Culture, affect, and computation

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Agenda

- Examples of cultural differences in various aspects of cognition
- Affect and Culture
- Moral Decision Making and Sacred Values
- Computational approaches to modeling and understanding culture
Experiment
Müller-Lyer illusion (1889)
Cross Cultural Results (Segall et al. 1966)

From Henrich et al. 2011
Cross Cultural Results (Segall et al. 1966)

Line “a” had to be about 1/5 longer than line “b” before they were perceived as equal.

From Henrich et al. 2011
Cross Cultural Results (Segall et al. 1966)

San Forager of the Kalahari were unaffected by the illusion.

From Henrich et al. 2011
- people’s psychological repertoire are universal?
- At least, tasks involving “low-level” cognitive processes, such as vision, should not vary much across the human spectrum (Fodor 1983)

- The previous example suggests that even a process as basic as visual perception can show substantial variation across population (Henrich et al. 2010)
  - Muller-Layer illusion is kind of culturally evolved by-product (Henrich 2008)
Other examples: Economic decision making

If subjects are motivated purely by self-interest, responders should always accept a non-zero offer $\Rightarrow$ proposers should offer the smallest non-zero amount.

Industrial nations always occupy the extreme end of the human distribution in these tasks.

Market integration and its participation in a world religion both independently predict higher offers.

Community size positively predicts greater punishments (Henrich et al. 2010).

From Henrich et al. 2011
Differences in rejection of offers

Differences in rejection of offers that are too low.

Also, in many societies (including China and Russia) there is a tendency to reject hyper-fair offers (from 60% to 100%).

From Henrich et al. 2011
Anti-social punishment and cooperation

Game: Public goods game
Anti-social punishment and cooperation

Game: Public goods game

Possibility of punishment: dramatically increased cooperation

The finding was generalized for the human species and published as: “Altruistic Punishment in Humans” in Nature
Anti-social punishment and cooperation

From Henrich et al. 2011

Anti-social punishment: participants paid to reduce the earning of “overly” cooperative individuals
Anti-social punishment and cooperation

The effects of anti-social punishment are so strong, that completely compensated for the cooperation inducing effects of punishment.

From Henrich et al. 2011
Other examples of difference

- **Folkbiological reasoning**

- **Spatial Cognition**
  - Indo-European languages use: egocentric location system
    - “the man is on the right side of the flagpole”
  - Majority of other languages use: allocentric location system
    - Based on cardinal system: “the man is west of the house”
    - Object centered system: “the man is behind the house”

- **Independent vs. interdependent self –concepts**
  - Individualism vs. collectivism (Markus and Kitayama, 1991)

- **Positive self-views**
  - People view themselves more positively than the rest of the group
  - Does not hold within East-Asian cultures
Other examples of difference

- Personal Choice
  - The feeling of free choice, how much people value free choice and the range of behaviors over which they feel that they are making choices varies across populations

- Motivations to conform
  - Example: East-Asians prefer objects that are common, Americans prefer more unusual objects

- Analytic vs. holistic reasoning (Nisbett 2003)
  - Two different modes of reasoning
  - Holistic: Orientation to the context (and relationships) as a whole (associative)
  - Analytic: detachment from context, preference for using categorical rules (abstract)

- Moral reasoning
Similarities

- The differences noted are not just between Americans and small scale societies
  - Differences are seen at every level of analysis: From West vs. East differences, to cultural differences between American from different SES living in the same city
- Similarities are also seen in different levels of cognition across the human species
  - Some perceptual illusions
  - Perceiving color
  - Emotional expressions
  - False belief task
  - Analog numeracy
  - Social relations
  - Psychological essentialism
  - Punishment of free riding,
  - mate preferences (waist-to-hip ratio preference), …
Culture

- “What people think about can affect how they think” (Bang, Medin & Atran 2006)

- Culture: “a convenient term for designating the clusters of common concepts, emotions, and practices that arise when people interact regularly” (Brumann, 1999)

- “Causally distributed patterns of mental representations, their public expressions, and the resultant behaviors in given ecological contexts” (Atran, Medin & Ross, 2005)
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Interplay between Affect and Expression of Culture

- Ashton-James et al. (2009) examine the role of affect in the expression of culture
- Do affective states influence the expression of people’s core self, constructed by their culture?
  - Affect serves an important function for placing people more or less closely to their culture

Positive Affect:
- psychological and physiological marker of well-being
- more creative thought
- more novelty seeking
- progress towards ones goals
- increases non-normative responses

Negative Affect:
- negative evaluations
- more rigorous and systematic thinking
- more cautious behavior
- produces propensity for familiar or normative actions
Who I am depends on how I feel

- **Hypothesis:**
  - Westerners when feeling positive will value interdependence higher
  - Easterners will value individuality higher
  - Opposite for negative affect

**Experiment 1:**
Students were primed with the autobiographical memory task (positive*neutral*negative)

Participants filled out the Value of Expression questionnaire (measure how much one values self-expressions)
Who I am depends on how I feel

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**Experiment 2:**
Students were primed with the “Music and Feelings” task

**Positive:** Mozart - *Eine kleine Nachtmusik* - 1
**Negative:** Rachmaninoff – *Vocalise*

Pen selection task: 5 pens, with 1 or 2 pens a different color than the rest

<table>
<thead>
<tr>
<th>Uncommon pen chosen:</th>
<th>Western participants:</th>
<th>East Asians:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Positive affect: 13%</td>
<td>Positive affect: 33%</td>
</tr>
<tr>
<td></td>
<td>Negative affect: 60%</td>
<td>Negative affect: 13%</td>
</tr>
</tbody>
</table>
Who I am depends on how I feel

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Experiment 3:
Used the facial feedback paradigm (Strack et al. 1998).

Then participants filled out the Twenty Statements Test (measure of self-construal)
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Cultural Variance in the Interpersonal Effects of Anger in Negotiations

- Adam, Shirako and Maddux (2010) explore the effects of expressing discrete emotion in negotiations across cultures.

- Expression of anger is known to induce larger concessions in negotiations, compared to other emotions or no emotion (e.g. Sinaceur & Tiedens, 2006; Van Kleef et al. 2004)
  - Angry negotiators are perceived tougher, anger is seen as a signal that there will be negative consequences unless concessions are made,…

- However, these studies exclusively focus on western subject populations
  - Effects of anger may vary across cultures as anger displays play different roles in different cultural contexts
  - Example: Ukta Eskimos apparently do not feel, express or talk about anger (Briggs, 1970), Kaluli of New Guinea are encouraged to display anger (Schieffelin, 1983)
Expressing anger may be perceived as relatively appropriate in Western cultures, but as relatively inappropriate in East-Asian Cultures

- Different cultural display rules make it relatively normative to express or even amplify emotion expressions in Western individualistic cultures
- And to deamplify and suppress emotions expressions in East Asians collectivist cultures
- Perceived appropriateness of emotion expressions can have a significant impact on their utility in negotiations

Hypothesis:
- a: anger would elicit larger concessions from Westerners and smaller concessions from Asians
- b: this is due to the appropriateness of expression of anger
Study 1

- Participants read a story about a negotiation where the main character did not want to include a warranty in the deal, but the counterpart insisted on it.

  no-anger: the last 4 statements made by the counterpart were preceded by “Client, without being angry”

  Anger: “Client, in an angry tone”
Study 2

- Participants played a negotiation game about the price, warranty period and duration of a service contract for a mobile phone.

In rounds 1, 3 and 5 of the negotiations the participants received predetermined messages from the other player (computer):
  - Anger condition: anger statements
  - No-anger condition: Intention statements
Study 3

- Experimentally manipulated the appropriateness of anger expression

“most people express anger in negotiation and it was acceptable to express anger during the study”,

the opposite for inappropriate-anger condition
Interaction between Culture, Power and Emotions in Decision-Making

- High power people are less likely to take the perspective of others (Galinsky et al. 2006)
  - And are less influenced by emotions of other players (Van Kleef et al. 2006
  - Overbeck, Neale and Goven (2010):
    - Powerful negotiators are only affected by their own emotions
    - Low power negotiators do not respond to their own emotions and are affected by those of a powerful counterpart

- Van Kleef, De Dreu et al. (2006) show that low-power participants concede much more than high-power participants

- In this study, we explore the role of power and emotions among non-WEIRD Americans and Iranians
Method

- Task: the multi-round negotiation task discussed before
- Design: 3(High Power, Low Power, Control) * 2(Angry agent, Smiling agent)
- Prime: Galinsky et al., 2003
  - High Power: Recall and write about a personal incident in which you had power over another individual or individuals
  - Low power: ... someone had control over you
  - Control: Recall your day yesterday.
- Participants:
  - Americans: 90 Americans recruited from Craigslist.com
  - Iranians: 42 Iranians (30 from Iran, 12 from Los Angeles)
  - Participants who dropped out of the negotiation before the third round were excluded from the analysis
Screenshots
Results

Opposite trend of effect of emotions on high power Americans

High power Iranians demand less than low power Iranians

No effect of emotion for Iranians
Summary

- The role of affect in the expression of culture

- The effects of expressing discrete emotion in negotiations across cultures

- Inverse role of power for Iranians could be related to the cultural role of powerful individuals in the Iranian culture
  - An indication of power within Iranians is self-sacrifice and softness to others

- Unlike previous findings, we show that high power Americans do get effected by the emotion of the other party
  - But they are effected differently from low power Americans, and those in the control condition
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Economic Theories of Decision Making

- The field of decision making has been dominated by economic perspectives
  - Model people as rational agents
  - Carefully weigh costs and benefits
  - Maximize the utility of every choice
  - Without consideration of issues such as:
    - Cultural norms, religious beliefs and moral rules which exist outside the market (Iliev et al. 2009)

- Psychological findings: illustrated violations of these axioms in different domain
  - e.g. Kahneman, Slovic and Tversky (1982)…
  - Moral decision making
An Example Dilemma

- A convoy of food trucks is on its way to a refugee camp during a famine in Africa. (Airplanes cannot be used.) You find that a second camp has even more refugees. If you tell the convoy to go to the second camp instead of the first, you will save 1000 people from death, but 100 people in the first camp will die as a result.

  - Would you send the convoy to the second camp?
    - $U(\text{notReRoute})=100-1000$
    - $U(\text{Reroute})=1000-100$

  - Ritov and Baron (1999): **63%** did not choose to send the convoy to the second camp
    - **12%** responded that they would not change the route of the convoy even if only 1 person in the first camp would die
Sacred Values

- This "rational actor" perspective:
  - Underlies much official economic policy and decision making
  - Has been challenged by recent work on sacred and protected value

- Sacred values (SVs) are distinct from secular values: SVs are associated with transcendental beliefs (Durkheim, 1912/1995).
  - Values which outweigh economic ones (Tetlock, 2003) as they “incorporate moral beliefs that drive action in ways dissociated from prospects for success” (Atran, Axelrod, & Davis, 2007).
  - “… those that resist trade-offs with other values, particularly with economic values” (Baron and Spranca, 1997)
  - “those values that a moral community treats as possessing transcendental significance that precludes comparisons, trade-offs, or indeed any mingling with secular values” (Tetlock, 2003)
Sacred Values & Quantity Insensitivity

- Sacred values are known to evoke deontological moral rules
  - They concern acts not outcomes

- SVs: More concerned about their moral obligations
  - As a result show insensitivity to quantity of outcomes
    - They could have easily perceived killing 100 equally wrong as killing 1000 (Iliev et al. 2009)

- The amount of sensitivity varies:
  - Causal Structure effects (Waldmann and Dieterich 2006)
  - Cultural differences (Lim and Baron 1997)

- Tradeoffs involving a SV result in strong negative emotions and moral outrage (Tetlock 2003)
Sacred Value Protection Model

- People want to protect what they hold sacred
  - Sacred values are compartmentalized separately from secular values.
  - When the two domains are intermingled, people feel threatened and they respond with moral outrage (Taboo).
  - In contrast, when two sacred values are compared with each other, people are less morally outraged (Tragic).
Tetlock, Kristel, Elson, Green, Lerner (2000)

- Taboo Tradeoff Scenario

- Tragic Tradeoff Scenario
Tetlock, Kristel, Elson, Green, Lerner (2000)

![Graph showing moral outrage by tradeoff type]

**Moral Outrage**

- **Taboo**
  - Did Not Save Johnny: 5
  - Saved Johnny: 2

- **Tragic**
  - Did Not Save Johnny: 4
  - Saved Johnny: 3

**Tradeoff Type**

- Did Not Save Johnny
- Saved Johnny
Ginges, Atran, Medin & Shikaki (2007)

- Extended previous findings to a more realistic setting.
  - Interviewed Israeli settlers (n=601), Palestinian refugees (n=535) and Palestinian students who were affiliated with various political groups (719)
- Offered three types of tradeoff deals as possible solutions to the conflict.
Taboo: Palestinians would recognize the sacred and historic right of the Jewish people to Israel. There would be two states: a Jewish state of Israel and a Palestinian state in 99% of the West Bank and Gaza.

Taboo+: On their part, Israel will pay Palestine 1 billion U.S. dollars a year for 10 years.

Symbolic: On their part, Israel will recognize the historic and legitimate right of the Palestinians to their own state and would apologize for all of the wrongs done to the Palestinian people.
SV Measure

- moral-absolutists: transformed the issues under dispute into sacred values
  - Among settlers: 46% of the sample
    - believed that it was never permissible for the Jewish people to “give up” part of the “Land of Israel” no matter how great the benefit.
  - Among Palestinian students 54%
    - treated both the principle of the “right of return” and Jerusalem as sacred values.
  - Palestinian refugees: 80%

- non-absolutists: had strong preferences against compromise over these issues but did not regard them as sacred values
Ginges, Atran, Medin & Shikaki (2007)

Taboo vs. Taboo +
Ginges, Atran, Medin & Shikaki (2007)

Taboo vs. Symbolic (Tragic)
Sacred Values and Intergroup Conflicts

- The existing work sacred values:
  - Been focused predominantly on conflicts embedded in a complex historical context
  - Ginges et al. (2007) & Atran et al. (2007): conflict between Israelis and Palestinians
  - Sachdeva and Medin (2009): conflict over the Babri Mosque in India.

- sacred values participants respond with greater outrage to deals with added material incentives
Iran’s Nuclear Program: The use of Sacred Rhetoric

- Iranian government only recently publicly disclosed having a nuclear program
  - It has vigorously defended the “inalienable rights” (2009)

- The Iranian position:
  - Mainly in the domain of sacred rhetoric (Marietta 2009)
  - “will not retreat one iota” (2007), “will ‘never ever’ compromise on nuclear dispute” (2009)...

- Framing the nuclear dispute as analogous to past historical events in which the advancement of the Iranian nation was interrupted by foreign powers

- Invoke emotions by drawing parallels between these events and having national nuclear program
  - Framing the issue as an ongoing struggle with deep historical context
Our Studies

- The use of sacred rhetoric in conjunction with drawing parallels with past historical events has:
  - Shifted the political domain involving Iran’s nuclear facilities to a sacred realm
  - Advocating a sacred position against a consequentialist one

- In two separate studies (Dehghani, Atran et al. 2010; Dehghani, Iliev et al. 2009):
  - Investigated whether Iranians who treat the Iranian nuclear program as a sacred value would be amenable to material incentives/disincentives to compromise
  - using it as a test bed for emerging sacred values
  - how material incentives and disincentives, such as economic sanctions, psychologically affect the targeted population and potentially influence behavior
  - Difference between nuclear energy and nuclear weapons?
Experiments

- 1997 Iranian participants in an online study conducted in Farsi
- Dependent variables: people’s approval, people’s anger, misleading factor

- The SV measure (based on Baron and Spranca’s 1997 measure):
  
  What do you think about Iran giving up its nuclear energy/weapons?
  
  - a. I think this definitely needs to happen.
  - b. I do not object to this.
  - c. This should be done only if the benefits of stopping the program are great enough.
  - d. This shouldn't be done no matter how great the consequences

- Participants who answered ‘d’ were considered to have a SV (14% for nuclear energy, 13% nuclear weapons)
Scenarios

- 2 (Nuclear program: nuclear energy vs nuclear weapons) * 3 (Type of deal: Taboo, Taboo+, Taboo-) design

- Scenarios:
  - Taboo: Iran will give up its program for developing nuclear energy(weapons) and surrender the current nuclear facilities to the UN; in return Israel will give up their program for developing nuclear energy(weapons) and surrender the existing nuclear facilities to the UN.
  - Taboo+: taboo + In return, United Nations will give $40 billion dollars in economic funds to Iran.
  - Taboo-: Taboo + You know that if Iran does not accept this deal, United Nations will impose additional sanctions on Iran.

- Participants were asked:
  - Do you personally approve of this deal?
  - If the Iranian government approves such a deal do you think that people will be angry?
  - If such deal is really proposed to Iran do you find it misleading?
Results:

Participants holding SVs predicted less support for the Taboo+ and Taboo- deals (p=.05)

Significant interaction between Sacred Value and Incentives (p<.05)

Participants holding SVs more anger for the Taboo+ and Taboo- deals (p=.01)

Significant interaction between Sacred Value and Incentives (p<.01)
Results

- Second replication of the backfiring effect of incentives for the program
- Unlike nuclear energy, there was no significant interaction between sacred values and type of tradeoff, and no difference between the approval rates, or predicted anger, between the Taboo and Taboo+/Taboo- conditions
- Main effect of sacred values in both nuclear energy and nuclear weapons conditions (p< 0.001)
  - SV people show lower approval and higher anger for the tradeoffs
- Overall main effect of type of nuclear program for approval (p < .001) and for anger (p = .0115)
  - where people who got the Energy condition showed lower approval and predict higher anger compared to those who got the Weapons condition
- Using the misleading variable as a covariate in the analyses did not change the results
  - the backfire effect of material incentives/disincentives cannot be attributed to greater suspicions regarding the program
Summary

- SV and utility theory
- SV and Protection model
- The role of sacred values in intergroup conflicts

- Relatively short-lived political discussions can result in strong attitudes which have properties of sacred values
  - By being framed as nationalistic/religious value

- These results suggest that a policy wholly based on a “carrots and sticks” approach may actually backfire
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Computational models of cultural reasoning

- Modeling the influence of culture on reasoning is a key problem in cognitive science

- New methods of computational social science could provide important insights into how human cultures work
  - and provide help with a wide variety of real-world problems such as conflict resolution.
  - If we can model certain aspect of a culture, we can make better predictions about that culture

- Relatively a new field

- Different approaches are emerging for modeling the influence of culture on reasoning
“The eCUTE project is working to develop an innovative technological application to aid cultural understanding and empathy in children and young adults. eCUTE uses a view of culture based on the 6 Cultural Dimensions defined by Geert Hofstede and Bennetts developmental model of intercultural sensitivity”.

- Hofstede: attempt to define some measurable and quantifiable aspects of culture
- Cultural dimensions: a study of IBM employees conducted between 1967 and 1978, 40 different countries.
- social inequality, relationships between individuals and groups, concepts of masculinity and femininity, and uncertainty and ambiguity
video

- "Hofstede's Dimensions of Culture - Explained Easily"
CARA

- CARA system (Subrahmanian et al. 2007): it uses semantic web technologies and opinion extraction from weblogs to build cultural decision models
  - Used for gathering data about different cultural groups
  - Learning the intensity of opinions that those groups have on various topics
  - Developing a process that supports building/extracting models of behavior of those groups
  - Continuously refining those models through shared, multi-person, learning experiences
MoralDM

- MoralDM uses a novel methodology for computational modeling of cultural reasoning based on analogical reasoning (Dehghani, Forbus, Tomai and Klenk, 2011)

- In this method:
  - Cultural narratives are semi-automatically translated into formal representations
  - These representations are used in the cognitive model to make predictions, using analogical reasoning

- Analogy + cultural narratives → cultural models
The link between analogy and decision making has been explored from various perspectives:

- Consumer behavior (Gregan-Paxton, 1998)
- Political reasoning (May, 1973)
- Legal decision making (Holyoak and Simon, 1999)

Decision makers recognize the situation as analogous to some previous experience => draw inferences from previous choices (Markman and Medin 2002)

Decision making is a constructive process & the agent relies extensively on her past experiences (Goldstein and Weber 1995)

Similarity processing and decision making share important commonalities (Medin et al. 1995)

- Common mental processes for the two tasks
MoralDM: Architecture

- Scenario presented in simplified English
- Semi-automatically translates simplified English scenarios into predicate calculus
- Calculates the relationship between the utility of each choice
- Compares a given scenario with previously solved decision
- Suggests decisions based on rules of deontological/utilitarian types

New Dilemma

Prior Cases w/Decisions

- After a decision is made for a given scenario, it can be stored in the case library for future use.

Natural Language Understanding

Order of Magnitude Reasoning

- Calculates the relationship between the utility of each choice

Analogical Reasoning

First Principles Reasoning

Sacred Values

AR and FPR work in parallel and complement each other by providing support (or disagreement)

Decision

Prior Cases w/Decisions

Analogical Reasoning

First Principles Reasoning

AR and FPR work in parallel and complement each other by providing support (or disagreement)
Modeling Cultural Differences in Moral Decision Making

- In MoralDM, culture differences can be captured using:
  - Different sacred values
  - There are moral rules and norms that are highly salient in some cultures but not in others
  - Different Cultural Stories

- Given that MoralDM relies on analogical reasoning:
  - By adding cultural stories of a certain culture to the KB of MoralDM
  - We can model the effect of these narratives on moral decision making of that culture
Use of computation for understanding culture

- We can use known computational methods/tools for understanding culture

- Two different ways computers can be used in studying culture:
  - Conducting culture experiments:
    - Enhanced experimental control, ease of manipulations, consistency and controlled measurements (Loomis et al. 1999)
    - e.g. use of virtual agents for studying culture
  - Analyzing cultural (cultural products) and behavioral data
    - large amount of mostly unused data, can potentially provide a new means of investigating culture, cultural change
    - e.g. analysis of political blogs
Using ECAs for studying culture

- Embodied conversational agents (ECAs) provide a convenient platform to isolate unique cultural characteristics and realize them through simulation.
  - Manipulate external features such as visual appearance, speech type, and contextual graphical environments.

- These features make ECAs useful and reliable tools for studying cultural cognitions.
  - e.g. certain behavioral characteristics that are relevant to specific cultures can be implemented in ECAs.

- We examine whether accent of an ECA can be used as a marker for culture by evoking “cultural frame-switching” in bicultural individuals (Dehghani, M., Khooshabeh, P., Huang, L., Oganseyan, L., Gratch, J. 2011)
Cultural Frame-Switching

- **Multi-Culturalism:**
  - Individuals can acquire more than one such domain-specific knowledge structure
  - even if these systems contain conflicting theories (Hong et al. 2000)
  - The original culture is not necessarily replaced when a new culture is absorbed
  - Internalized cultures are not necessarily blended

- **Cultural frame-switching:**
  - Interpretive frames, in individuals who have internalized two cultural identities, can shift due to situational cues (Benet-Martinez et al. 2002)
  - Multi-cultural individuals have different norms and culturally specific systems of meaning
  - These norms can get activated depending on the context and the social environment.
  - This can result in varied constraints on the individual’s psychophysical behaviors
Hong, Morris, Chiu and Benet-Martinez (2000)

- Experimentally created frame switching among biculturals
- Primed Chinese-Americans with American, Chinese or neutral iconic images
- Participants in the Chinese primed condition:
  - used more of a Chinese interpretive lens (focused more on external attributions) than those in the American or control conditions.
- Participants in the American primed condition:
  - projected more American cultural values by focusing on individual attributions for the same task.
- Attribution task adopted from Morris and Peng (1994)
- Participants were asked on a 12-point scale why one fish was swimming in front of the group
  - Chinese Primed condition: The fish is being chased by the other fish
  - American Primed condition: The one fish is leading the other fish
Related Work: Rader, Echelbarger and Cassell (2011)

- Examine the interaction between culture and ECA design in the domain of education
- Developed virtual peers that matched the dialect of children speaking African-American English
- Asked children to complete a bridge building exercise.
- Children alternated playing the role of student and teacher as they explained the building process
- Students who tend to speak more dialed English did so less when they played the role of a teacher.
- Virtual peer and culturally congruent context, coupled with the role switch, influenced students to speak mainstream English
  - shown to be related to higher student achievement.
Related Work: Yin, Bickmore and Cortes (2010)

- Individuals who process information using peripheral cues get influenced by an agent tailored to their own culture

- Examination of their cultural agents shows that they might have been at a home-field disadvantage (Medin et al. 2010)
  - The cultural groups scholars select to study get ‘marked’
  - The home-field culture of the researchers goes ‘unmarked’ and its cultural nuances become unnoticed.

- The authors had two female agents; one Latina and the other Anglo.
  - Latina agent was visibly busty, in a colored room, and pictured with a Frida Kahlo painting, …
  - Anglo agent was in a sterile, white room, with only a college banner.

- The researchers over-marked the Latino culture.
  - This could result in stereo-typing effects (Fryberg et al. 2008), and may explain some of their surprising results
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Experiment

- Experimentally model frame-switching among bicultural (and monocultural) individuals using ECAs
  - We control for non-verbal behavior
  - Manipulate solely the virtual agent’s accent of spoken English
  - Measure the effect on the participants’ perception and cognition.

- Measure if their preference for certain moral acts are affected by this manipulation.

- Hypothesis:
  - The accent of a virtual agent should affect people’s perception of the culture of the agent
  - ECAs that have an accent that is congruent with a participant’s culture will bias that participant to use the congruent cultural frame
  - Accent can be used as a marker for a culture
Method: Materials and Design

- Design: between subject 2 X 2 full factorial
  - First factor: Culture of the participants (American or Iranian-American).
  - Second factor: The agent’s accent (American English or Iranian English accent)

- Voice of the ECA was prerecorded

- Participants read a story which included a balanced number of American and Iranian cultural products

- None of these idea units were explicitly labeled with their cultural referent (there was no explicit reference to St. Patrick’s day as such)

- The idea units were interleaved so as to minimize memory distortions due to recency or primacy.
Yesterday was an interesting day. I got out of class at around 4:30. The weather was great and spring was in the air. My classmate Shawn, who I’m not really good friends with and don’t know too well, invited me to a bonfire at the beach. I told him that I was hungry and needed to get something to eat before going to the beach. He was going to his parent’s house for dinner and invited me over. I don’t know him well, so I initially refused his offer. But he kept on insisting that it’s the beginning of Spring and I should go and have dinner with his family, he said then we can all go to the bonfire together. On the way to his house, Shawn asked why I was wearing almost all green. I thought it was a strange question as a lot of students were wearing green that day.

I went over to his house and met his dad at the living room. I thought to myself that the apple doesn’t fall far from the tree. Upon seeing his father, Shawn introduced me to him, saying this is my good friend Anthony. He seemed surprise by my presence. Now I wasn’t sure if they were expecting a guest for dinner. Then Shawn’s mother came to the living room, I had met her before. She used to work in the registrar of the school. I said hi to her and she greeted me back saying that it looked like water had gone under my skin.

They had some apples on the table, they also had some coins right by the apple. He offered some salad to me, I asked if it was okay to chop up the garlic which was conveniently already on the table by the apples, which I think he had forgotten to put in the salad. He hesitated and took a few seconds before saying yes...

Earlier when I was at Jamba juice, I had seen the same green grass that Shawn had on his table. I asked his dad whether they drink the juice of the green grass. He looked at me as if he had not understood what I was talking about. So, I told him that grass juice is very nutritious and includes a broad spectrum of vitamins, minerals and antioxidants. As he was looking out the window, he said that water is past his head.

I finished my salad and asked Shawn when we can leave to see the bonfire. Suddenly Shawn and his family members all started saying that I should stay for dinner and go back to their place after the bonfire because my apartment was far from their house. I didn’t understand why they were asking me to stay for dinner, because I think they didn’t have any dinner prepared. I told Shawn that I need to go and watch the game later at night. My favorite college team was in the second round of a tournament. A bunch of the guys from the baseball team were going to watch the game at the local watering hole. I really needed to go to blow off some steam. But he said that his dad is already making food for us. Shawn then asked me how I’ve lost so much weight in the past couple of months. I told him you will not lose weight until you give up carbs, and I suggest you go cold turkey.

I saw a very small art piece on the wall of their hallway. It was a picture of some Chinese looking guys playing with a ball on horses. I told his dad that this is a lovely picture. He thanked me and told me that I could take it. I first thought he was kidding, but he seemed serious and told me that he wants me to take it. Shawn’s mother also said that it will look better in my house and I should take it. Given that they were insisting so much, and the piece didn’t look expensive I took it and thanked them for it. Shawn’s parents told Shawn that they had to wait for another hour and a half to serve dinner because some family friends had just called and were coming to visit them for the first day of spring. Given that I had plans to go watch the game and couldn’t wait that long, I got up thanked them for the picture and salad, and had my friend pick me up. Shawn and his parents insisted that I should wait and have dinner with them. But my friend was already there to pick me up. She had put green papers all over her car, and had beer too.
Yesterday was an interesting day. I got out of class at around 4:30. The weather was great and spring was in the air. My classmate Shawn, who I’m not really good friends with and don’t know too well, invited me to a bonfire at the beach. I told him that I was hungry and needed to get something to eat before going to the beach. He was going to his parent’s house for dinner and invited me over. I don’t know him well, so I initially refused his offer. But he kept on insisting that it’s the beginning of Spring and I should go and have dinner with his family, he said then we can all go to the bonfire together. On the way to his house, Shawn asked why I was wearing almost all green. I thought it was a strange question as a lot of students were wearing green that day.

I went over to his house and met his dad at the living room. I thought to myself that the apple doesn’t fall far from the tree.
Rapport Agent

- Utah (Hartholt et al. 2009): designed to establish rapport with human participants
  - by providing contingent feedback while the human speaker is speaking.

- To produce feedback: the agent detects and analyzes in real-time the human speakers’ audiovisual features
  - silence, head nod, eye-gaze (looking at the agent or not) and smile.
Rapport Agent
Procedures

1. After reading the story, they interacted with the ECA:
   - The virtual agent greeted them, explained an overview of the research at our research center
   - Asked them to summarize the story they had just read

2. Main DVs:
   - Was it appropriate for Anthony to leave before dinner?
   - Do you think Shawn’s parents really wanted to give the picture to him?

3. Participants were asked several questions about different emotions of the characters

4. For manipulation check:
   - Did the agent have more of an American accent or Middle-Eastern accent?
   - Did the agent appear more Western or more Middle-Eastern?
Hypothesis

- Hypothesis: participants should use culturally congruent frames to interpret and answer these questions.
- The cultural frames get activated by the ECAs
- First question:
  - Iranian cultural frame: it is not appropriate to refuse someone’s generosity and hospitality.
  - When interacting with the culturally congruent agent, Iranian-Americans should say it was inappropriate for Anthony to leave dinner early.
- Second question:
  - Giving the picture to Anthony: an instance of Iranian hospitality, especially when it comes to sharing their cultural artifacts (in this case Persian miniature)
  - When interacting with the culturally congruent agent, Iranian-Americans should say it the parents wanted to give the picture to the guest.
Results: Manipulation check

Main effect of agents’ accent (p<0.01)

Main effect of culture (p<0.05)

Main effect of agents’ accent (p<0.01)
Results: Appropriateness

- Significant interaction between the culture of the participants and accent of the agent (p<0.05)

The difference was not significant for Americans (p=0.162)

Significant difference between conditions (p=0.051)*
Results: Wanting to give the picture

- Significant interaction between the culture of the participants and accent of the agent (p<0.01)

The difference was not significant for Americans (p=0.203)

Significant difference between conditions (p=0.012)
Results: Emotions

- Significant interaction between culture and agent’s accent for Anthony’s feeling of happiness ($p < 0.05$)
  - Iranian-Americans interacting with the congruent agent: rated Anthony’s happiness higher than those in the non-congruent condition ($p < 0.05$)
  - for Americans ($p < 0.05$)

- Same interaction for Anthony’s satisfaction ($p < 0.01$)
  - The same significant trend held for Anthony’s satisfaction, both cultures ($p < 0.01$)

- Same interaction for Shawn’s parents’ satisfaction ($p=0.01$)
  - Same significant trend for Iranians ($p < 0.01$), not for Americans

- The effect also approaches significance for Shawn’s satisfaction ($p=0.088$)
  - Same significant trend for Americans ($p < 0.05$), not for Iranians
Discussion

- Virtual agents can successfully make socio-cultural effects on people’s cognition.
- In our experiment, the accented virtual agent’s visual appearance was identical across experimental conditions.
- The manipulation also affected people’s evaluations of the emotions of the characters in the story.
  - Emotions evaluated more positively when interacted with a culturally congruent agent.
Use of Blogs in

- Blogs can potentially be a natural source for investigating the interplay between culture, emotions and decision making

- Blogging is widely popular across the globe
  - “the internet world provides a far more diverse population from which to draw as well as access to a wide range of languages” (Cohen et al. 2004).

- Issues can be systematically tracked and analyzed over different time periods
  - Archives of blogs allow longitudinal analysis of psychological change (Cohn, Mehl and Pennebaker 2004)

- This allows us to track responses to an event as it naturally unfolds, examining a continues timeline of psychological change (Cohn, Mehl and Pennebaker 2004), starting before the event took place.
  - It is not a trivial task to track people’s emotions about a particular task over a period of several months in a lab setting.
Example

- We Analyzed conservative and liberal blog-posts related to the construction of the “Ground Zero mosque” (Dehghani, Gratch et al. 2011)
  - “Ground Zero Mosque”: one of the most contentious political issues in the United States in the past five years or so
  - It served to highlight the ideological differences between liberal and conservative moral frameworks

- Focused on the differences in the use of linguistic features
  - Explored the differences in the choice of words, to classify the blogs as liberal or conservative
  - Use feature analysis to explore the most indicative features of the groups, exploring what makes the posts liberal or conservative

- Choice of words used by these two ideological groups were distinct enough that we were able to classify them with an accuracy of 91.6%
- Feature analysis revealed that what makes these blogs conservative or liberal is not description, or ideology, of the in-group, but negative portray of the out-group.
- Competing groups my use more negative portray of the out-group to define their identity, than characteristics of the in-group.
Summary

- Computational models of cultural reasoning
  - Used for understanding cultures
  - Making predictions
  - Can be very helpful in different domains, from conflict resolution to international commerce

- Computational methods provide useful novel methods for studying culture
  - For mass data collections
  - As part of the experimental setting
  - ...
Thank you!