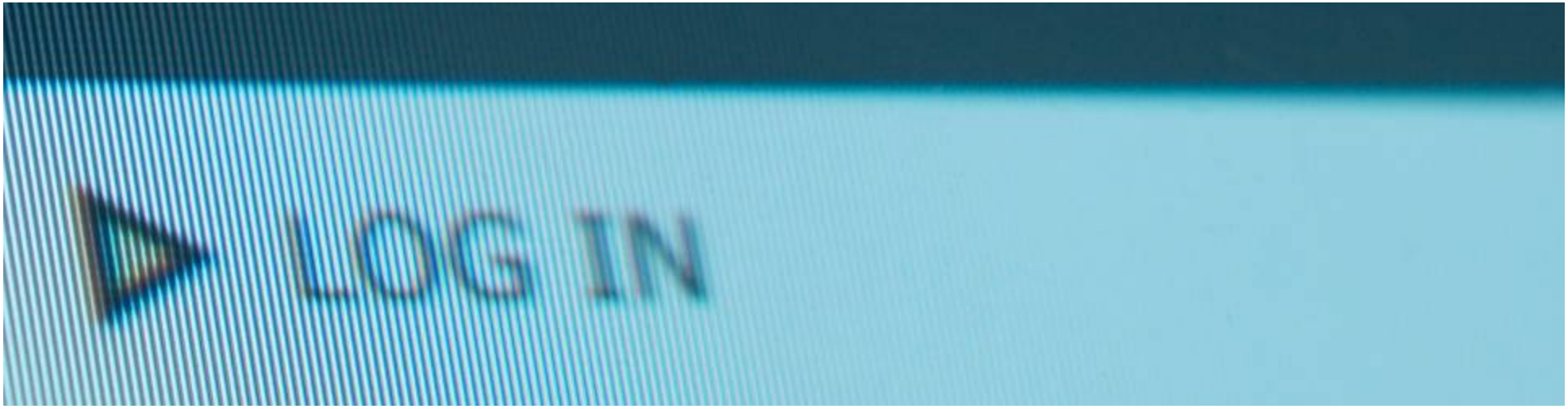
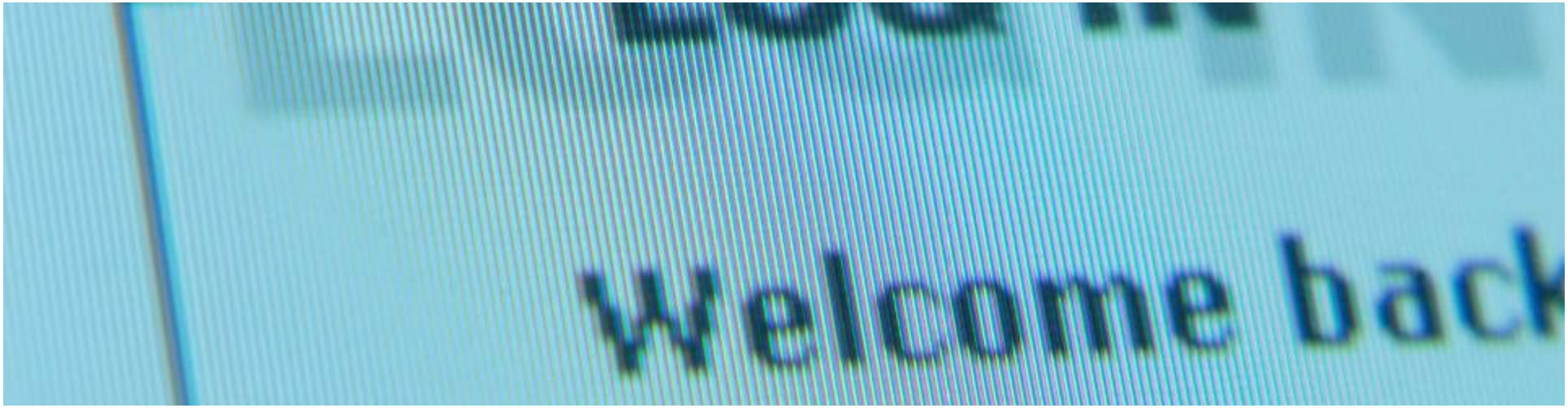
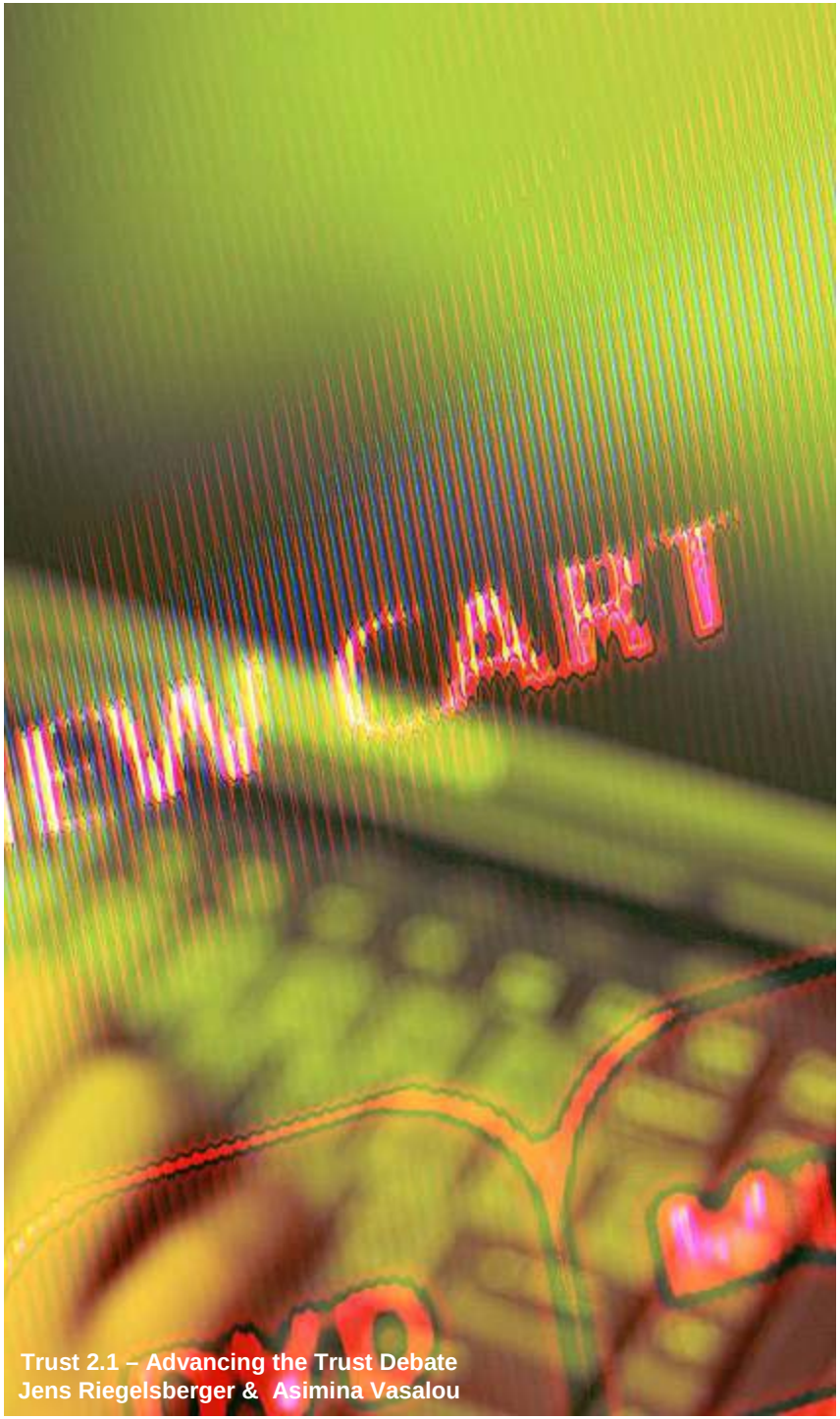


Trust 2.1 –
Advancing the trust debate

Jens Riegelsberger
Google

Mina Vasalou
Imperial College London





Trust Debate in HCI

- **CSCW 06 Workshop**– organised by Quiping Zhang, John C. Thomas, Dianne Cyr, S. Joon Park
- **CHI 06 Workshop** – organised by Jens Riegelsberger, Asimina Vasalou, Philip Bonhard, Anne Adams
- **IJHCS special issue 2003 –** edited by Susan Wiedenbeck, Cynthia Corritore, Beverly Kracher
- **CHI 2002 SIG** – edited by Susan Wiedenbeck, Cynthia Corritore, Beverly Kracher
- **Communications of the ACM Special Issue 2000**- edited by Andrew Rosenbloom
- … and numerous edited books and monographs as well as articles in magazines and popular press

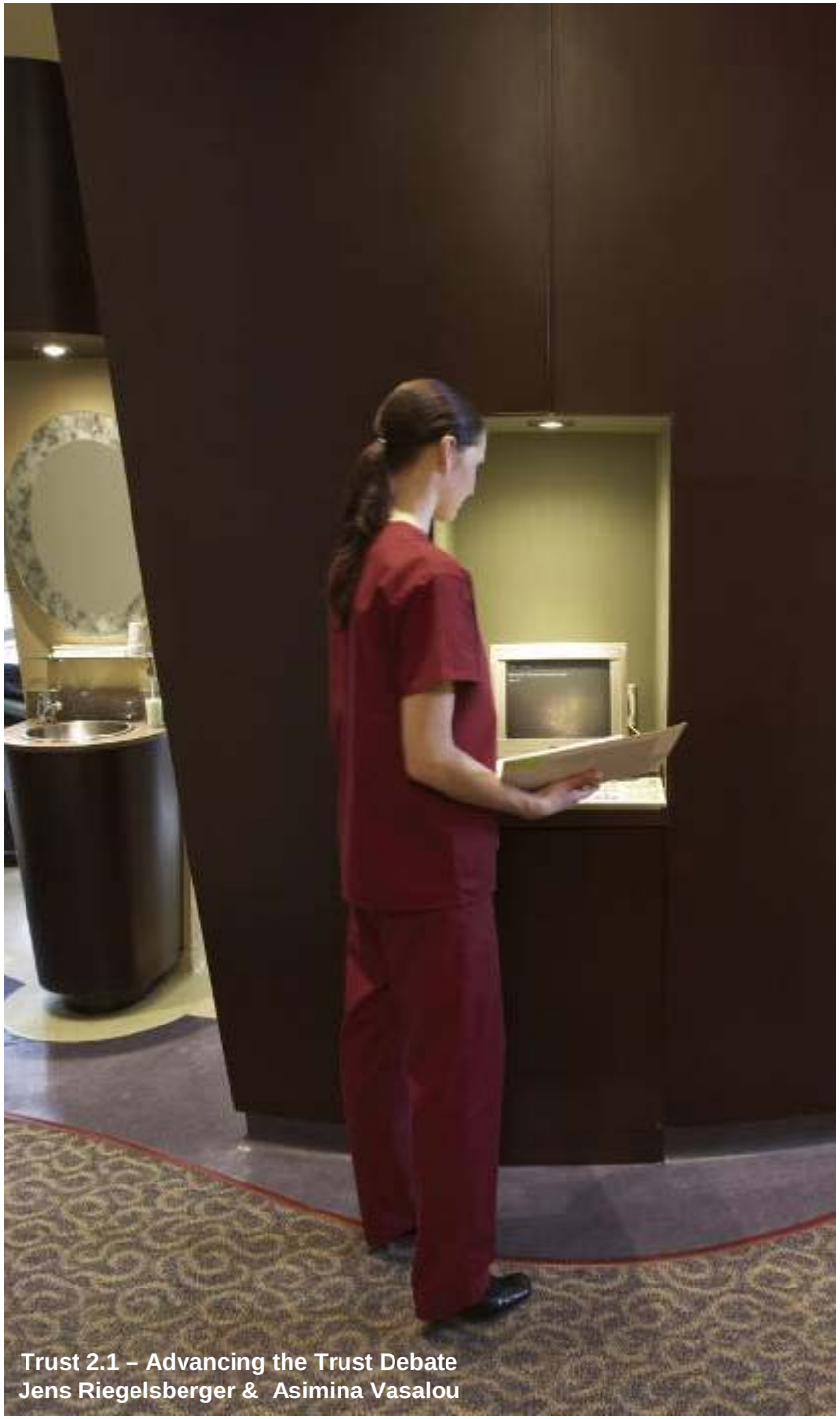
Trust debate

Diverse approaches in terms of:

- Disciplinary background
- Definitions
- Methods
- Objects of trust
  (e.g. websites, agents, protocols, companies, individuals)
- Risks

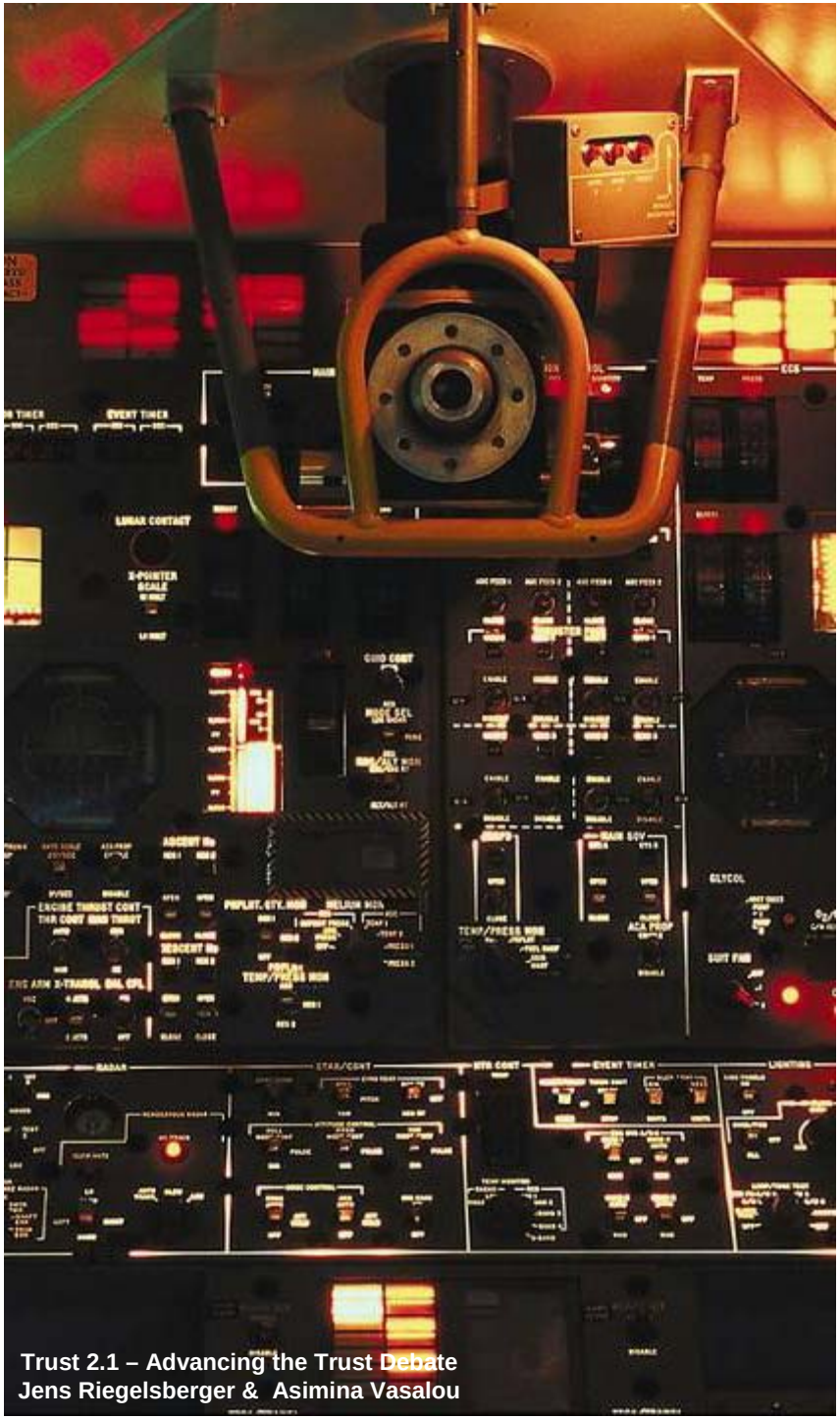
Trust debate

- Changing focus over time
  (e.g. in e-commerce: safety of transactions to phishing)
- Any situation is embedded in a web of multiple trust relationships and risks



Aims of this SIG

- **Review** existing models and approaches and their applicability
- **Build** a framework to achieve common ground on objects and risks
- **Discuss** goals of trust research and related ethical considerations



Trust 2.1 – Advancing the Trust Debate
Jens Riegelsberger & Asimina Vasalou

- **Nathan Bos**
  Chemical signals and attributions
- **Cindy Corritore**
  Trust in informational websites
- **Sonja Grabner-Kraeuter**
  Trust in Marketing Research
- **Amjad Hanif**
  eBay Reputation System
- **Ponnurangam Kumaraguru**
  Phishing
- **Gary Olson**
- **Jens Riegelsberger**
  A framework for trust in CMC
- **John Thomas**
  Trust and the Myth of a unified agent
- **BJ Fogg**

New developments in long-distance trust

Nathan Bos, for CHI 2007 workshop on trust

1. Chemical signals and trust
2. Perception of distance affects attribution

Trust in long distance collaboration

- Why is trust is harder to achieve at a distance?
- Working assumption has been that the *thin information channels* of computer-mediated communications are what makes trust difficult at a distance
- Two new developments suggests there is more to it

Oxytocin affects trust

- Intranasal administration of neuropeptide oxytocin increases trust
  - Oxytocin is a associated with pair bonding and infant attachment
- Subjects were more trusting and trustworthy in a well-established trust game
  - Did not lead to general increase in risk behavior
- What does this mean for videoconferencing?

Kosfeld, M., Heinrichs, M., Zak, P.J., Fischbacher, U., & Fehr, E. (2005). Oxytocin increases trust in humans. Nature 435 (2), 673-677.

Perceptions of distance affects trust

- Previous research has shown that at long distance people make different attributions (Cramton) and pay less attention to others
- Recent experiments show that people viewing the same information but told they are watching events at a distance make different attributions and perceive fewer distinctions

Henderson, M.D., Fujita, K., Trope, Y., & Liberman, N. (2006). Transcending the "Here": The Effect of Spatial Distance on Social Judgment. Journal of Personality and Social Psychology, 91 (5), 845-856.

What does this mean?

- Do these findings change the trust research agenda?

Online Trust

Cindy Corritore
Creighton University
Beverly Kracher
Creighton University
Susan Wiedenbeck
Drexel University
Robert Marble
Creighton University

CHI 2007
Look how far we have come.
Imagine how far we can go.
REACH BEYOND
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SIGCHI

the object of trust

- the website
  - research all over the board in different fields
    - don't address this explicitly
    - address it explicitly
- our focus: informational websites
  - eg. health information (WebMD)
- our basis
  - Kracher the philosopher
  - Reeves and Nass CASA (Computers as Social Actors)
- trusting parties
  - users

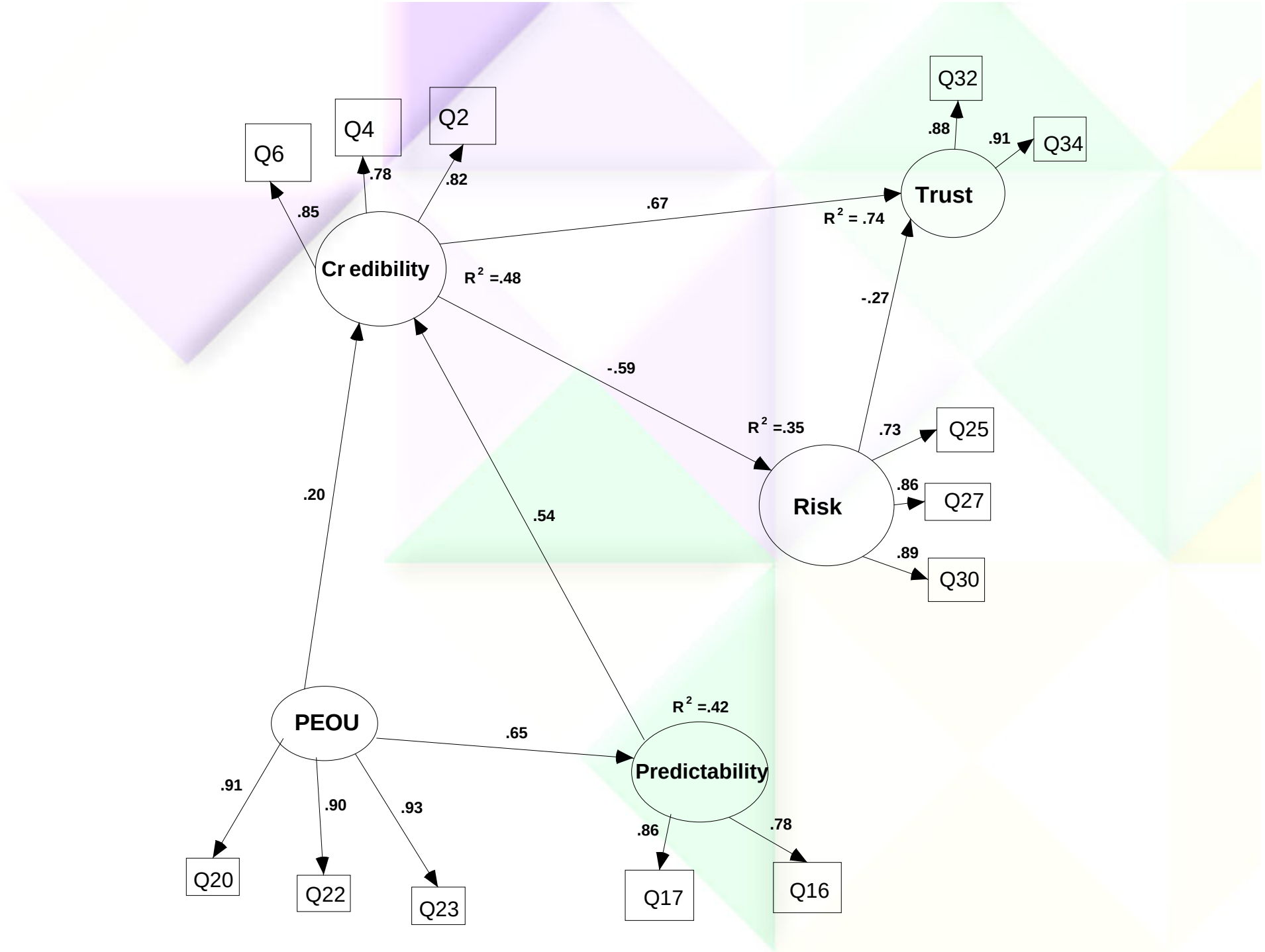
risks related to online trust

- model of high level online trust of a website
- risk is one of three constructs impacting trust that we study
  - perception of risk of using the website
- measured by three items:

1. I believe there could be negative consequences from using this website.
2. I feel I must be cautious when using this website.
3. It is risky to interact with this website.

current work

- examining online trust in the context of health promotion websites
  - well individuals seeking health information – diet, exercise, maintenance, etc.
  - methodology to have participants interact with a well-known website (WebMD), then evaluate their trust using a measurement instrument.
  - model we propose ….


Q6
Q4
Q2
Q32
Q34
.85
.78
.82
.88
.91
.67
Trust
R² = .74
Cr edibility
R² =.48
-.27
-.59
R² =.35
.73
Q25
Risk
.86
Q27
.89
Q30
.20
.54
PEOU
R² =.42
.65
Predictability
.91
.90
.93
.86
.78
Q20
Q22
Q23
Q17
Q16

next

- different environments ….
  - MMVW (massively multi-user virtual worlds)
  - others?

cindy@creighton.edu
susan.wiedenbeck@cis.drexel.edu

Trust in marketing research

- Growing importance of trust in marketing research
- Primary focus was on business-to-business relationships
  (e.g. Moorman et al. 1993; Morgan & Hunt 1994; Doney & Cannon 1997)
- Selected empirical studies with different objects of trust
  - Trust as important success factor in B2B-relationships (e.g. Moorman et al. 1993; Ganesan 1994; Plötner 1995; Doney & Cannon 1997)
  - Importance of customer satisfaction and trust in different customer segments (Garbarino & Johnson 1999)
  - Consumer trust in service provider (frontline employees and management policies and practices) (Sirdeshmukh et al. 2002)
  - Brand trust (Müller & Wünschmann 2004; Delgado-Ballester 2004; Matzler, Grabner-Kräuter & Bidmon 2006)
  - Consumer trust in distribution channels
    - Retailers and/or department stores (Bauer et al. 2006; Zentes et al. 2006)
    - Electronic commerce (e.g. Bart et al. 2005; Schlosser et al. 2006)

Risk in marketing research

- Different concepts of risk in the marketing and consumer behavior literature
  - Perceived risk
  - Risk aversion
  - Risk taking
- Dual conception of risk (e.g. Rousseau et al. 1998)
  - uncertainty of an outcome
    - System-specific and transaction-specific uncertainty (Grabner-Kräuter 2002)
  - importance of negative consequences associated with the outcome of a choice
- In the marketing literature uncertainty (unknown probability) and risk (known probability) are frequently used synonymously – problems of measurement (Mitchell 1999)
- Complex relationship between trust and risk (Mitchell 1999; Grabner-Kräuter and Kaluscha 2003; see also Cheung and Lee 2006 as an example in the IS literature)
  - risk is a precondition for the relevance of trust
  - trust reduces perceived risk
  - risk taking is a consequence of trust

Perceived risk in consumer behavior

- Perceived risk is a well-established concept in consumer behavior
  - Situational and personal construct that has been defined in several ways (Mitchell 1999)
  - Individual and cross-cultural differences (Harridge-March 2006; Mandrik & Bao 2005; Park and Jun 2003; Teo and Liu 2007)
- Dimensions of perceived risk
  - Financial, social, time, performance, psychological, and physical (Beardon and Mason 1978)
  - Two factors: a combined performance/financial/time risk factor and a psychological/social risk factor (Sweeney et al. 1999)
- Perceived risks of purchasing online, e.g. (Garbarino and Strahilevitz 2004)
  - Loss of privacy
  - Unauthorized use of credit card information
  - Purchasing from a fraudulent site
  - Having the product not perform as expected
  - Shipping and delivery problems
- Most frequently questionnaires with items for online risk perceptions are used (e.g. Schlosser et al. 2006; Bart et al. 2005; Park and Jun 2003)

Research interests

- Continued use of the Internet as transaction medium for high-involvement products and/or services
  - Different factors influence consumer adoption and continuance behavior (Eriksson and Nilsson 2007)
  - Asymmetrical effects of different dimensions of trust (Sirdeshmukh 2002; Cho 2006)
- Cross-cultural differences in depersonalized trust
  - Differences in risk perception?
  - Differences in trust inducing factors?
- Gender differences in bases for online trust
  - Men are more likely to make more risky decisions than women (Maddux and Brewer 2005; Byrnes et al. 1999)
  - Women perceive a higher level of risk in online purchasing than men (Garbarino and Strahilevitz 2004)
- Theoretical framework for the relationship between uncertainty, risk and trust

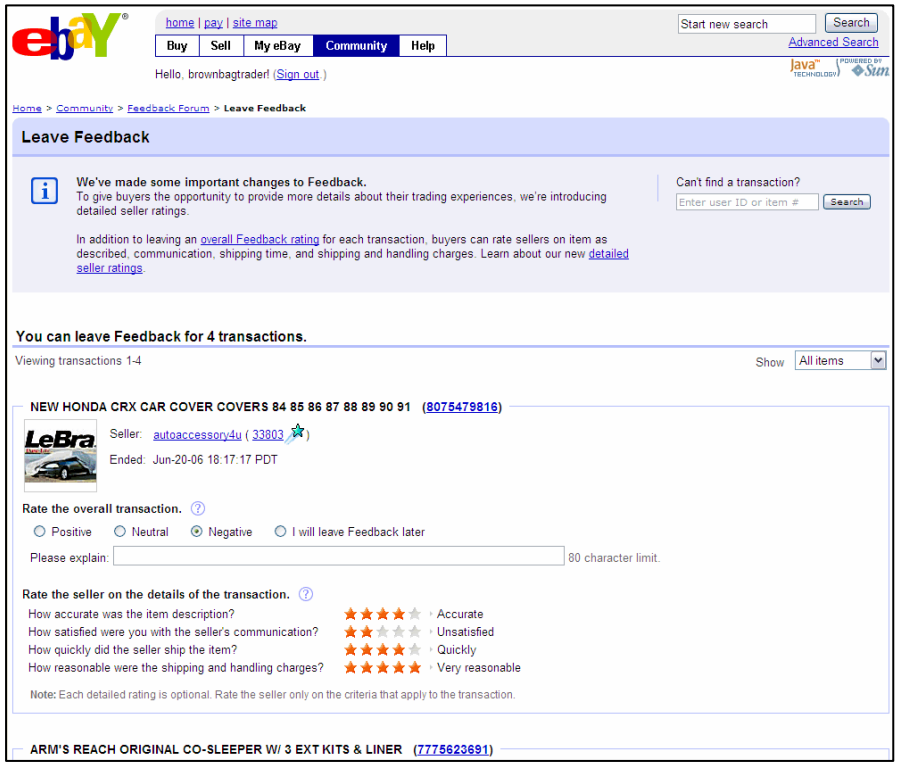
- Contact information: sonja.grabner@uni-klu.ac.at

Amjad Hanif – eBay Trust & Safety

- Focus on building “trust between strangers” to support commerce
- Feedback Forum was launched in 1996 to enable trade in marketplace
- Members are able to rate each other based on their performance
- Feedback score is one of the primary factors in trust on the site
- Over 5 billion ratings in system today with about 4 million left each day
- Interested in improving the accuracy of member ratings leading to better information for our community, and improved seller performance

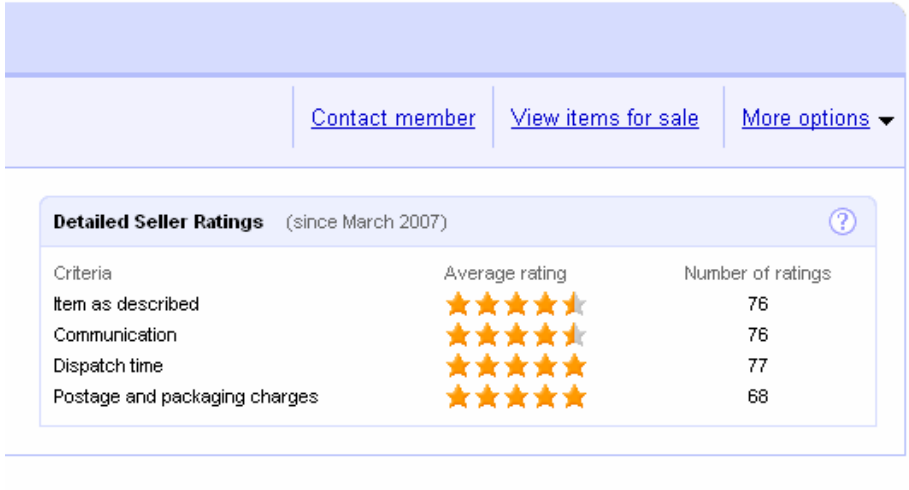
Recent Changes to Feedback

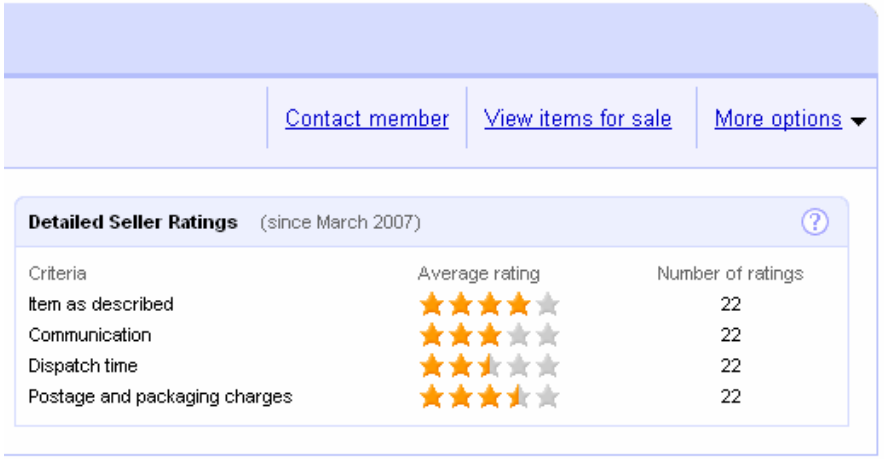
- Pilot was underway for last 8 weeks in selected countries
- Going live today in all countries
- Allows buyers to rate sellers on 4 specific of the transaction
- Unlike other feedback, ratings are not attributed to a specific buyer



Two Example Sellers

User Name:	Seller 1	Seller 2	Site Avg.
Positive Feedback %:	98.3%	98.1%	99%
Feedback Score:	226	101	-
Item as Described:	4.5	4.1	4.5
Communication:	4.7	2.5	4.4
Shipping time:	4.8	2.2	4.3
Shipping & Handling Charge:	4.8	3.5	4.3





Object of trust in phishing

AA27

- Phishing takes advantage of the way we assign meaning to the content

AA28

- Phishers make use of the trust that users (trustor) have on organizations (trustee)

AA29

- Victims falsely trust the fake emails to be from legitimate organizations

AA30

- Victims falsely trust the fraudulent websites as legitimate organizations

AA31

P. Kumaraguru, A. Acquisti, and L. Cranor. **Trust modeling for online transactions: A phishing scenario.** In Privacy Security Trust, Oct 30 - Nov 1, 2006, Ontario, Canada.

Risks in phishing

AA32

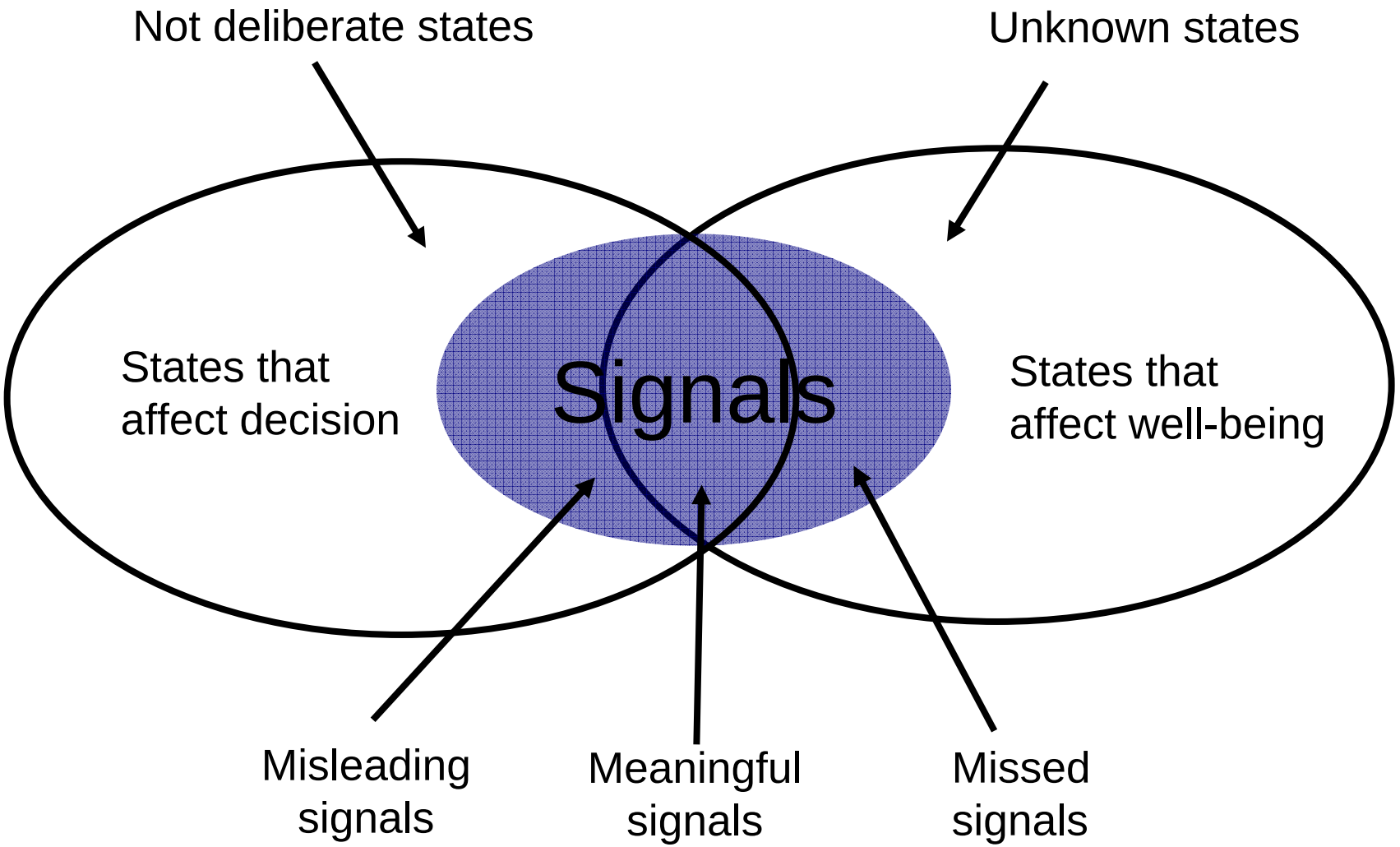
- Phishing is a growing concern among Internet users
- Cost involved

AA33

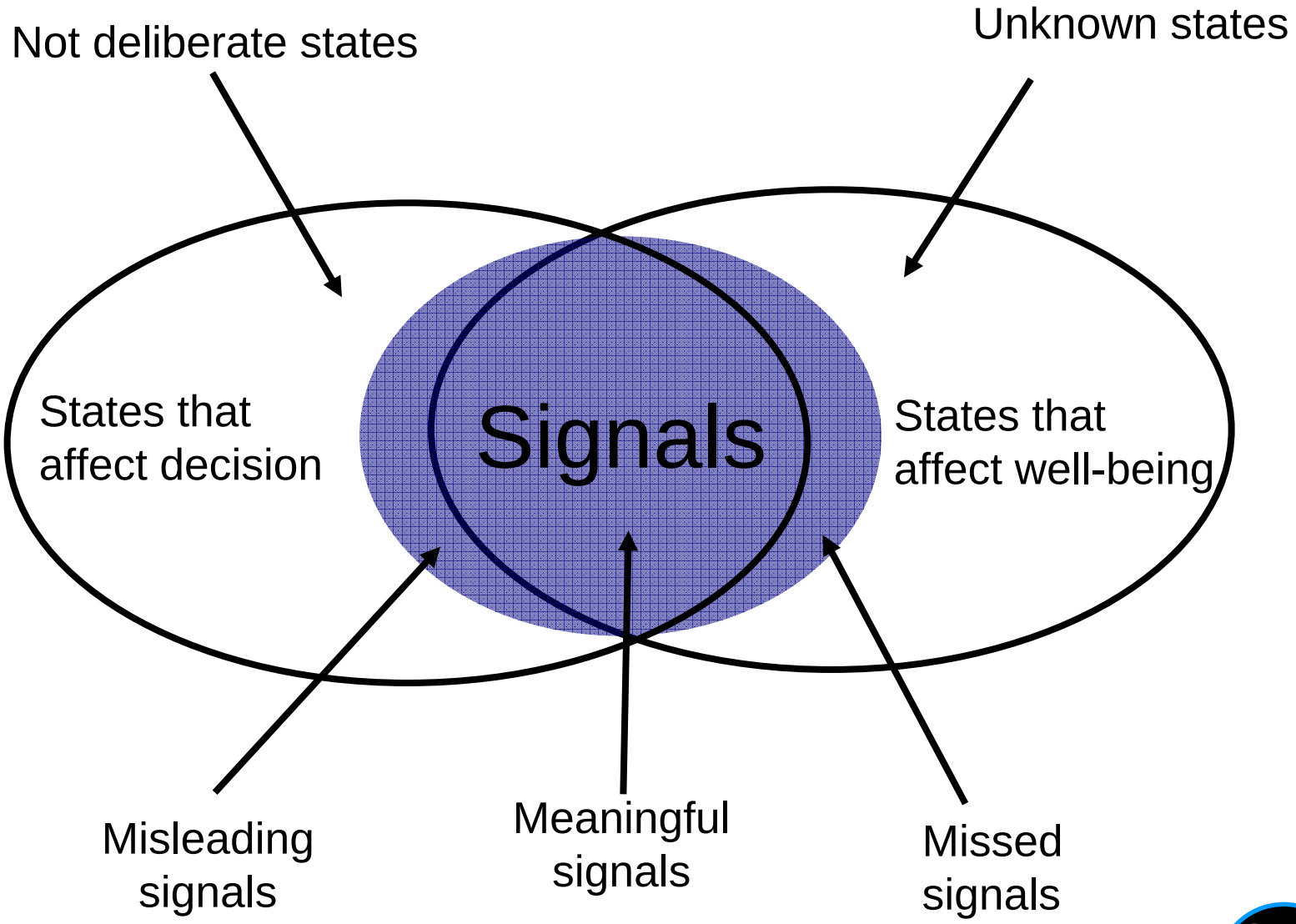
  - Direct cost: incurred due to phishing attack
  - Indirect cost: incurred due to increase in support calls and emotional stress for users
  - Opportunity cost: users refraining from using the Internet
- Important and hard problem to solve

Model representation

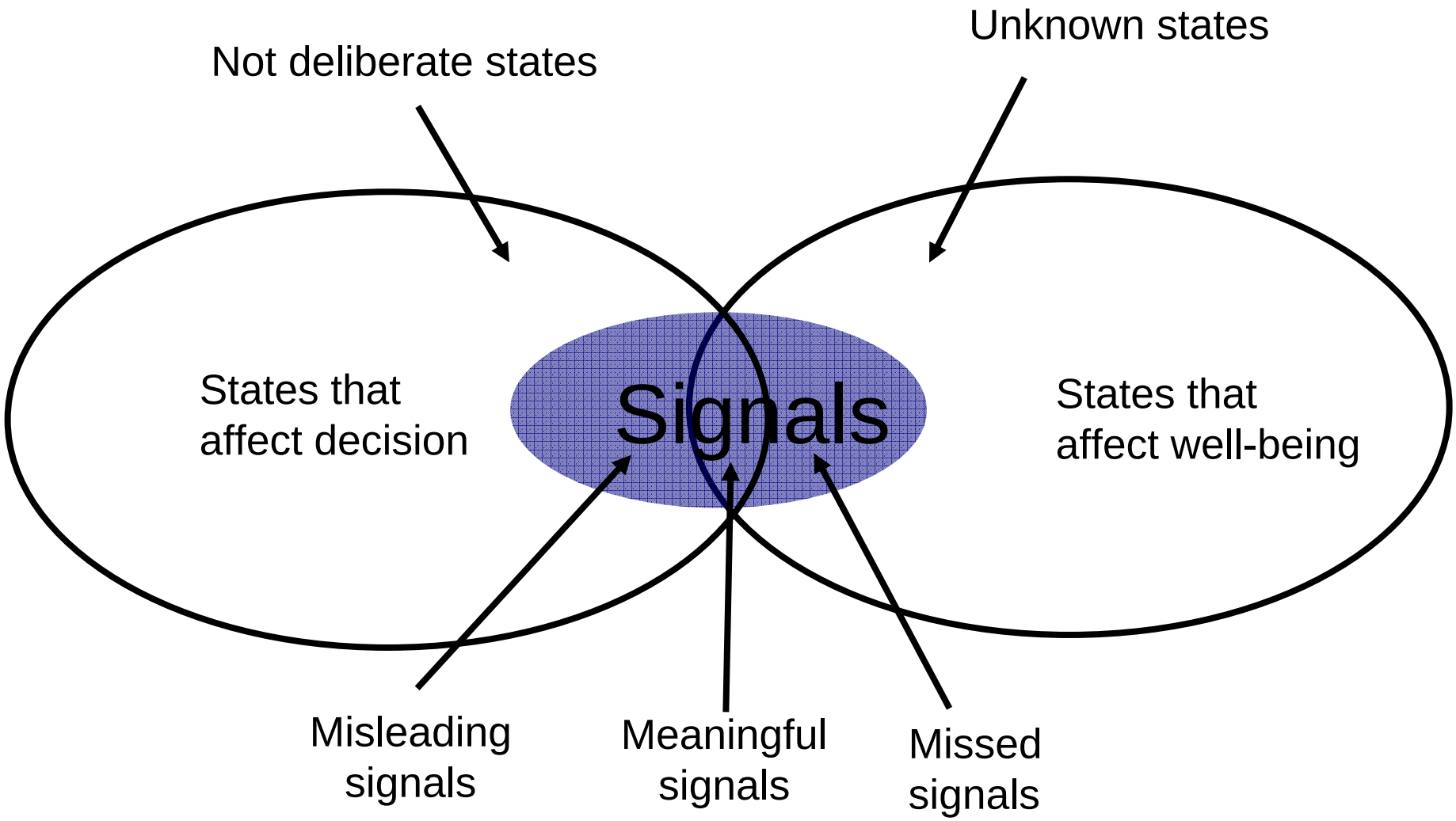
AA34



Expert model



Non-expert model



Experiment

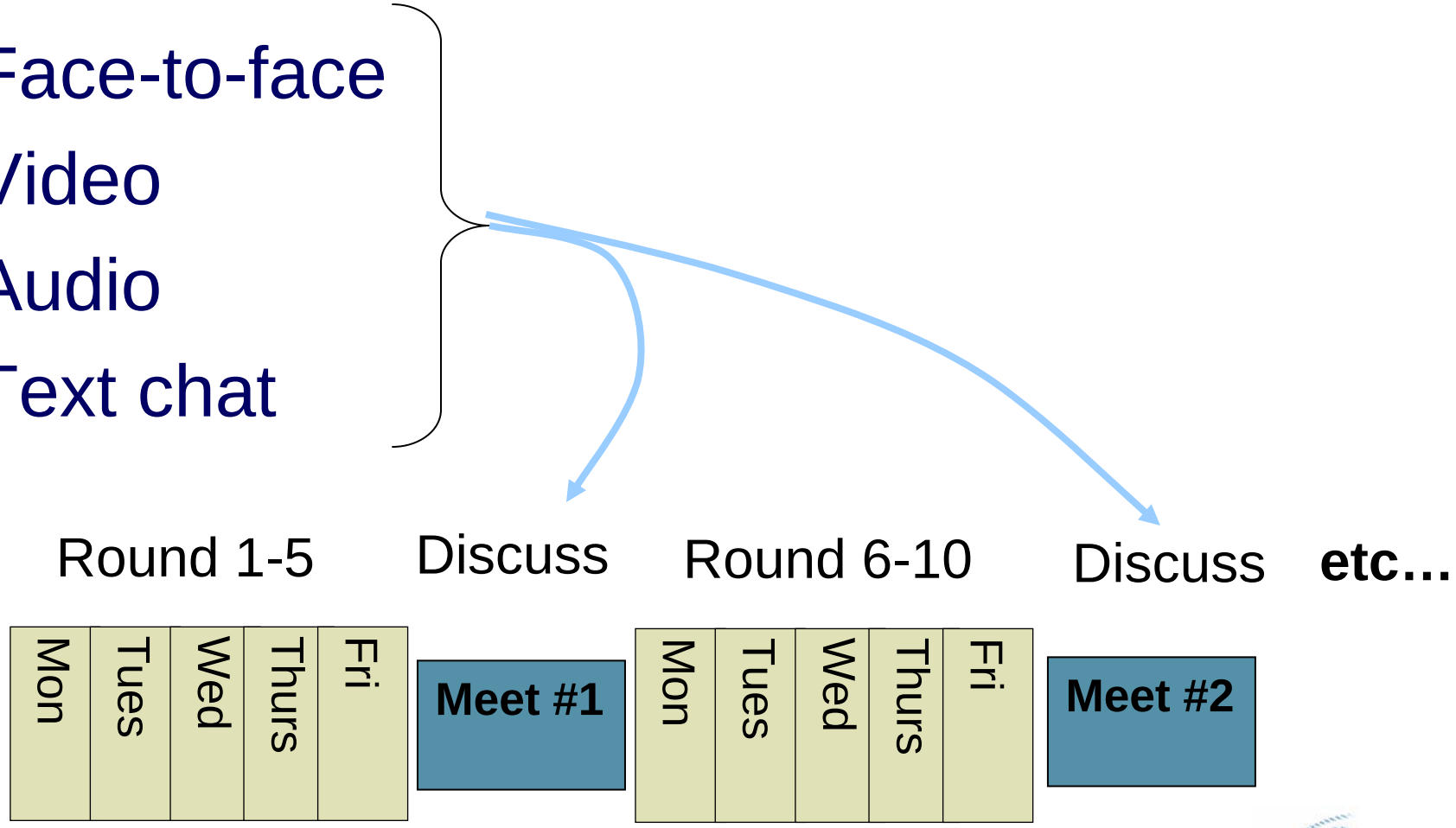
- Methodology
  - Interview study
  - Experts and non-experts
- Results
  - Significant difference between experts and non-experts in decision making
  - Non-experts would like to have tools / advice to help them make better trust decisions
- Need better understanding of trust decisions in phishing scenario to support users make better trust decisions

Interpersonal Trust at a Distance

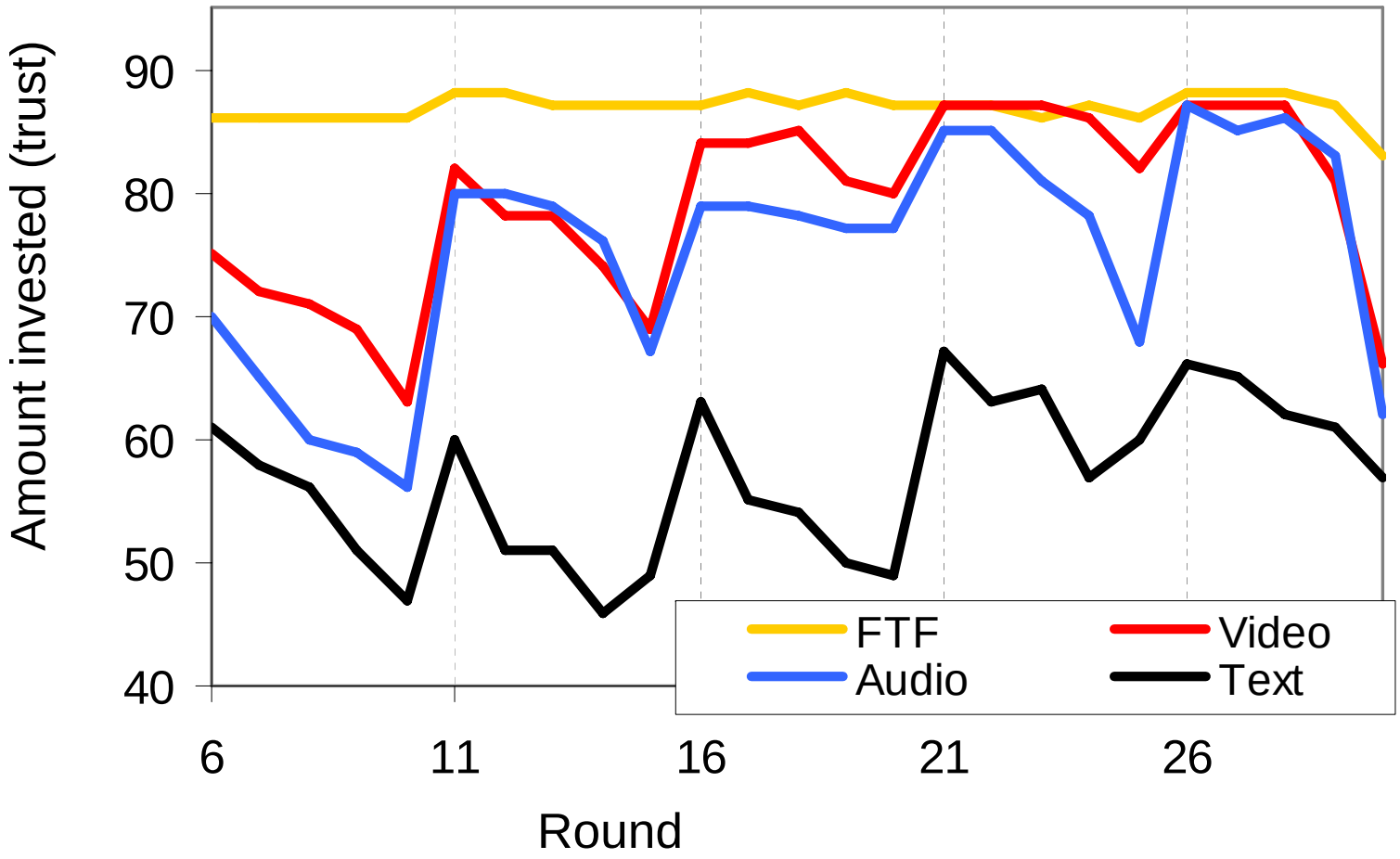
- What factors promote or impede the formation of trust when people are geographically distributed?
- Measure of trust – the extent to which people cooperate in a social dilemma game
  - Has been used widely in the field
  - Validated by other measures (e.g., questionnaires)
- Studies
  - Various media of interaction
  - Various activities prior to interaction

Different conditions for discussion

- Face-to-face
- Video
- Audio
- Text chat

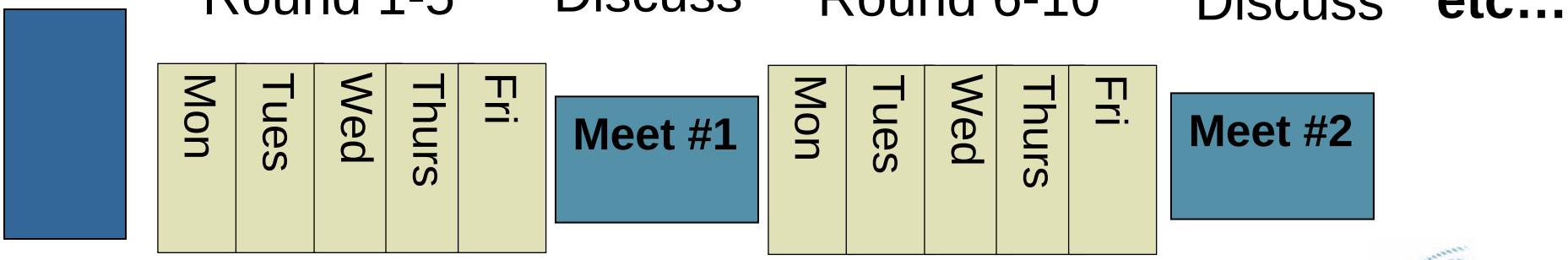


Results by round



Different conditions beforehand

- Face-to-face
- Social text chat
- Seeing a photo of the other person
- Seeing a brief resume of the other person
- Nothing



Objects of Trust

Empirical research

- User trust in e-commerce web sites
  [I3E 2001, CHI 2002, CHI 2003, Brit. HCI 2004]
- Users' ability to identify trustworthy web sites
  [CHI 2003, Brit. HCI 2004]
- Trust in online advisors
  [CHI 2005, Brit . HCI 2005]

Conceptual work

- Framework for Trust in Mediated Interactions
  [IJHCS 2005]

Risks in Online Interactions

Risks

> Financial Loss
(transaction, credit limit, credit history?)

> Waiting Times,

> Spam,

> ‘Hassle’

More uncertainty

> Inexperienced with decoding cues

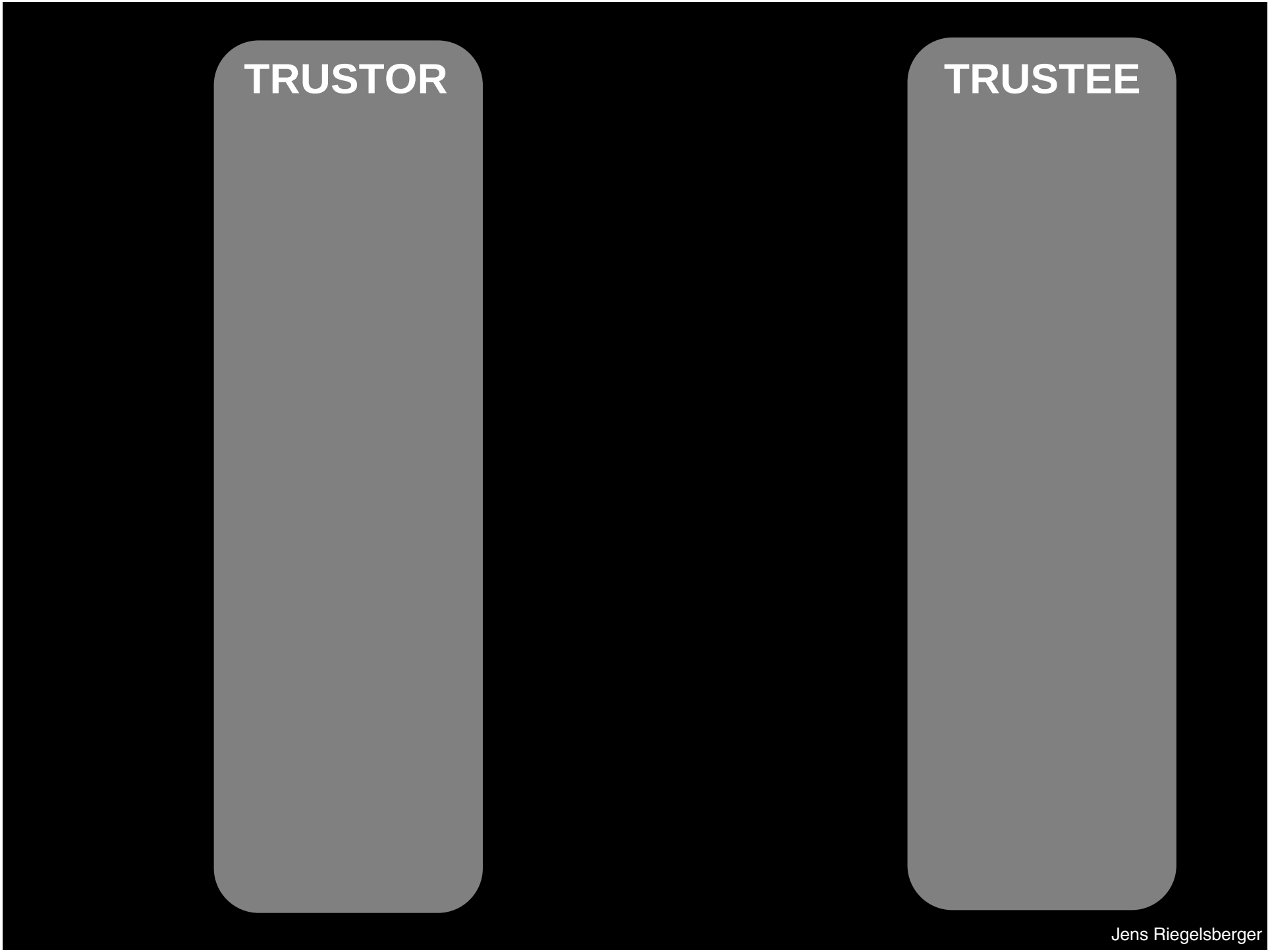
> Less surface cues are available

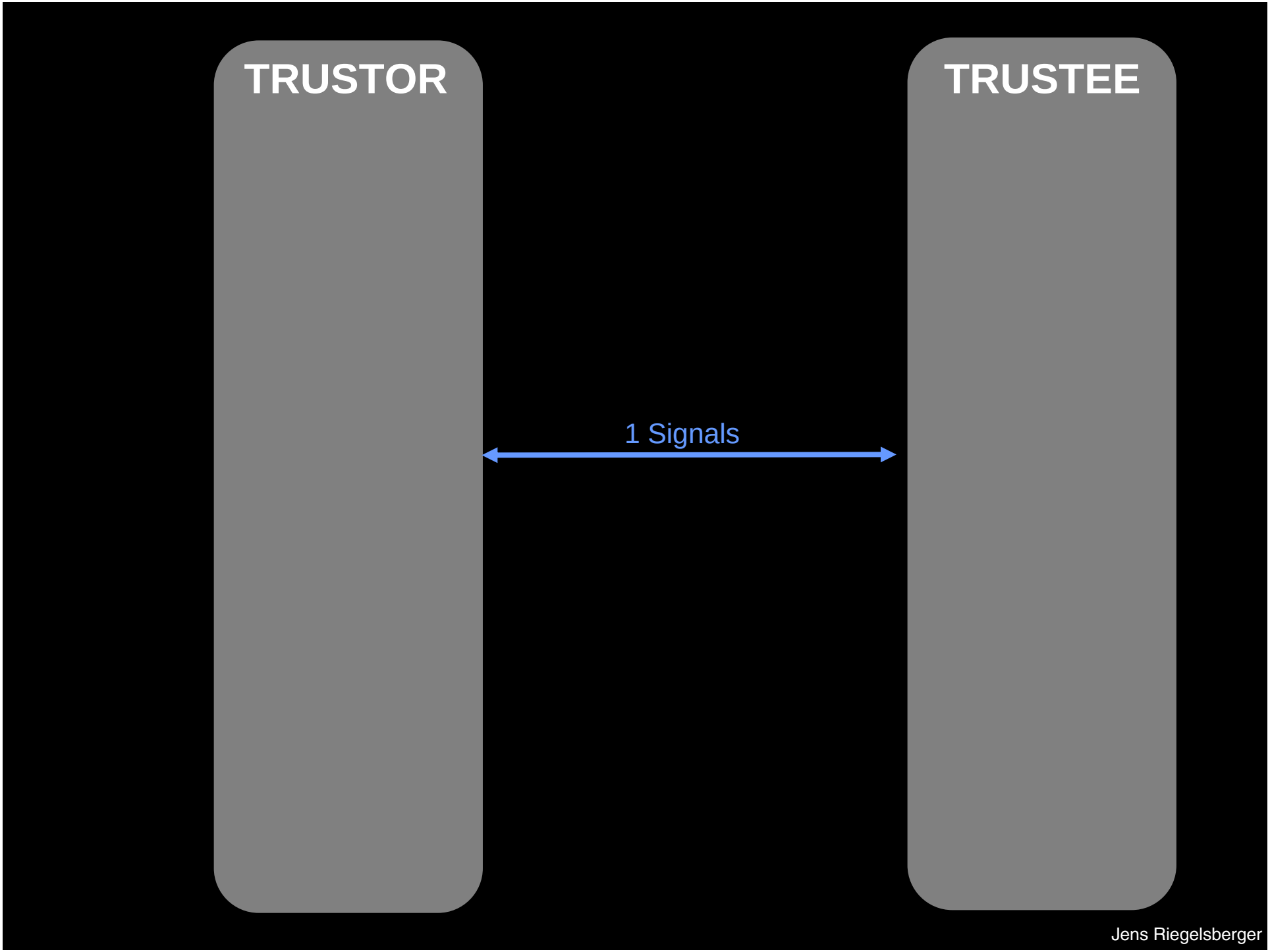
> Cues might have no significance
(“anyone could set up a good-looking site”)
Symbols vs. Symptoms

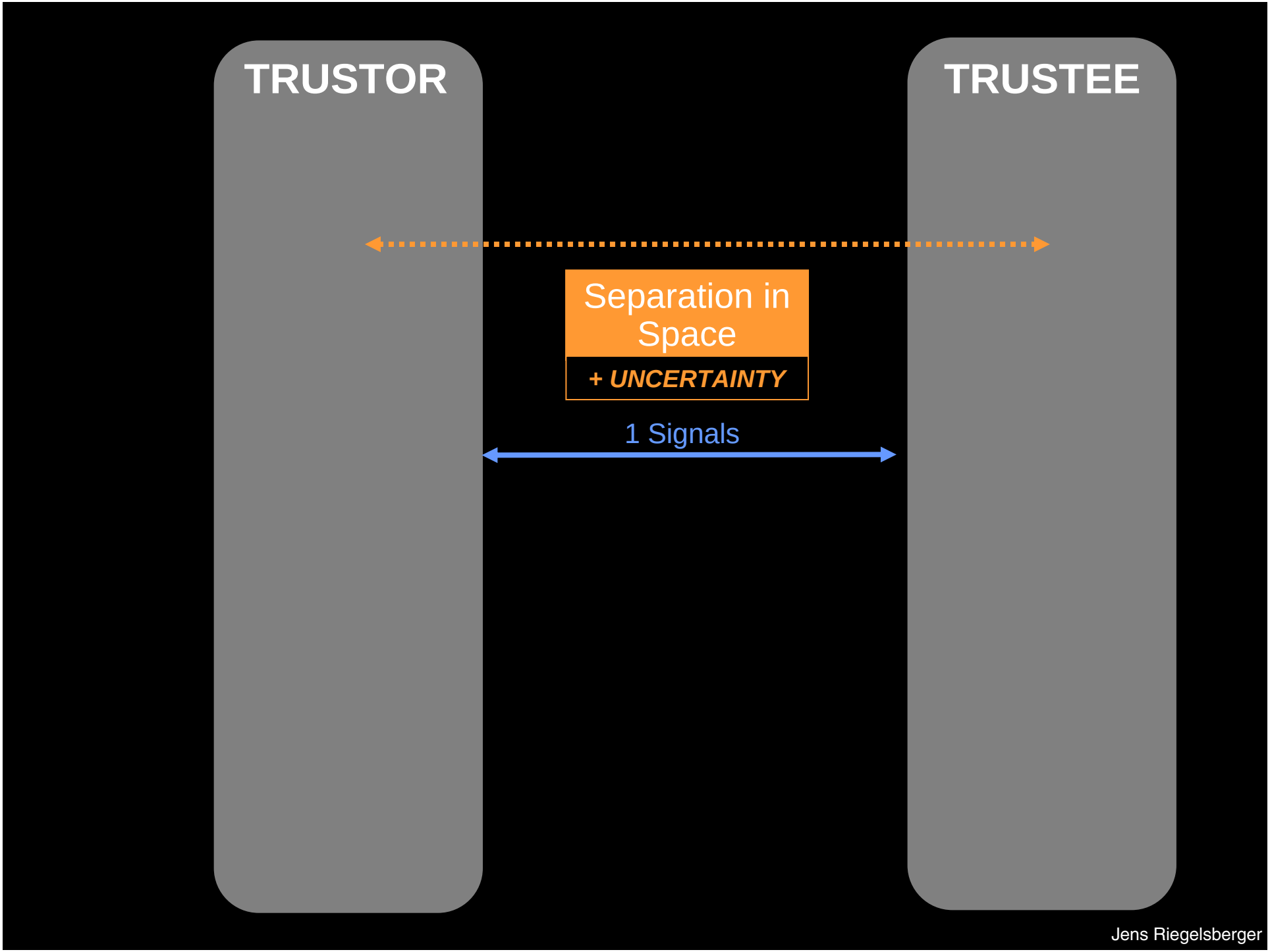
Dis-embedding

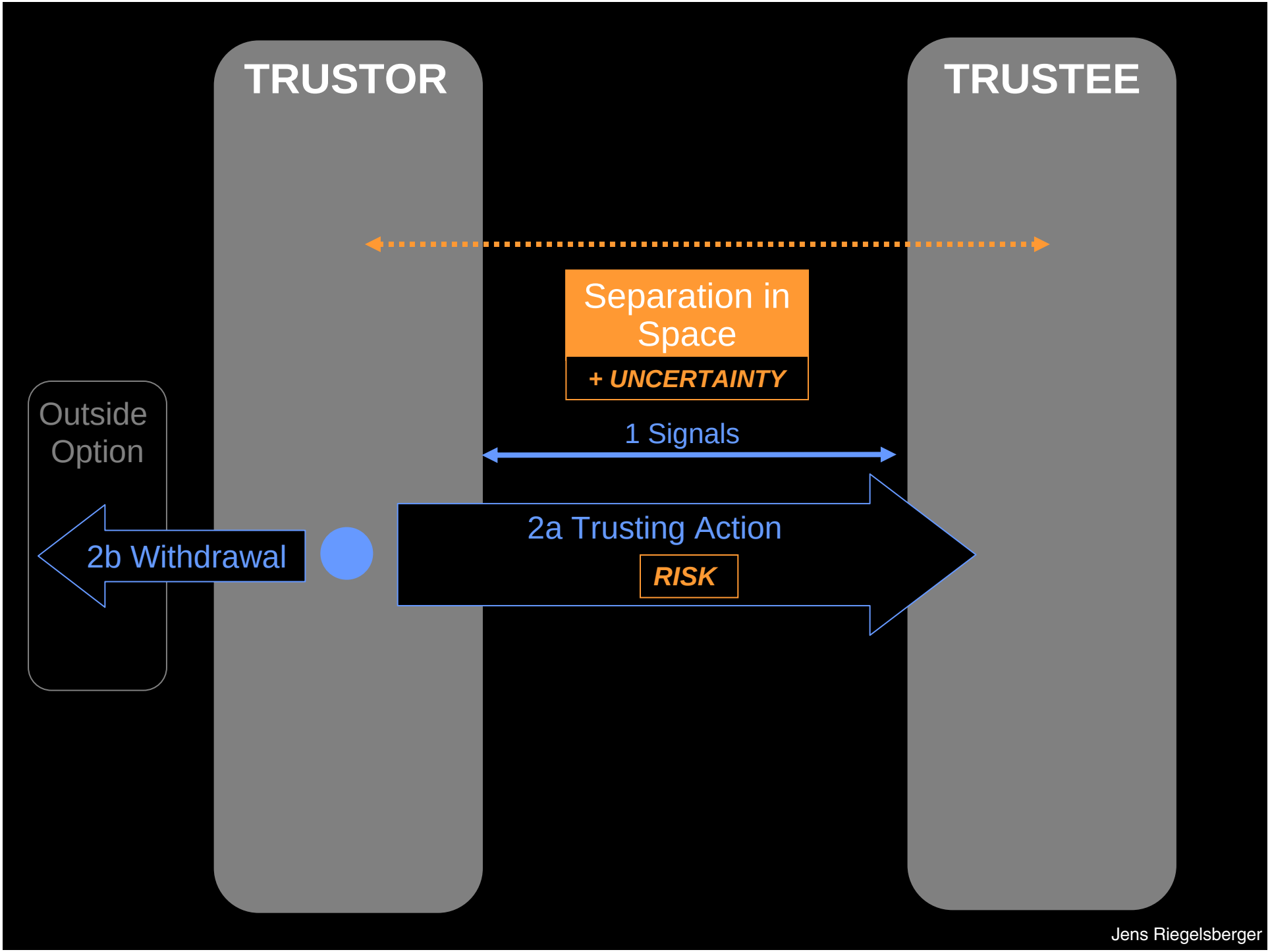
Interaction is stretched over time and space and involves complex socio-technical systems
[Giddens, 1990]

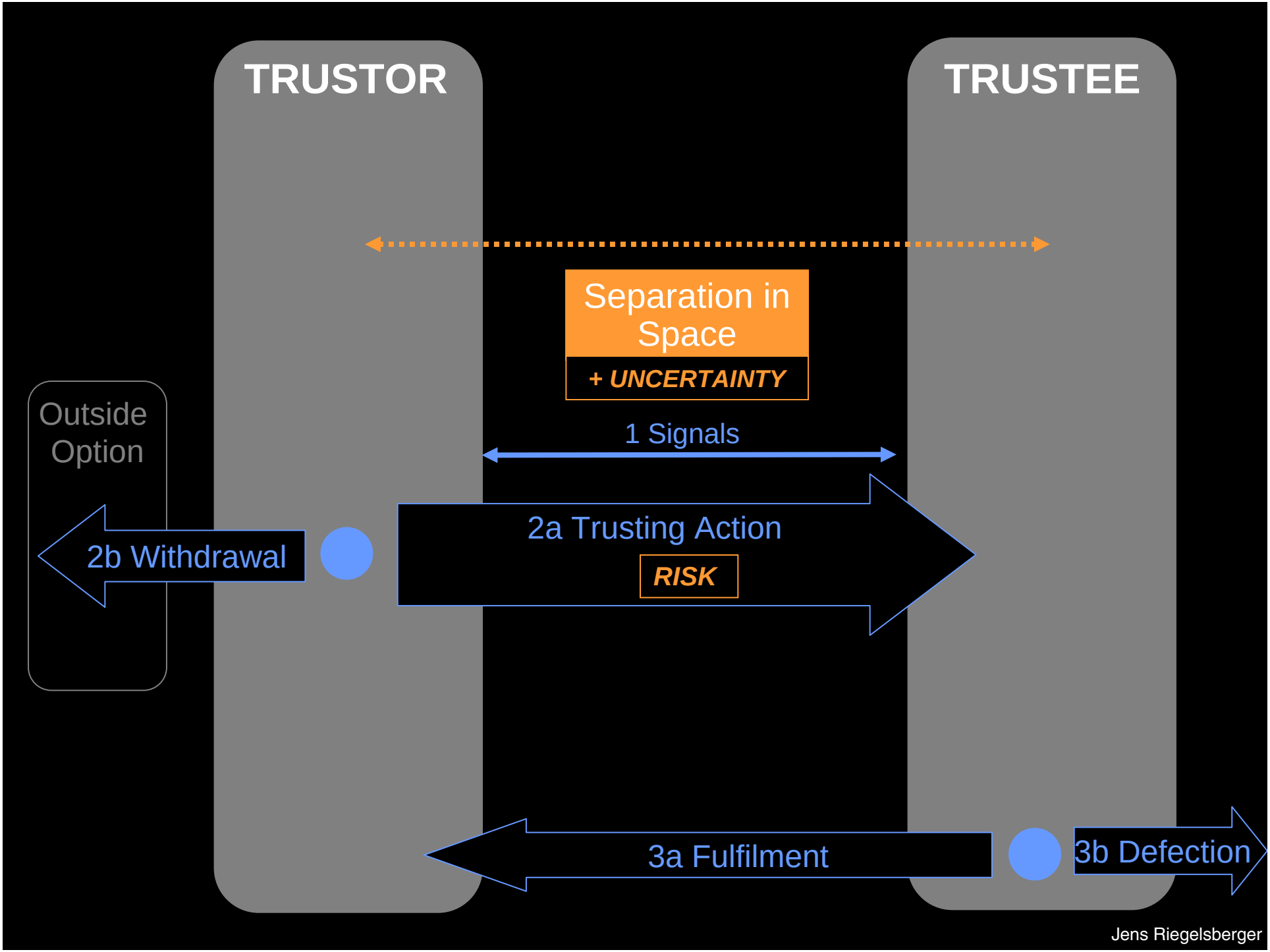
… pervasive in modern societies (e.g. catalogue shopping)

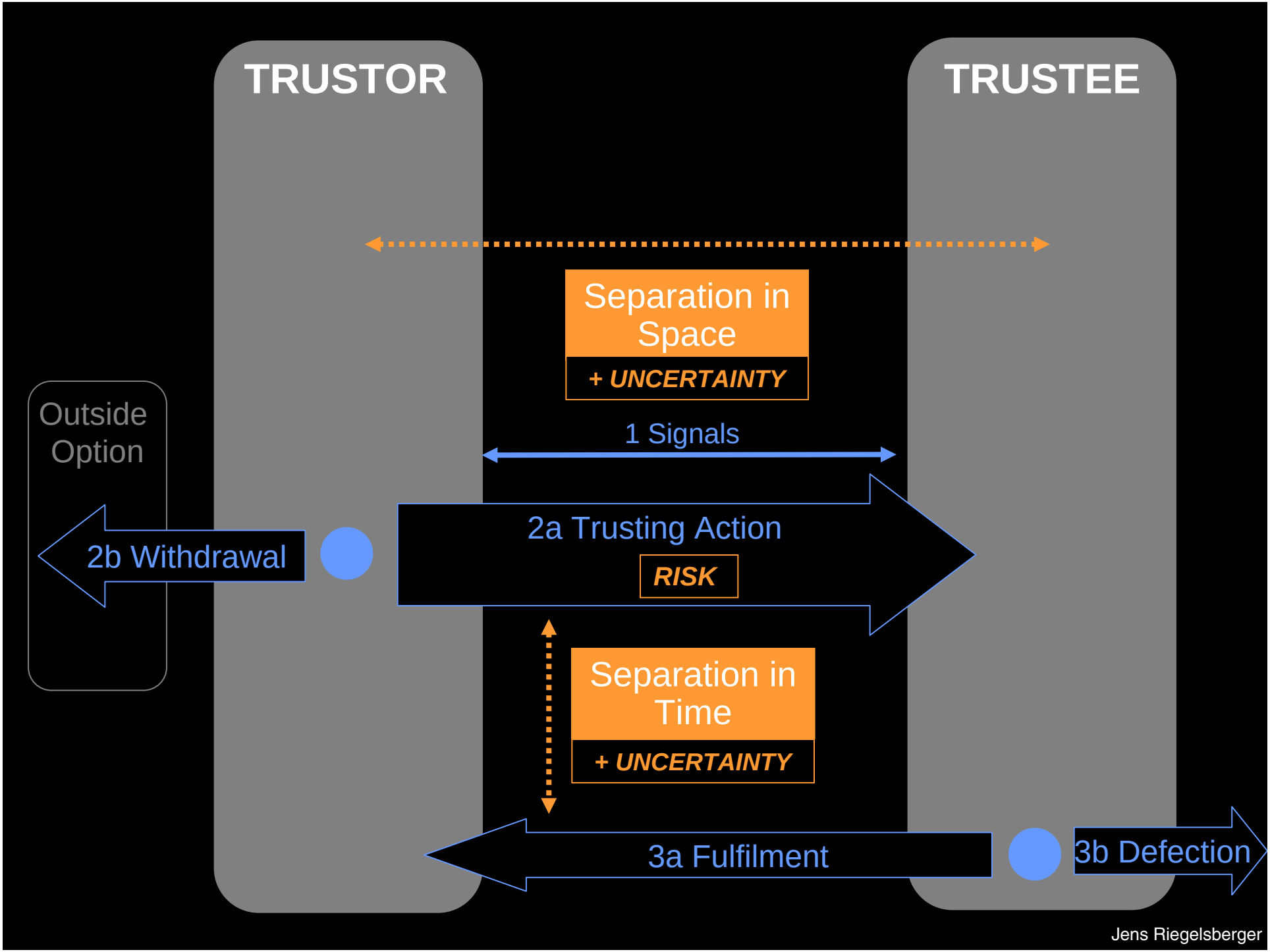

TRUSTOR
TRUSTEE
Jens Riegelsberger

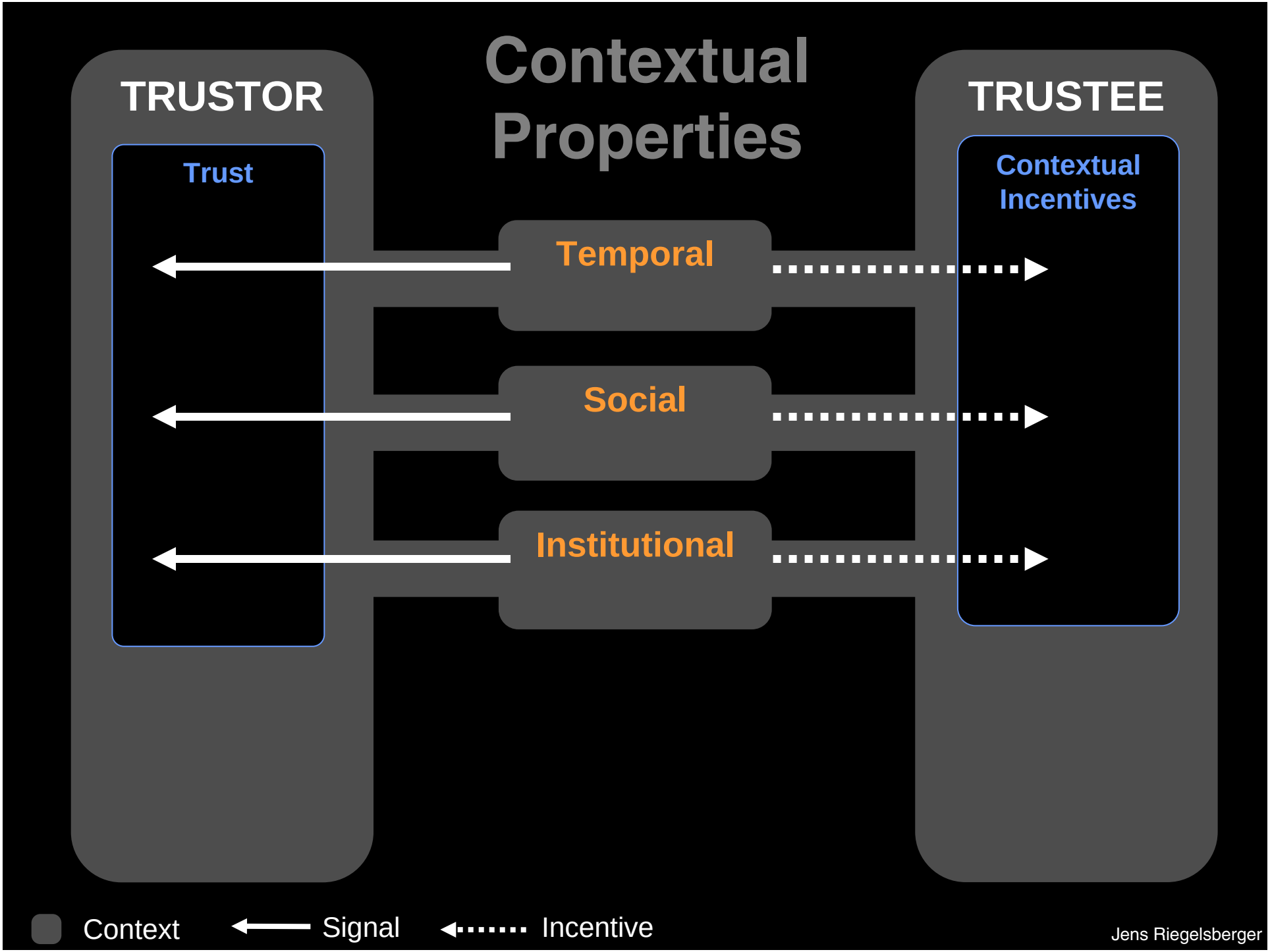

TRUSTOR
TRUSTEE
1 Signals
Jens Riegelsberger

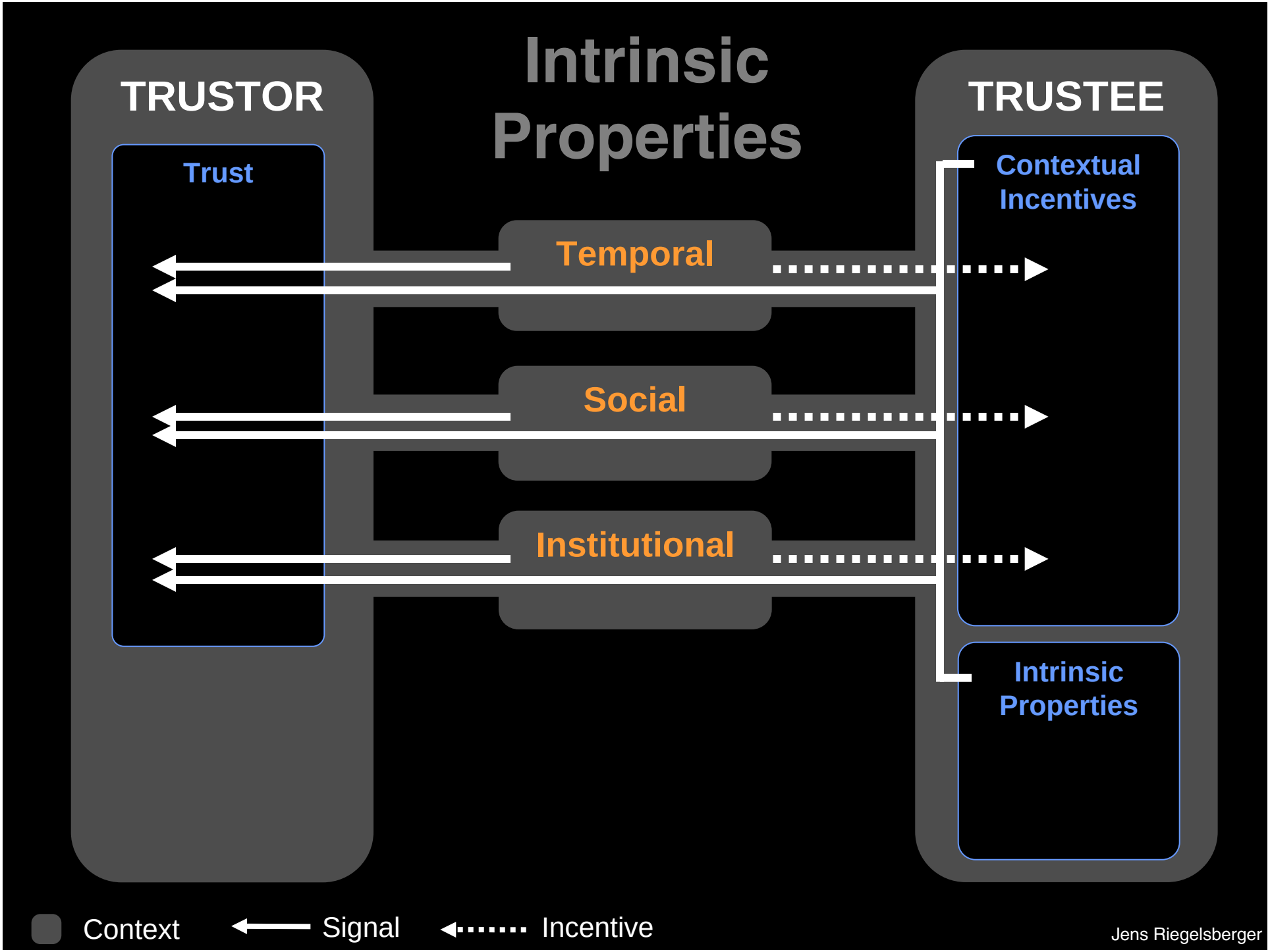

TRUSTOR
TRUSTEE
Separation in Space
+ UNCERTAINTY
1 Signals
Jens Riegelsberger


TRUSTOR
TRUSTEE
Separation in Space
+ UNCERTAINTY
Outside Option
1 Signals
2b Withdrawal
2a Trusting Action
RISK
Jens Riegelsberger


TRUSTOR
TRUSTEE
Separation in Space
+ UNCERTAINTY
Outside Option
1 Signals
2b Withdrawal
2a Trusting Action
RISK
3a Fulfilment
3b Defection
Jens Riegelsberger


TRUSTOR
TRUSTEE
Separation in Space
+ UNCERTAINTY
Outside Option
1 Signals
2b Withdrawal
2a Trusting Action
RISK
Separation in Time
+ UNCERTAINTY
3a Fulfilment
3b Defection
Jens Riegelsberger


Contextual Properties
TRUSTOR
Trust
TRUSTEE
Contextual Incentives
Temporal
Social
Institutional
Context
Signal
Incentive
Jens Riegelsberger


Intrinsic Properties
TRUSTOR
Trust
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Contextual Incentives
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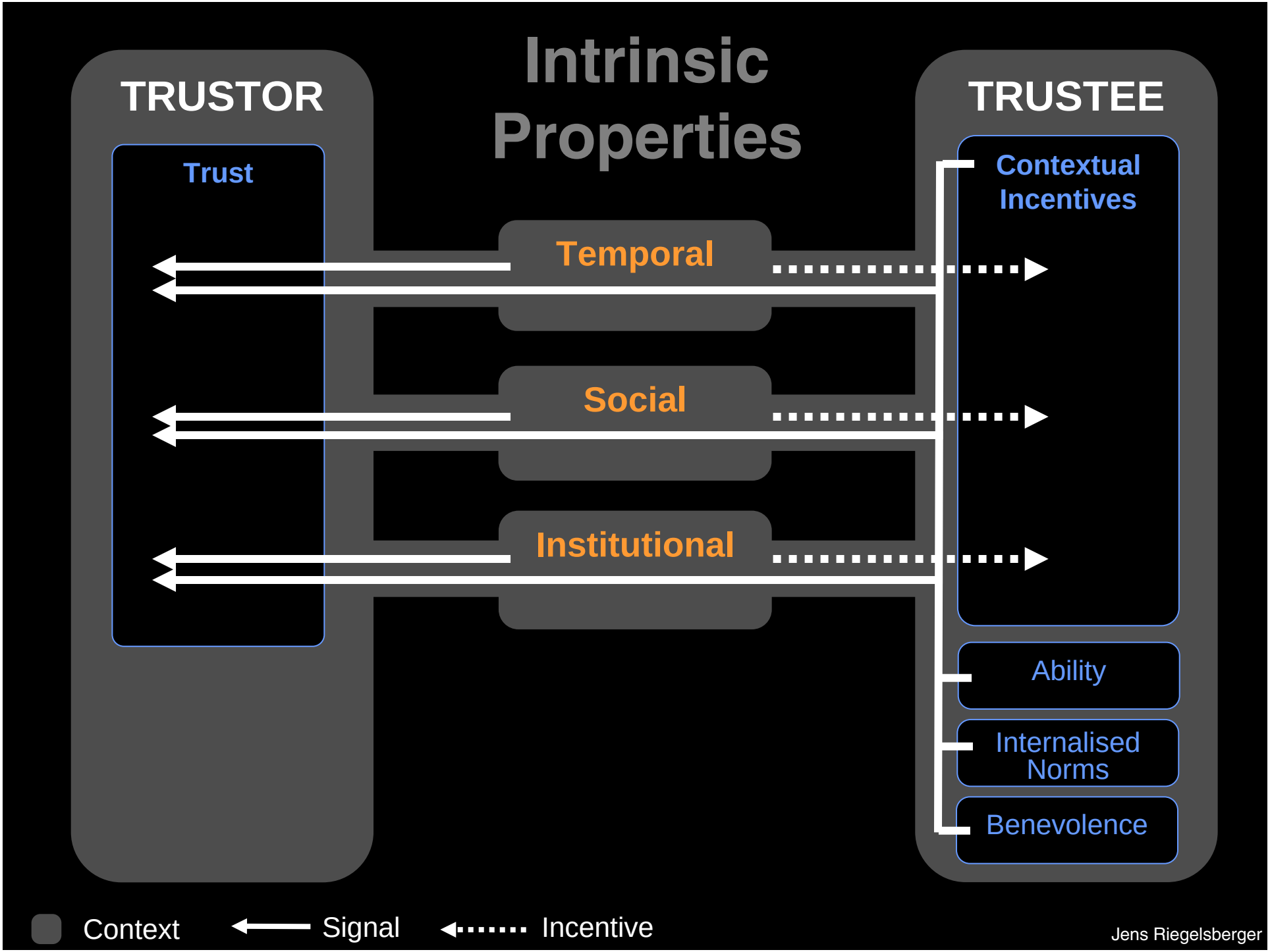
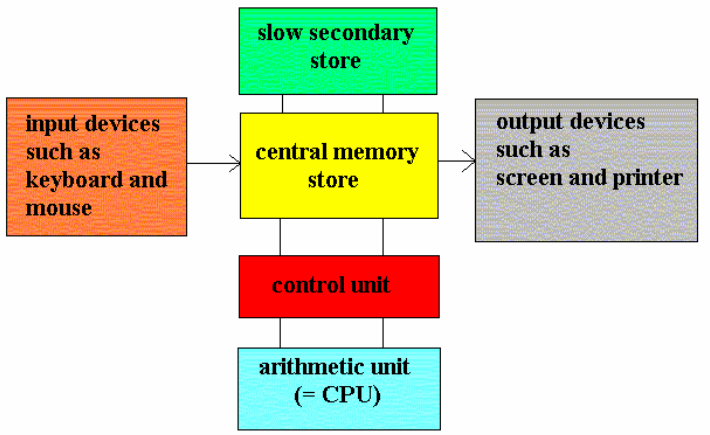
Jens Riegelsberger


Intrinsic Properties
TRUSTOR
Trust
TRUSTEE
Contextual Incentives
Temporal
Social
Institutional
Ability
Internalised Norms
Benevolence
Context
Signal
Incentive
Jens Riegelsberger

Trust and the Myth of a Unified Agent

John C. Thomas
SIG on on-line trust
CHI 2007
San Jose, CA
May 1, 2007

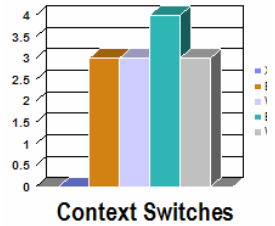


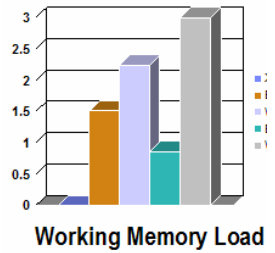
Object of Trust in Two Domains

- High Performance Computing Tools: Trust is complexly related to a number of components
  - Connectivity to high performance facilities
  - Documentation veracity and completeness
  - Tool functionality and side-effects
- End User Programming via Widget Composition
  - Widget descriptions are accurate
  - Composition facility works as stated without hidden side-effects
  - Ability to comprehend facility
  - Ability to choose, compose, test, debug

Risks

- High Performance Computing
  - Wasted time → missed deadlines → low performance rating | critical failure
  - Undetected error →low performance rating | critical failure
  - Feeling incompetent, fooled, guilty
- End User Programming
  - Wasted time → missed deadlines → low performance rating
  - Undetected error → low performance rating
  - Feeling incompetent, fooled
- Modeling focuses on productivity and complexity
  - Assumption is that if the tools actually “work,” users will come to trust the systems.
  - Risk minimization comes from careful design, coding, and testing.



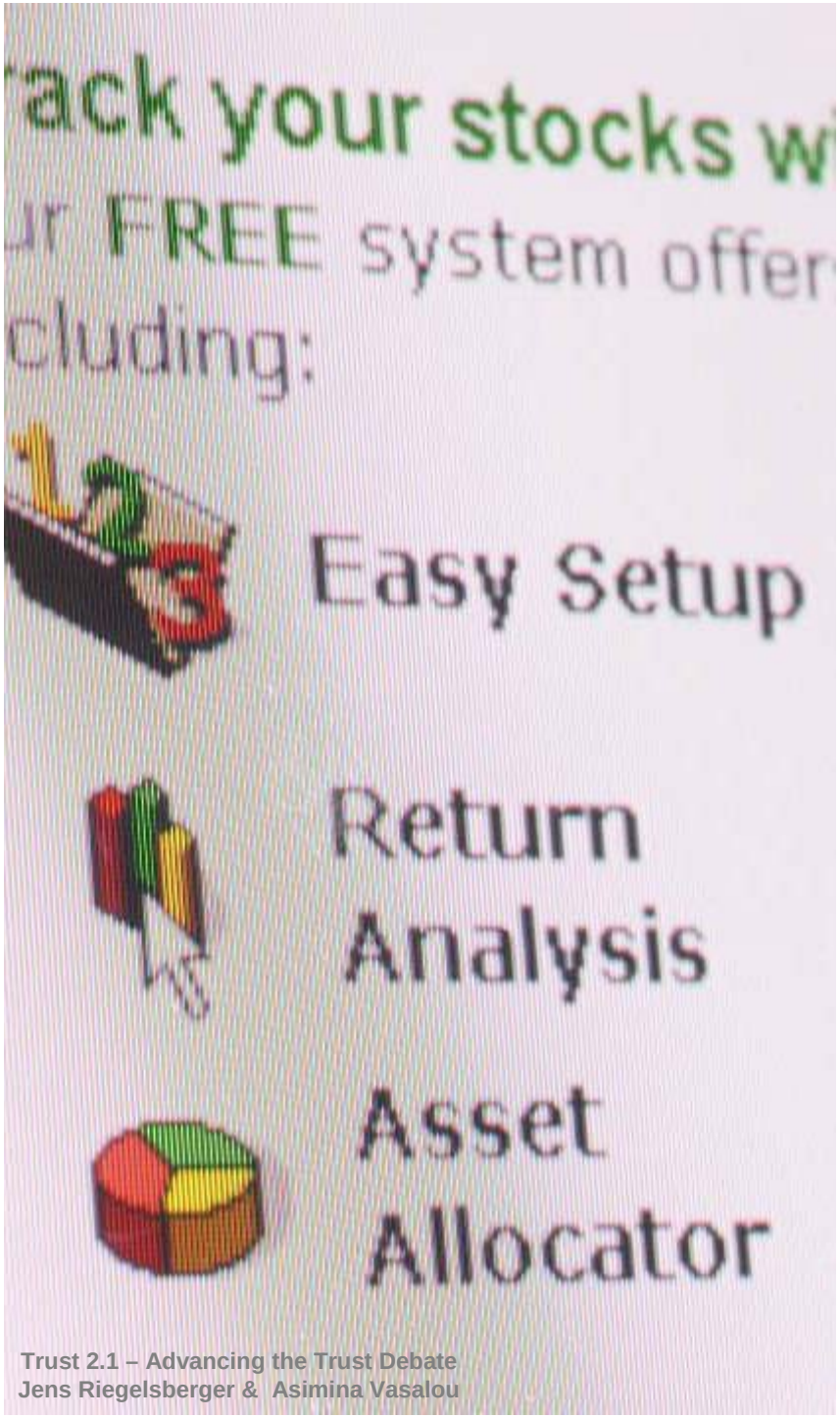


Myth of a Unified Agent

- In ordinary speech and writing, we pretend individuals are unitary agents; yet, experience shows this is not true (and advertisers, among others, take advantage of this).
  - E.g., “Do you want to lose weight (quit smoking, exercise more, etc.) or not?”
  - “Do you trust me (or this system or this company) or not?”
- In actuality, different environmental frames as well as different emotional states can substantially *change* our actual behavior.
- After the fact, we try to generate coherent and consistent “stories” to make us appear unitary and rational.
- Important in at least two ways, with respect to trust.
  - How issues are framed and when someone is asked can have huge influence on choices with respect to trust.
  - Once the person “agrees” to trust, that agreement itself becomes a kind of “two-edged sword.”
  - On the one hand, the fact of agreement can distort memory and perception to make that agreement of trust rational.
  - On the other hand, beyond some threshold of irrefutable evidence, the person tends to “switch” to an even less trustful and more hostile stance than if they had never agreed to trust, especially if there is insight into the manipulations of frame and emotion that led to original decision

Implications of Multi-agency

- If the desire is to have a truly informed consent, one could try to make sure that the user is asked in several real or imagined contexts and asked to “put them together.”
- On the other hand, if the system is trustworthy “enough,” such a thorough procedure might scare away potentially satisfied and productive users.

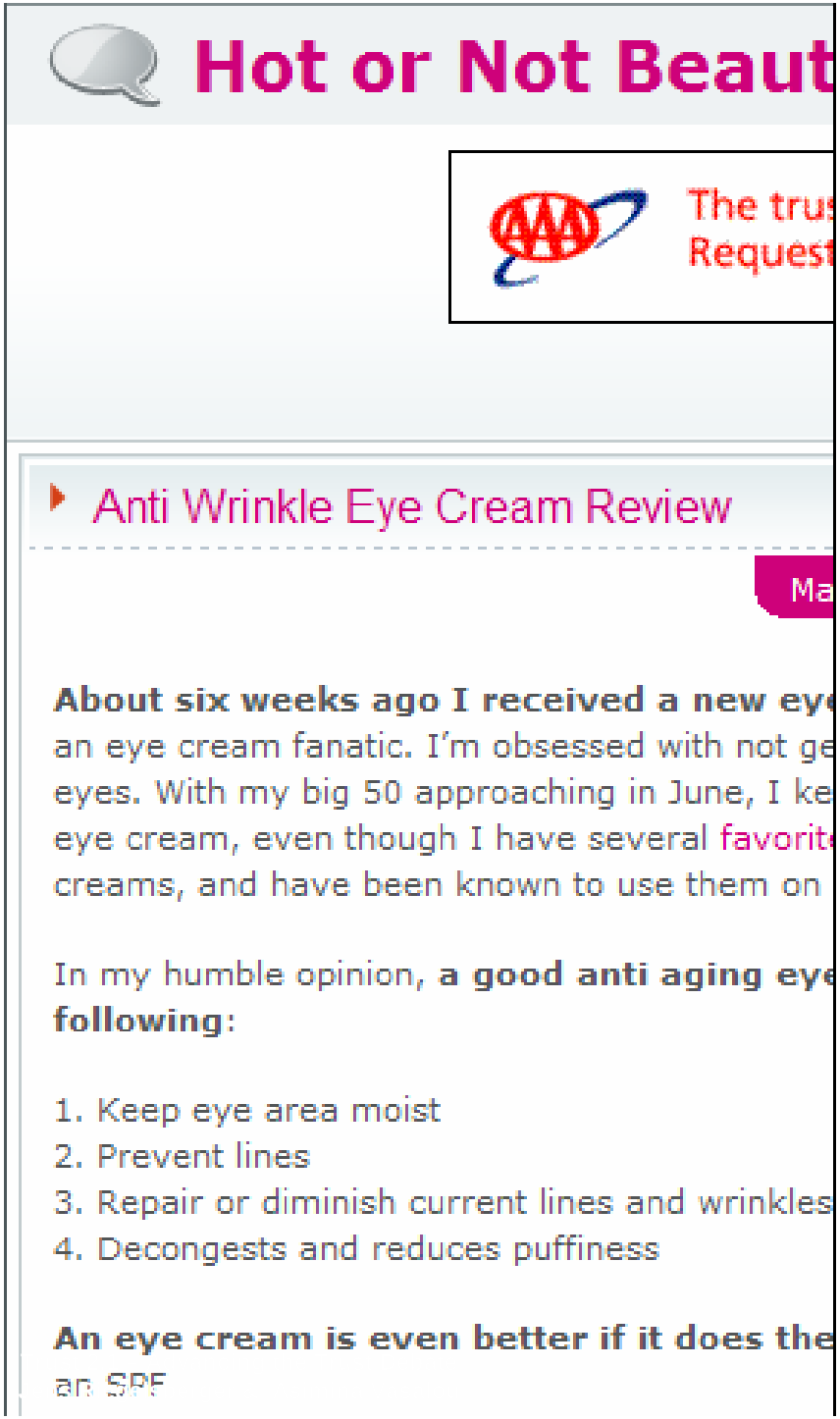


Goals of Trust Research

Cui bono?

- Allow sites to acquire more customers?
- Allow users to make better decisions?
- Increase trust in online technologies in general?
- Make everyone act more socially rational?

Trust research poses serious ethical questions. Some examples …

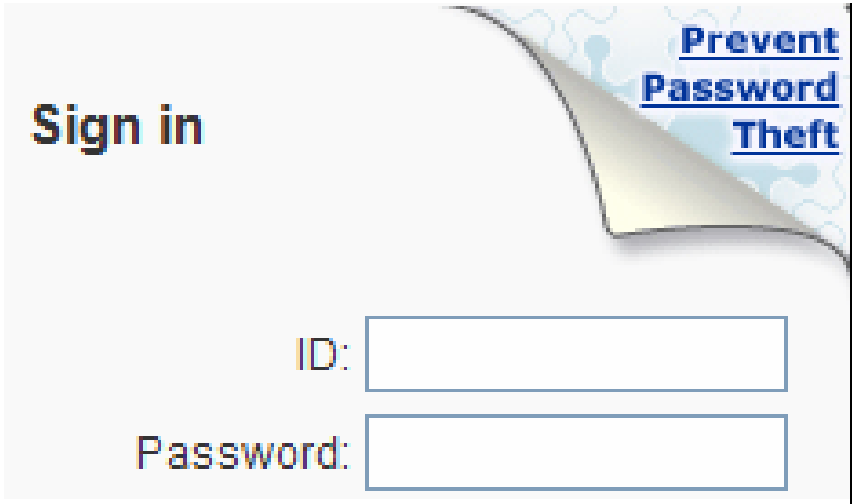


Scenario 1

Vichy hired a marketing company to maintain a Blog on its new anti-aging cream.

The Blog posed a woman who was trying out the product reporting on her positive experiences.

Eventually consumers discovered this and responded with rage.



Scenario 2

Phishing, i.e. using imposter websites or identities to get users to divulge their credentials is a growing problem.

Successful phishing relies on ‘trustworthy interface design’

Can malevolent phishers build on the output of HCI trust research?