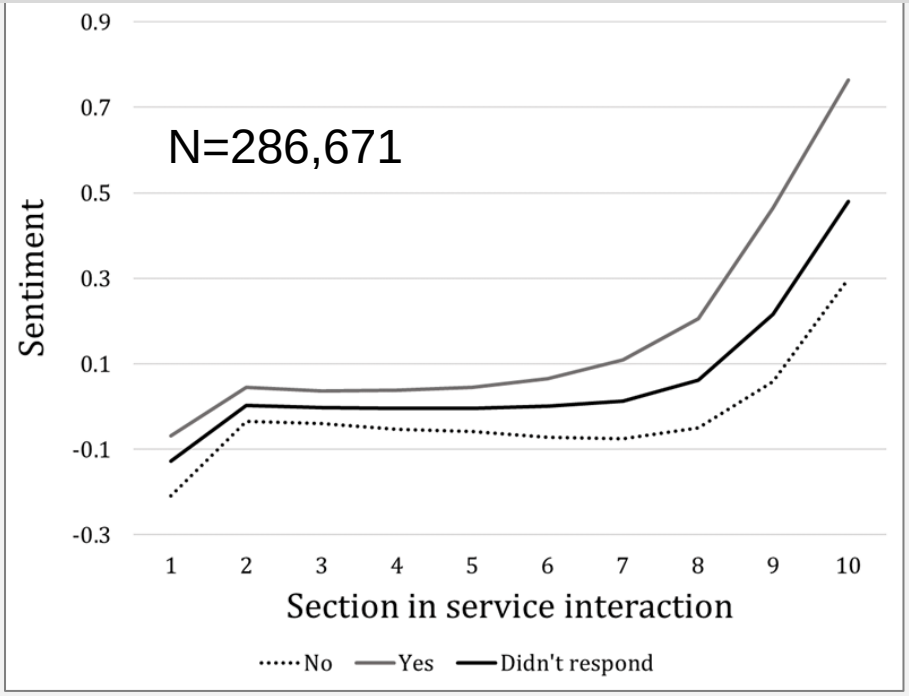
t(390437)=458.5,
p<0.001

Findings

CUSTOMER EMOTION DYNAMICS & SERVICE QUALITY

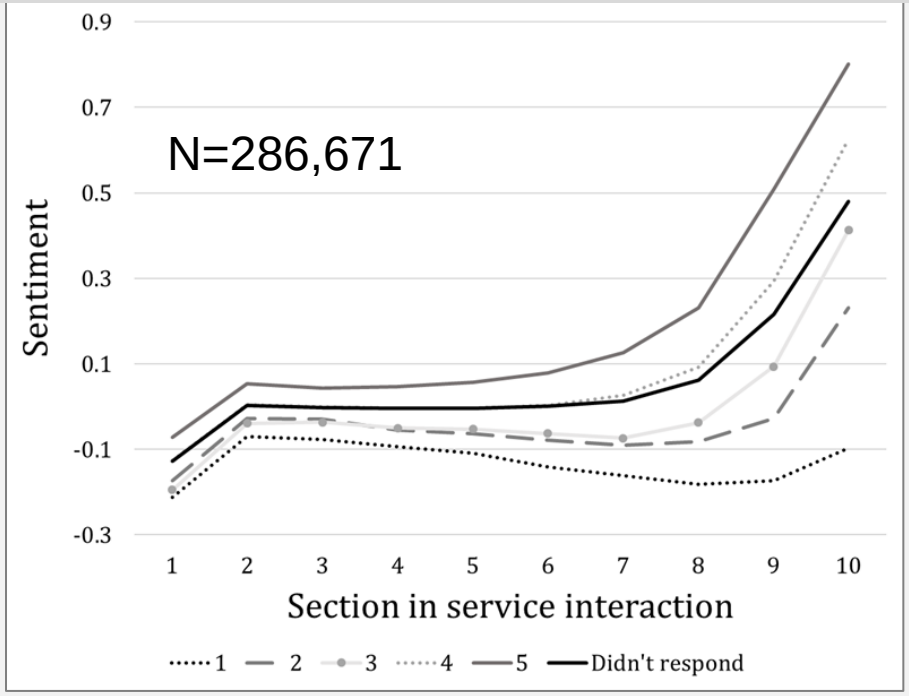
Hypothesis 2

$\chi 2(10)=28481.386$, $p<0.001$



Sentiment in different sections by Service Recovery response

$\chi 2(10)=44725.318$, $p<.001$



Sentiment in different sections by CSAT response

CONTRIBUTIONS

I. Theoretical contributions
   - Understanding meaning and trends of customer emotion dynamics in chat

II. Methodological contributions
   - Introducing a service-adapted sentiment analysis tool

III. Managerial contributions
   - Enabling prevention of customer dissatisfaction and service failures

LIMITATIONS AND FUTURE RESEARCH

- Model accuracy
- Detection of employee emotion
  - Emotional labor (Rafaeli & Sutton, 1987)
- Integration of other aspects of customer behavior
  - key strokes, customer engagement history
- Customer emotion and employee performance
  - (Altman, 2017; Ashtar, 2017)

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