

Cognitive Biases in Folklore

From



To



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Stories are really important

storytelling is a natural cognitive function: “narrativity”

Narrativity = organising experiences and events into a pattern of meaningful relations – things happen for a reason (usually, goals and motivations of agents)

Stories are really important

Indirect evidence from stone tools, beads and ochre suggest symbolic expression dates back around 100K years

Australian Dreamtime accounts probably date back 10,000 years



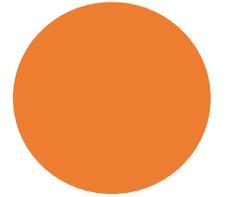
What is folklore?

- Definitions vary
- Broadly traditions common to a culture, subculture or group
- Includes oral traditions such as tales, proverbs, jokes and material culture, customary lore, rituals, celebrations etc.
- Focus on folk tales



What folk tales?

- Apocryphal story
- Told as true (but not *necessarily* believed)
- Traditionally transmitted orally
- Quick to adapt to new technology – ‘Faxlore’
- Contemporary folk tales – ‘Urban legends’, conspiracy theories, ‘Fake News’



Why research folklore?

- Culturally successful
- 7000+ years old – (Nunn et al 2016; da Silva et al 2016)
- Content cannot be necessarily explained in explicitly utilitarian terms
- Nature may strongly reflect cultural evolutionary processes

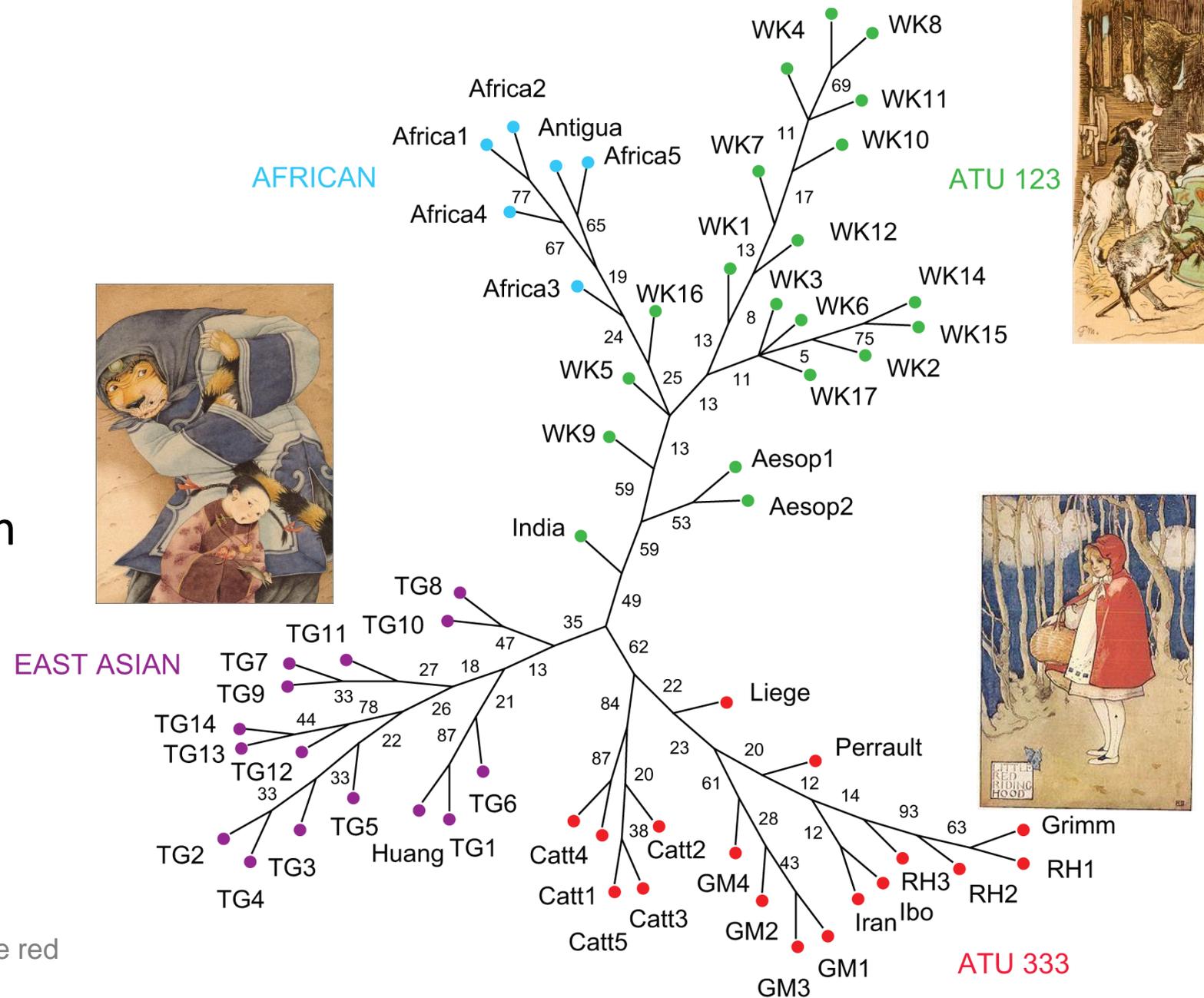
Nunn, P. D., & Reid, N. J. (2016). Aboriginal memories of inundation of the Australian coast dating from more than 7000 years ago. *Australian Geographer*, 47(1), 11-47.

Da Silva, S. G., & Tehrani, J. J. (2016). Comparative phylogenetic analyses uncover the ancient roots of Indo-European folktales. *Royal Society open science*, 3(1), 150645.



Folktales Evolve

- Some stories are products of incredible lineages
- Shaped by the selection pressures of human minds and societies



Tehrani, J. J. (2013). The phylogeny of little red riding hood. *PloS one*, 8(11), e78871.

“Each event, or incident, in a narration, possesses a certain potency of reproduction... The under potent is omitted; the normally potent is reproduced; the over potent is not only reproduced, but may so dominate all the rest as to change the whole course of the narration”

Frederic Bartlett, 1920

Bartlett, F. C. (1920). Some experiments on the reproduction of folk-stories. *Folklore*, 31(1), 30-47.

**SOCIAL LEARNING
HEURISTICS & BIASES**

CONTENT

Social Survival Emotional MCI Stereotype Hierarchical
Consistency

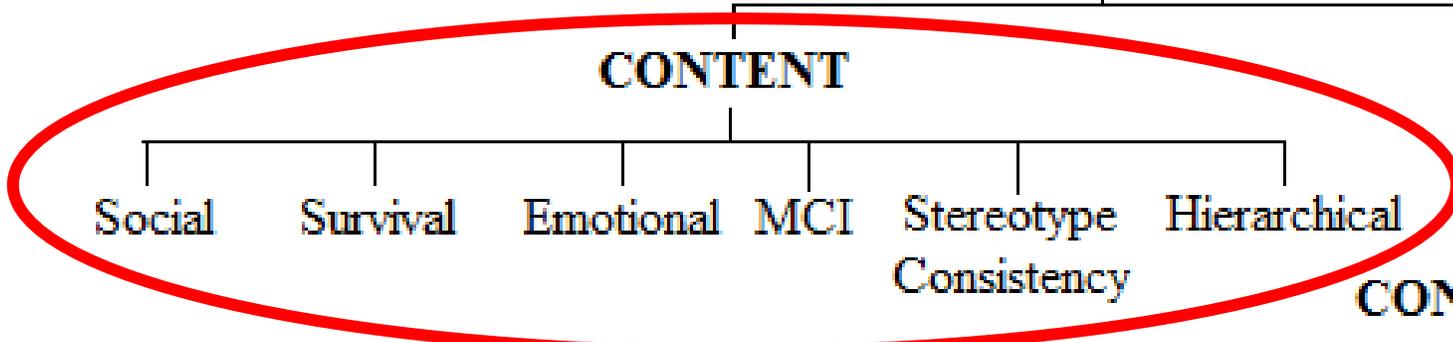
CONTEXT

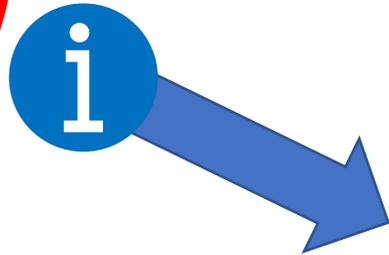
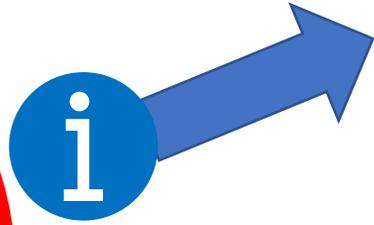
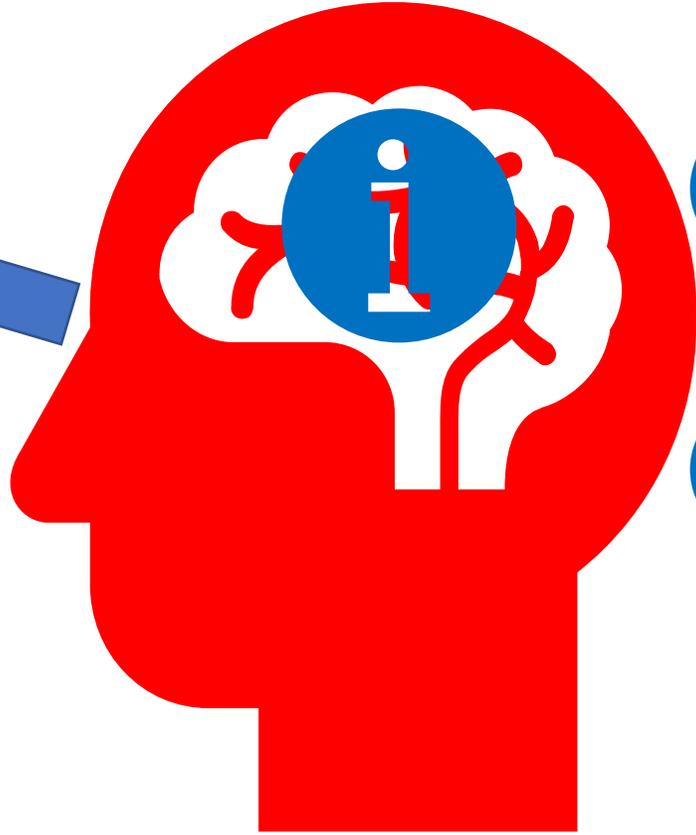
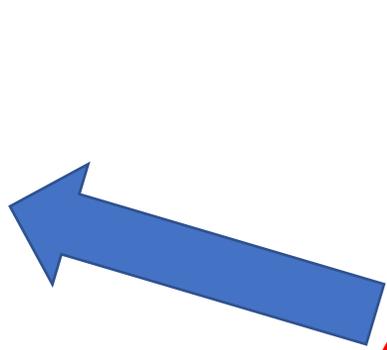
Model-based

Prestige Success Similarity Others

Frequency-dependent

Conformity Rarity







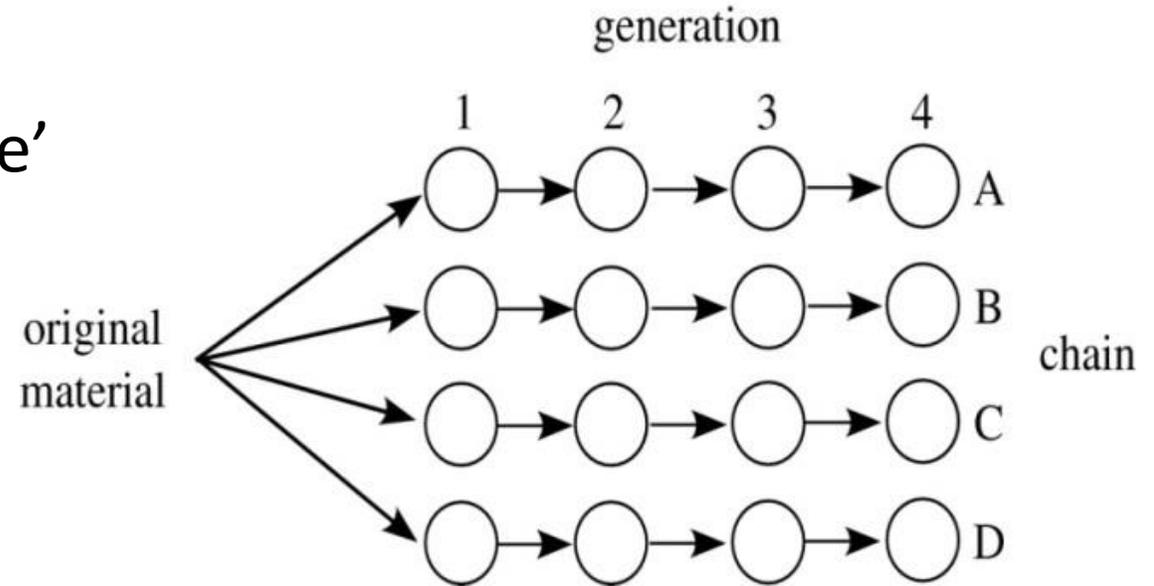
Cultural evolution of folktales

- Disposition towards certain types of content makes us susceptible to material which exploits these dispositions even if it isn't useful
- Content biases key selection pressure on evolution of folktales



Transmission Chains

- Pioneered by Frederic Bartlett
- Like 'Chinese Whispers' or 'Telephone'
- Reveals processes of transmission
 - What is remembered?
 - What is passed on?
 - What parts of a story are preserved through transmission?
 - What changes are introduced?



Minimally Counterintuitive (MCI) Bias

- Tales of the supernatural are highly successful culturally
- Fairy tales, ghost stories, myths and legends
- But why?



MCI Bias

Basic, intuitive assumptions about the world around us (Boyer, 1994)

Folk Biology

Like begets like

Grows and dies

Requires
sustenance

Folk Physics

Solidity – Objects
cannot occupy the
same space

Continuity –
Objects exist
continuously in
space and time

Folk Psychology

Sentient being have
goals, feelings,
mental states etc.

We can only know
what we've seen or
experienced

Boyer, P. (1994).
The naturalness of
religious ideas: A
cognitive theory of
religion. Berkeley,
CA: University of
California Press.

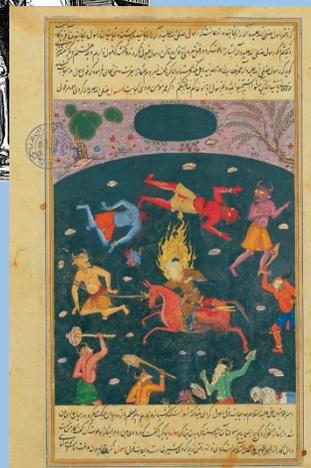
MCI Bias

Counterintuitive Concepts

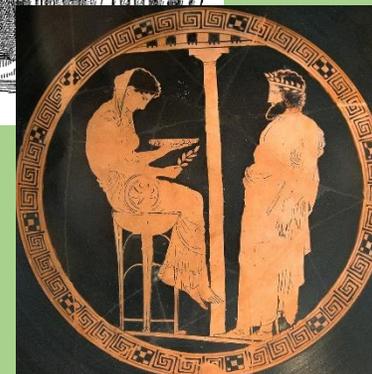
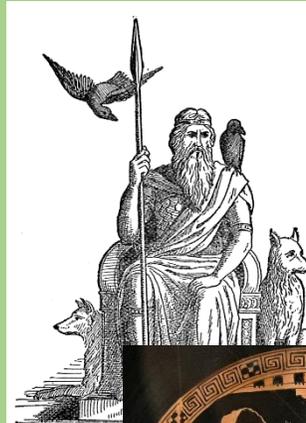
Folk Biology



Folk Physics



Folk Psychology



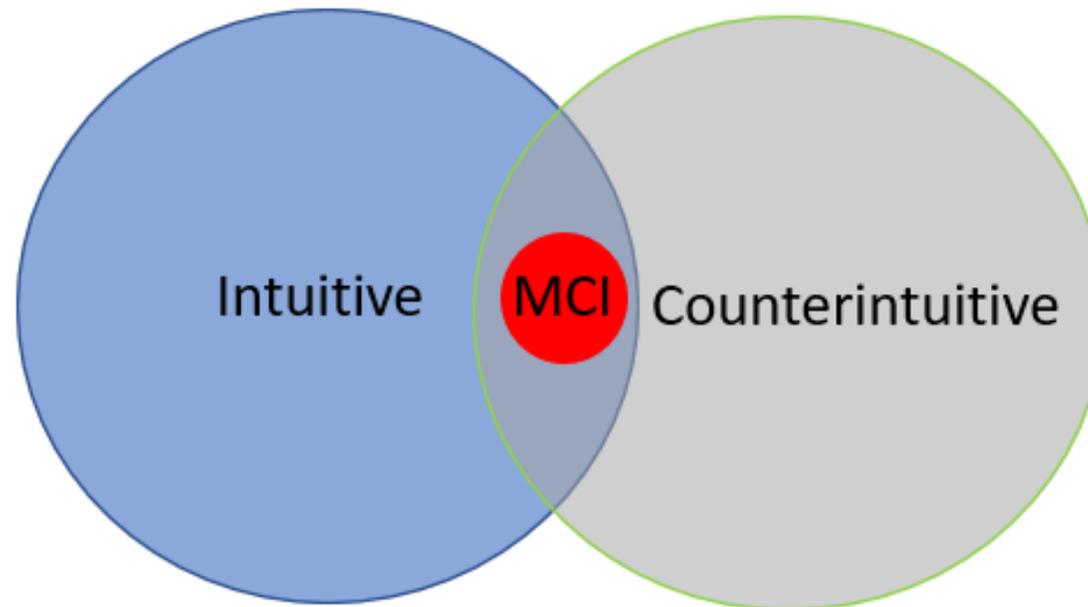
MCI Bias

Not all counterintuitive concepts are equal!

e.g. an invisible ladder vs an invisible, weightless ladder that can read minds and talk while being in two places at once.

Sweet spot between intuitive (comprehension) and counterintuitive (attention)

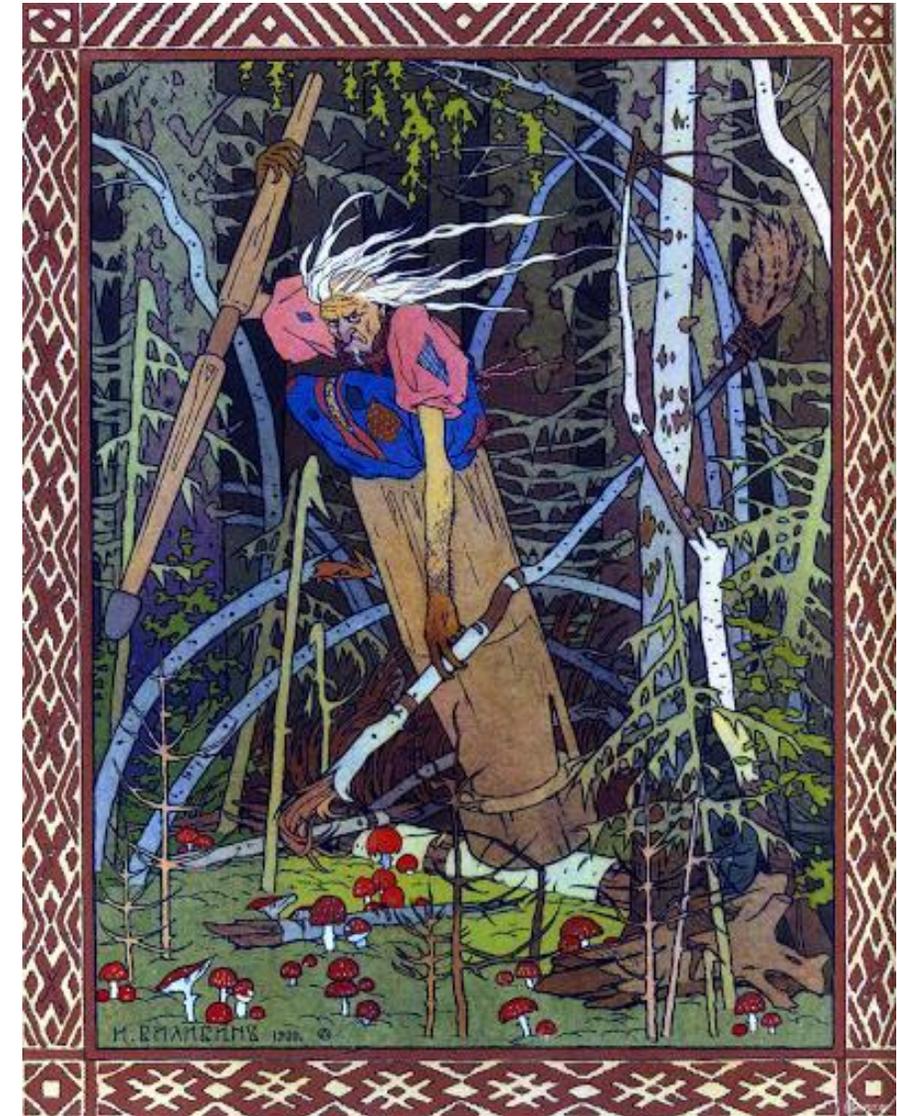
= *Minimally Counterintuitive Concepts*



Burdett et al (2009)

Counterintuitive items coded in a cross-cultural set of folktales

Book title	Number of folktales	Region
<i>Folk Tales from Chile</i>	10	South America
<i>Russian Folk Tales</i>	12	East Eurasia
<i>Magyar Folk Tales</i>	11	Mediterranean
<i>Lion and Jackal with other Native Folk Tales from South Africa</i>	8	Sub-Saharan Africa
<i>Chinese Myths and Legends</i>	8	East Eurasia
<i>The Lion's Whiskers: Tales from High Africa</i>	8	Saharan Africa
<i>Folk Tales of North America</i>	8	North America
<i>Folk Tales of the South Pacific</i>	8	Pacific



Burdett, E. R., Porter, T., & Barrett, J. (2009). Counterintuitiveness in folktales: Finding the cognitive optimum. *Journal of Cognition and Culture*, 9(3-4), 271-287.

Burdett et al (2009)

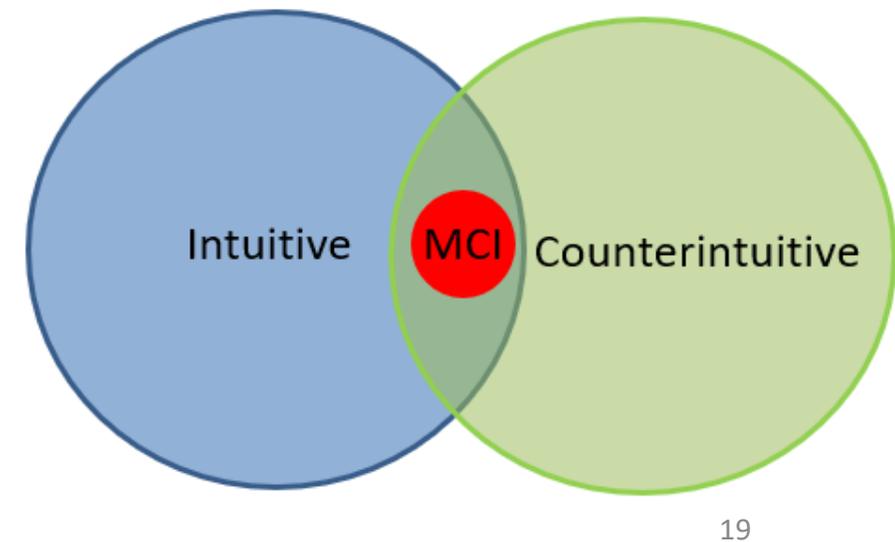
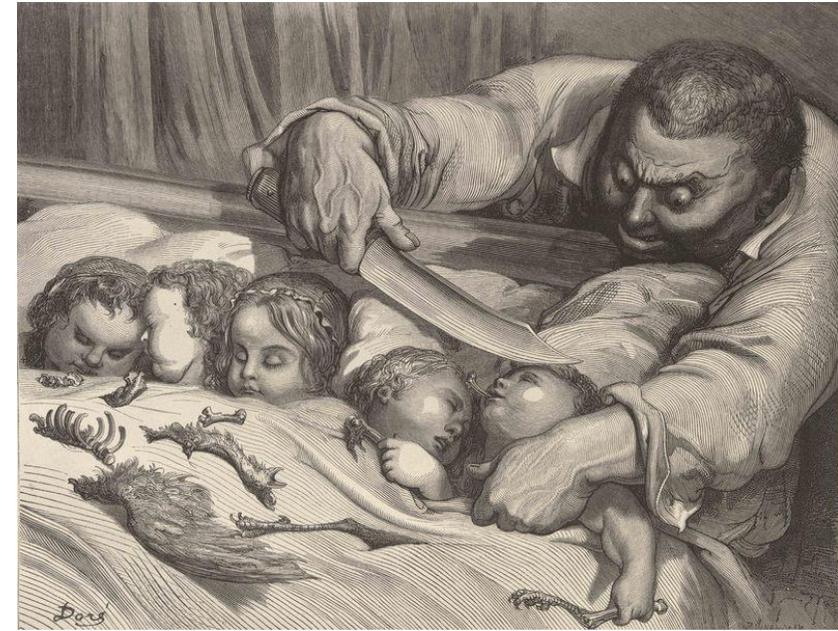
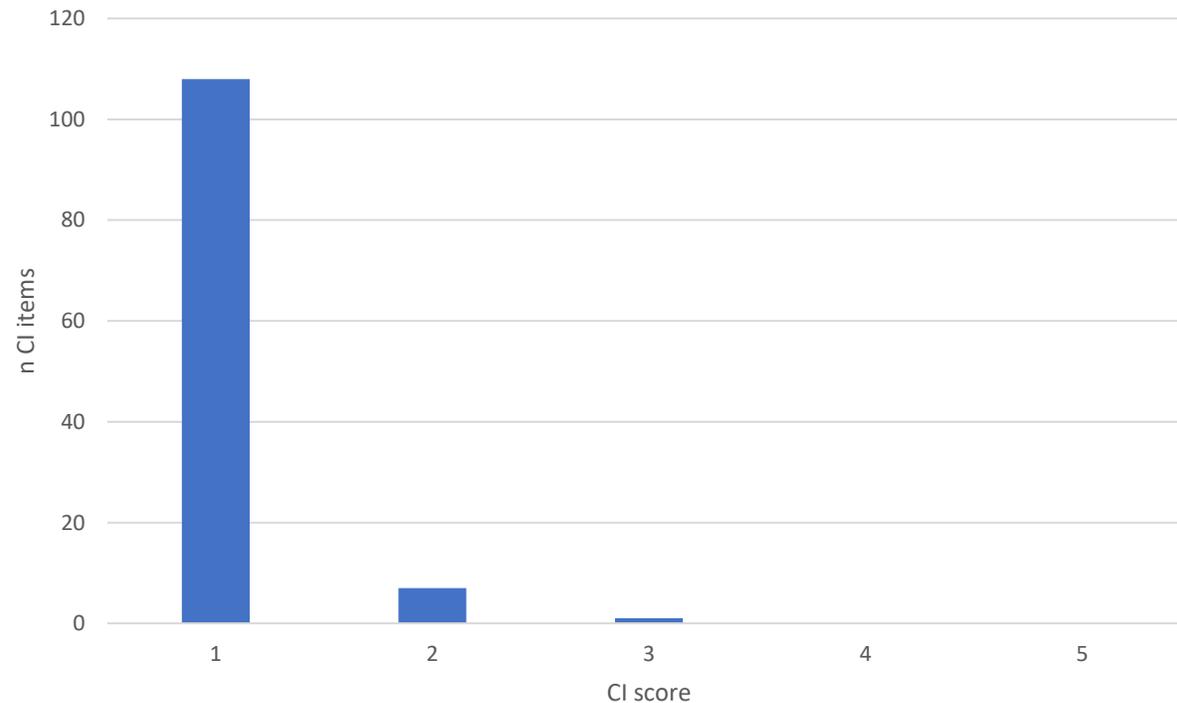
Counterintuitive items coded in a cross-cultural set of folktales

Concept (public representation)	Coding	Counterintuitiveness score
A woman with jet black hair and eyes	HUMAN	0
A dead woman	HUMAN	0
A dead woman who comes back to life	HUMAN ^b	1
A dead woman who comes back to life only at night	(HUMAN ^b) ^u	2
A dead woman who comes back to life and takes off her head only at night	HUMAN ^(b+b) ^u	3
A brown horse with four legs and a long tail	HORSE	0
A horse that talks	^M HORSE	1
A talking tiger that gives birth to domestic cats	^M TIGER ^b	2
An axe that can move on its own	^A AXE	1
An invisible ladder	LADDER ^P	1



Burdett et al (2009)

- Total of 116 CI items identified by team of independent coders
- 99% CI score 1-2
- Supports hypothesis of *minimal* counterintuitiveness (MCI)



MCI Bias

- Supported by a number of studies using transmission chains and recall experiments (Barrett & Nyhof 2001; Boyer & Ramble 2001)
- Some suggest a cognitively optimal number of counterintuitive elements:
 - 1-2 (Burdett et al, 2009)
 - 2-3 (Norenzayan et al, 2006)

Norenzayan, A., Atran, S., Faulkner, J., & Schaller, M. (2006). Memory and mystery: The cultural selection of minimally counterintuitive narratives. *Cognitive science*, 30(3), 531-553.



MCI Bias

How does MCI bias operate?

As a function of individual concepts within a narrative -
Individual concepts have inherent transmission advantage

Or

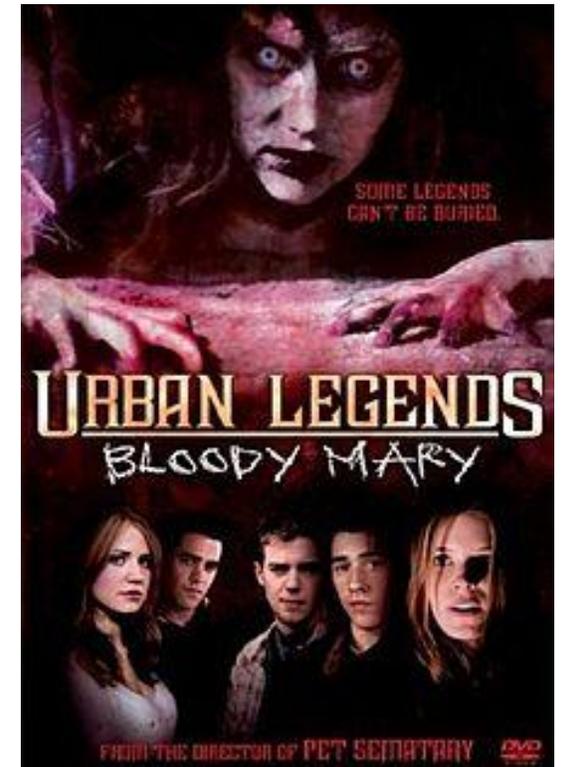
As a function of the whole narrative – The narrative as a
whole gains a transmission advantage

BLOODY MARY



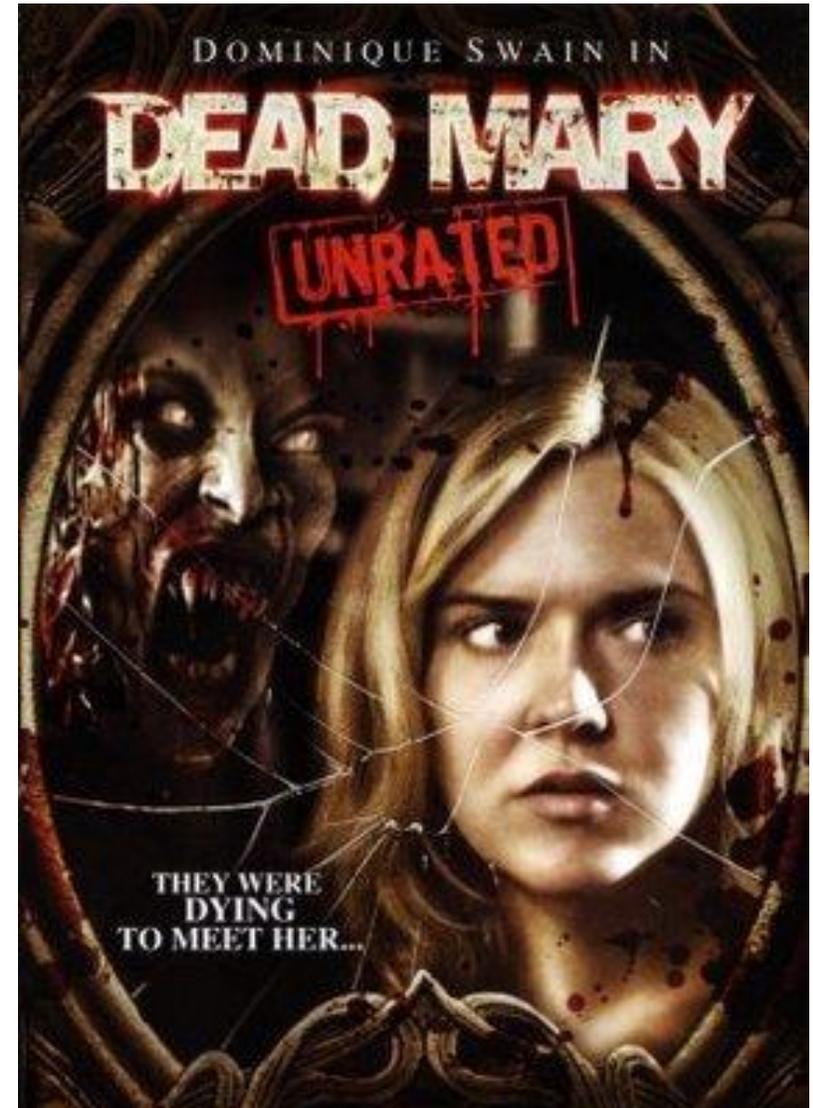
BLOODY MARY

- Origin in older mirror divination folklore – Accidental summoning of horrific figure.
- Modern legend has from post-war USA – Earliest published version in 1976
- Mary Worth, Mary Whales, Black Agnes, the White Lady, the Bell Witch and Svarte Madame.
- Britain, North America, Sweden, Holland, France, Australia, Japan and Thailand.



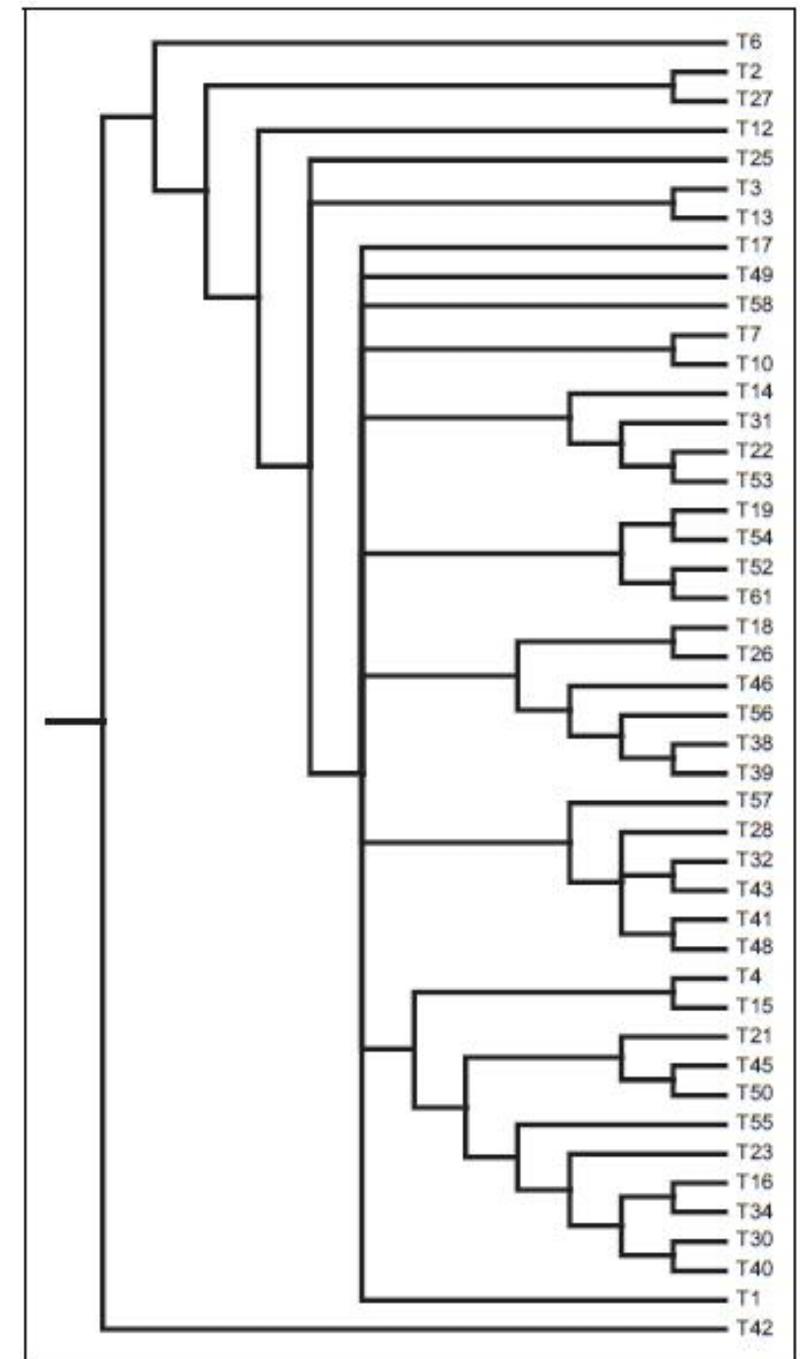
BLOODY MARY

- 45 variations collected – Any contemporary tale featuring the deliberate summoning of a supernatural figure using a mirror.
- 36 plot variables (‘characters’) were coded as present or absent.
- Number of phrase repetitions, supernatural figure, background of ghost, nature of injury of victim, means of escape etc.
- These concepts were also identified as counterintuitive (appearing out of mirror) and intuitive (takes place in a bathroom).



MCI Content in **BLOODY MARY**

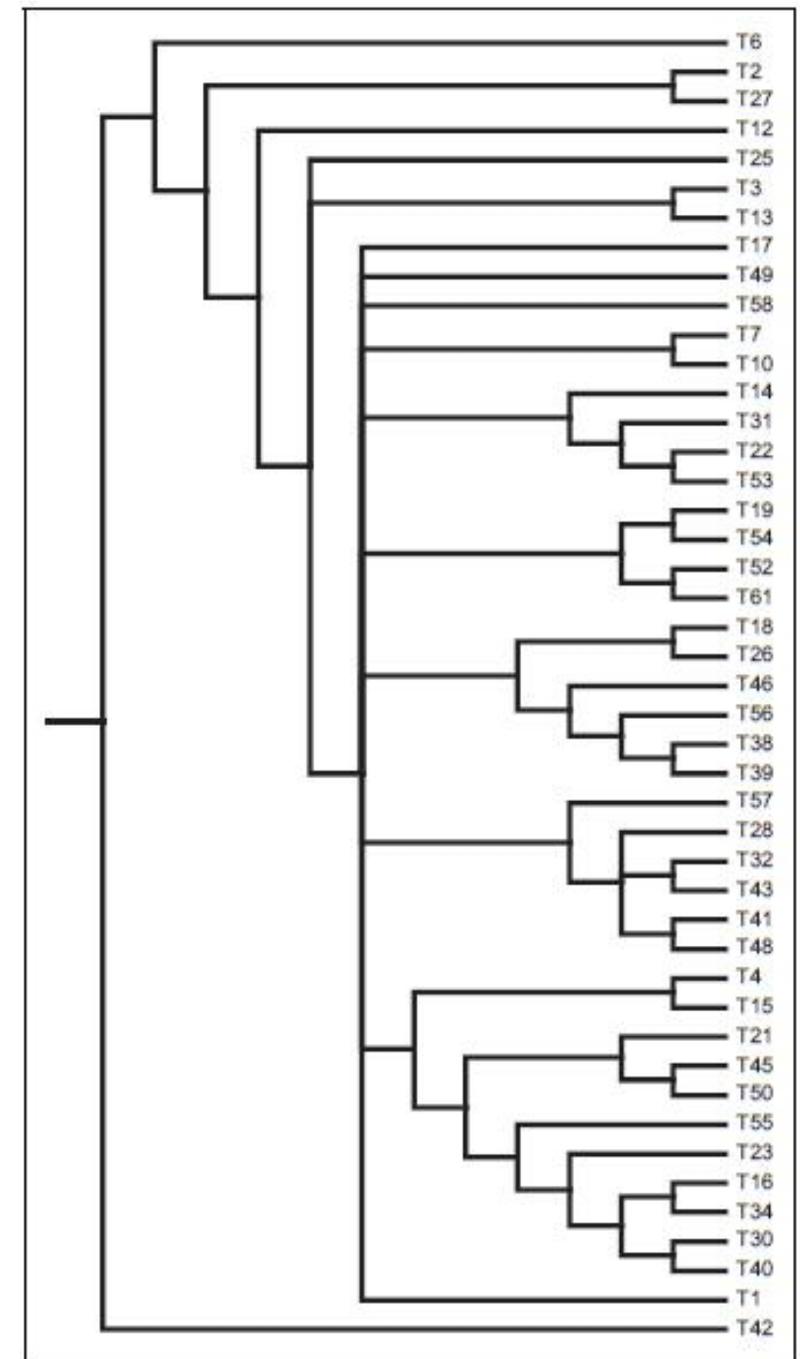
- Range of 1-4 counterintuitive concepts.
- 91% featured 1-3 counterintuitive concepts.
- Fits within fixed cognitive optimum suggested by Barrett and Norenzayan.



MCI Content in **BLOODY MARY**

- No significant difference between counterintuitive and intuitive concepts
- Intuitive and Counterintuitive concepts were equally stable in transmission

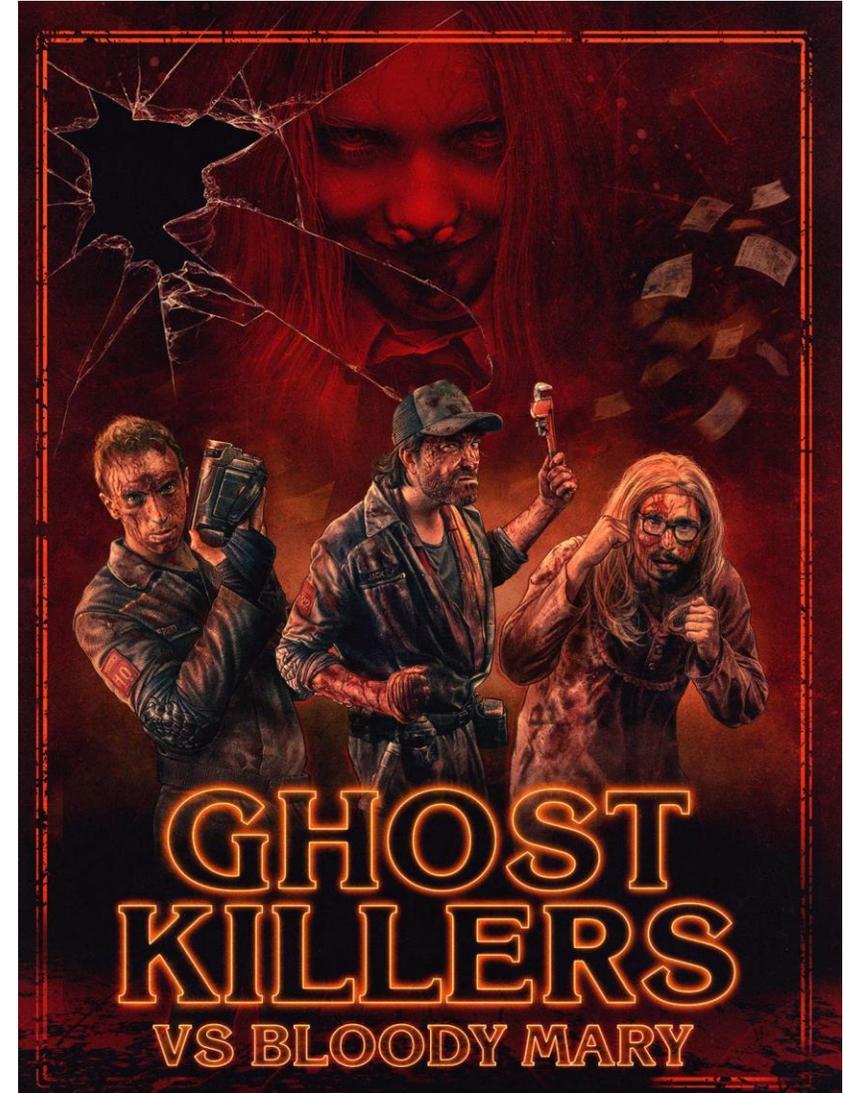
Stubbersfield, J., & Tehrani, J. (2013). Expect the Unexpected? Testing for Minimally Counterintuitive (MCI) Bias in the Transmission of Contemporary Legends: A Computational Phylogenetic Approach. *Social Science Computer Review*, 31(1), 90-102



MCI Bias

- MCI bias works as a function of the narrative as a whole not on individual concepts.
- No inherent transmission advantage – depends on narrative context
- Upal (2011): Questioned specific cognitive optimum – Cohesion is key

Upal, M. A. (2011). Memory, mystery and coherence: Does the presence of 2-3 counterintuitive concepts predict cultural success of a narrative? *Journal of Cognition and Culture*, 11, 23–48



MCI content in Urban Legends

- 260 urban legends collected from snopes.com using the 'randomizer' function
- Coded for the presence of bias-exploiting content
- Number of counterintuitive features ranged from 1-2
- 93% of the MCI legends featured just one MCI object or concept
- But MCI was least frequently coded - 6% of legends

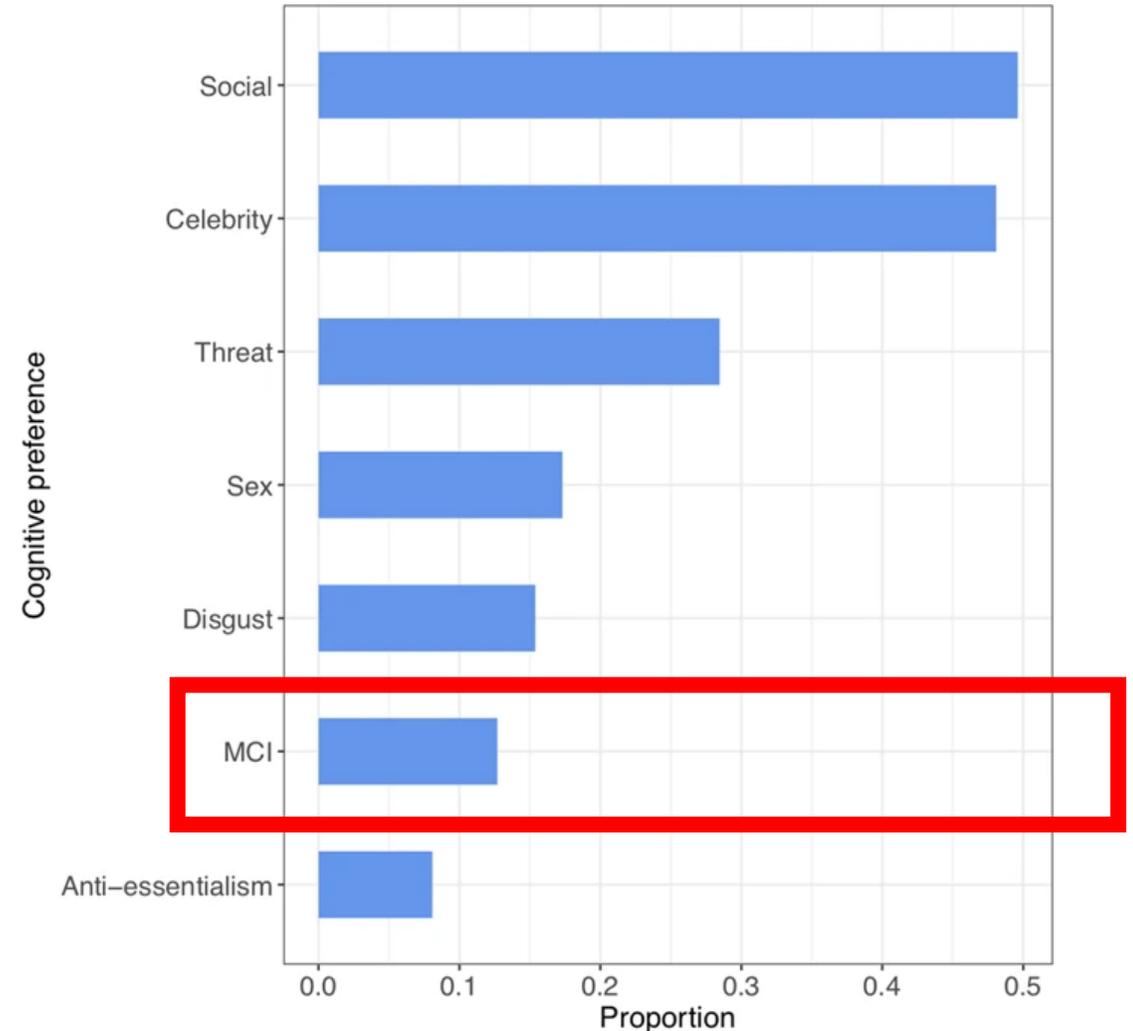
MCI content in 'Fake News'

Acerbi 2019

- 260 Fake News articles
- Coded for the presence of bias-exploiting content
- MCI low – 13%



Acerbi, A. (2019). Cognitive attraction and online misinformation. *Palgrave Communications*, 5(1), 1-7.



Emotional content bias

Known to be important in storage and recall of memories in individuals (LaBar & Cabeza 2006)



LaBar, K.S., & Cabeza, R. (2006). Cognitive neuroscience of emotional memory. *Nature Reviews Neuroscience*, 7, 54-64.

Disgust Bias

Heath, Bell & Sternberg 2001

- Transmission chain study
- Advantage for more disgusting urban legends
- Reflected in distribution of urban legends online

Heath, C., Bell, C., & Sternberg, E. (2001). Emotional selection in memes: the case of urban legends. *Journal of personality and social psychology*, 81(6), 1028.



Disgust Bias

Eriksson & Coultas 2014

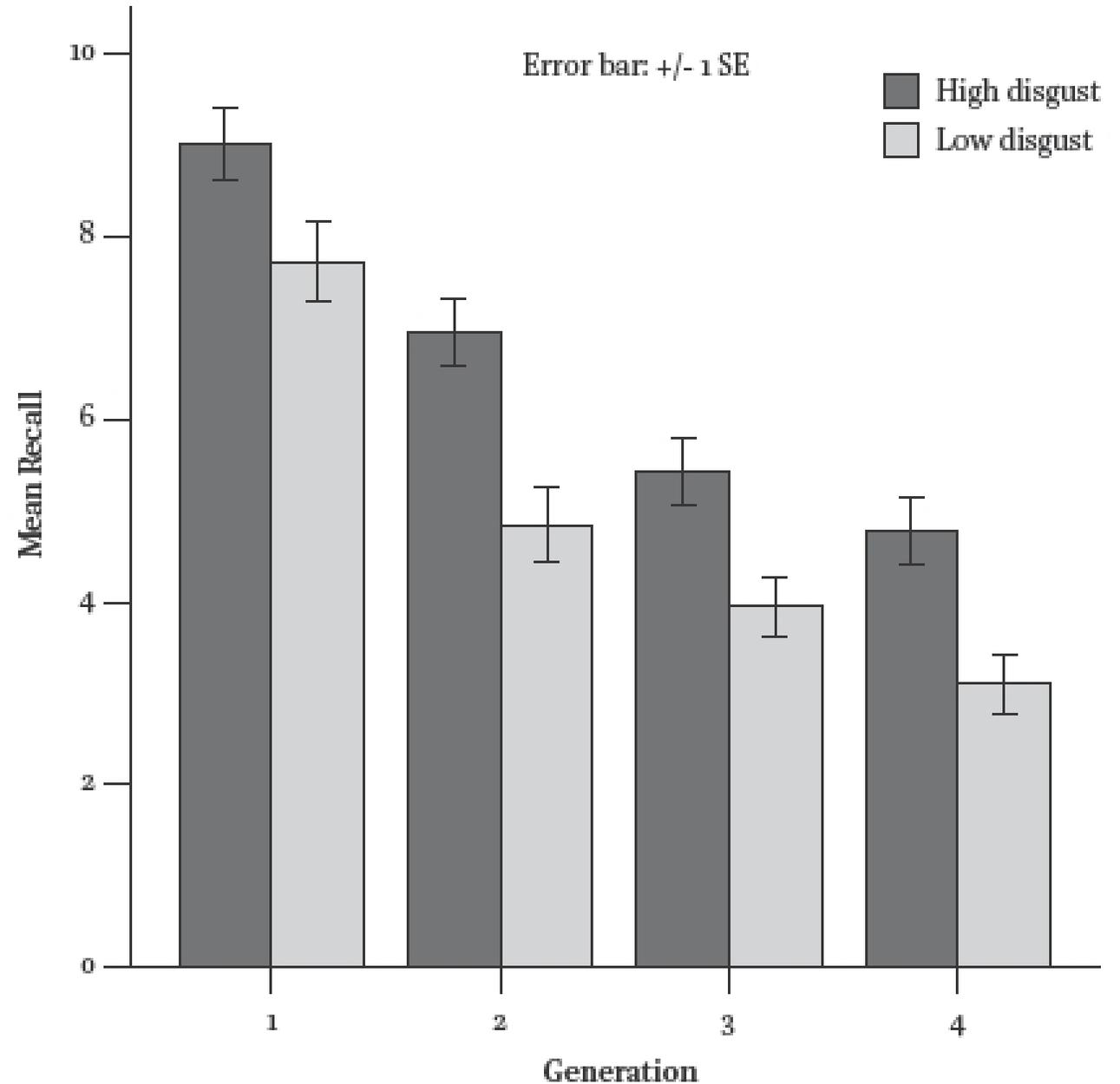
- Expanded on Heath et al (2001)
- Used urban legends in transmission experiment
- Varied is levels of disgust:
 - High: “When returning to clean up the kitchen Jasmine found that the flour she had used was infested with maggots”
 - Low: “When returning to clean up the kitchen Jasmine tasted the cake mix and found it tasted better than ever.”

Eriksson, K., & Coultas, J. C. (2014). Corpses, maggots, poodles and rats: emotional selection operating in three phases of cultural transmission of urban legends. *Journal of Cognition and Culture*, 14(1-2), 1-26.

Disgust Bias

Eriksson & Coultas 2014

- More disgusting urban legends more faithfully transmitted



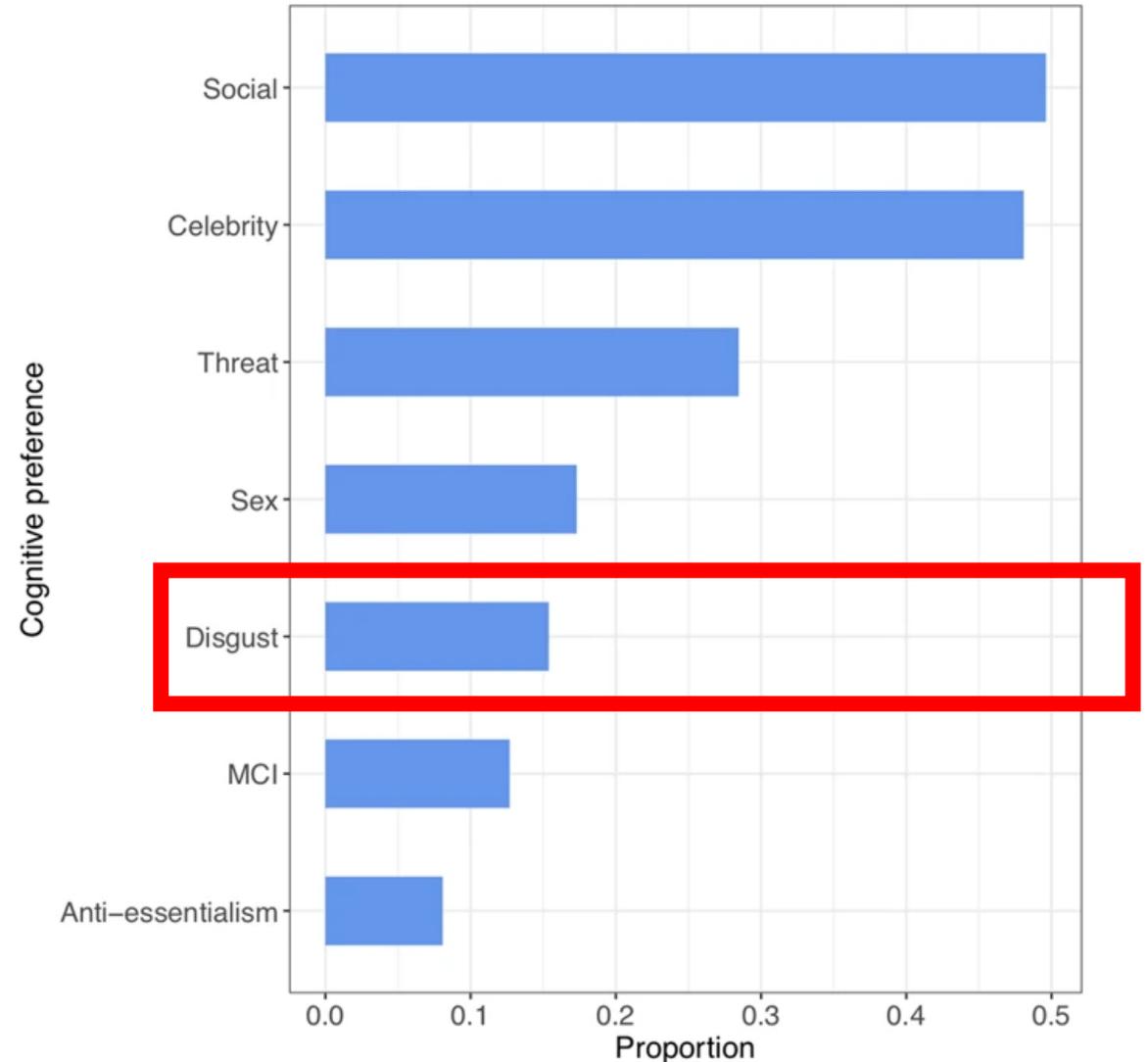
Disgusting content in Fake News

Vosoughi, Roy & Aral 2017

- Common emotions: fear, disgust, and surprise

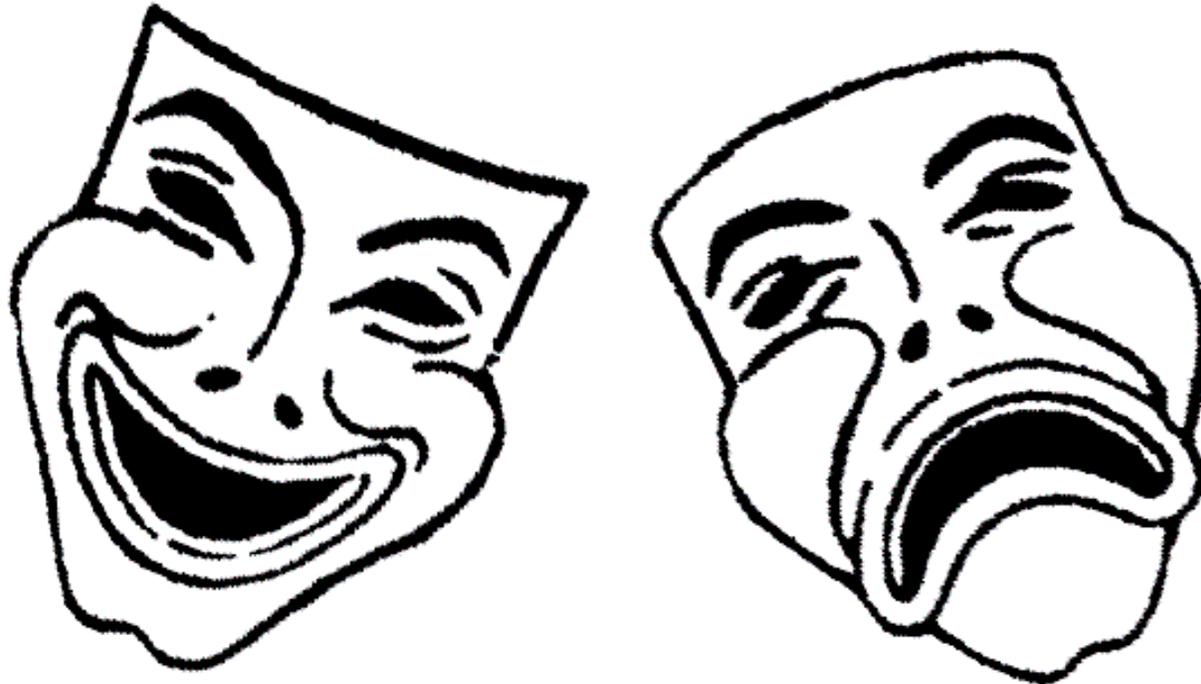
Acerbi 2019

- ~15% elicited disgust (largely absent from real news)



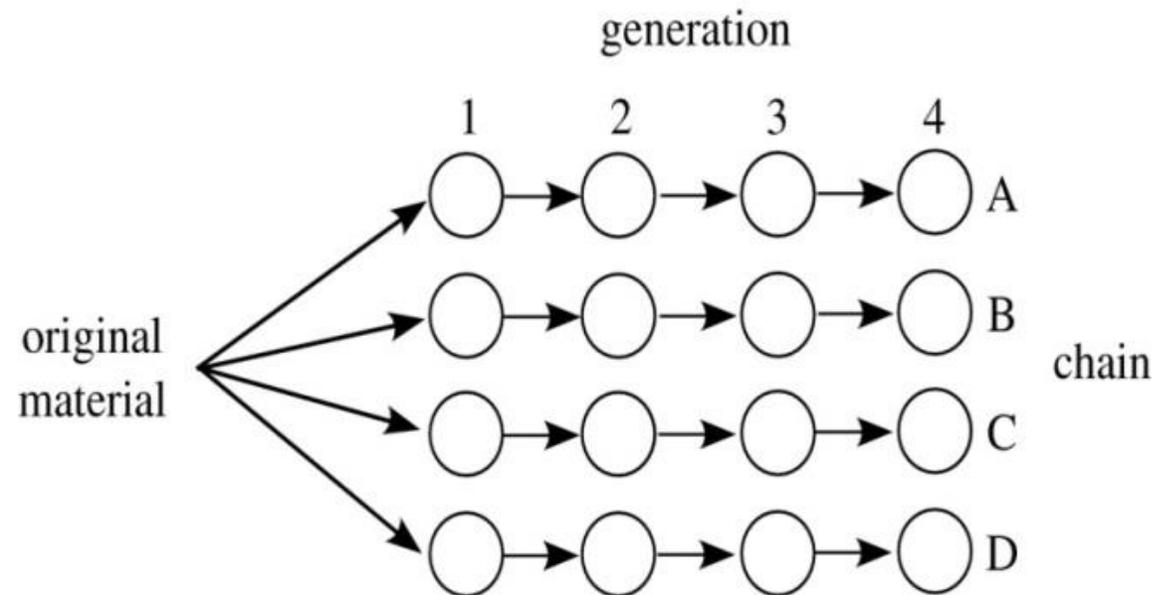
Emotional bias

- But disgust is not the only emotion evoked by folktales
- A general bias for emotional content?



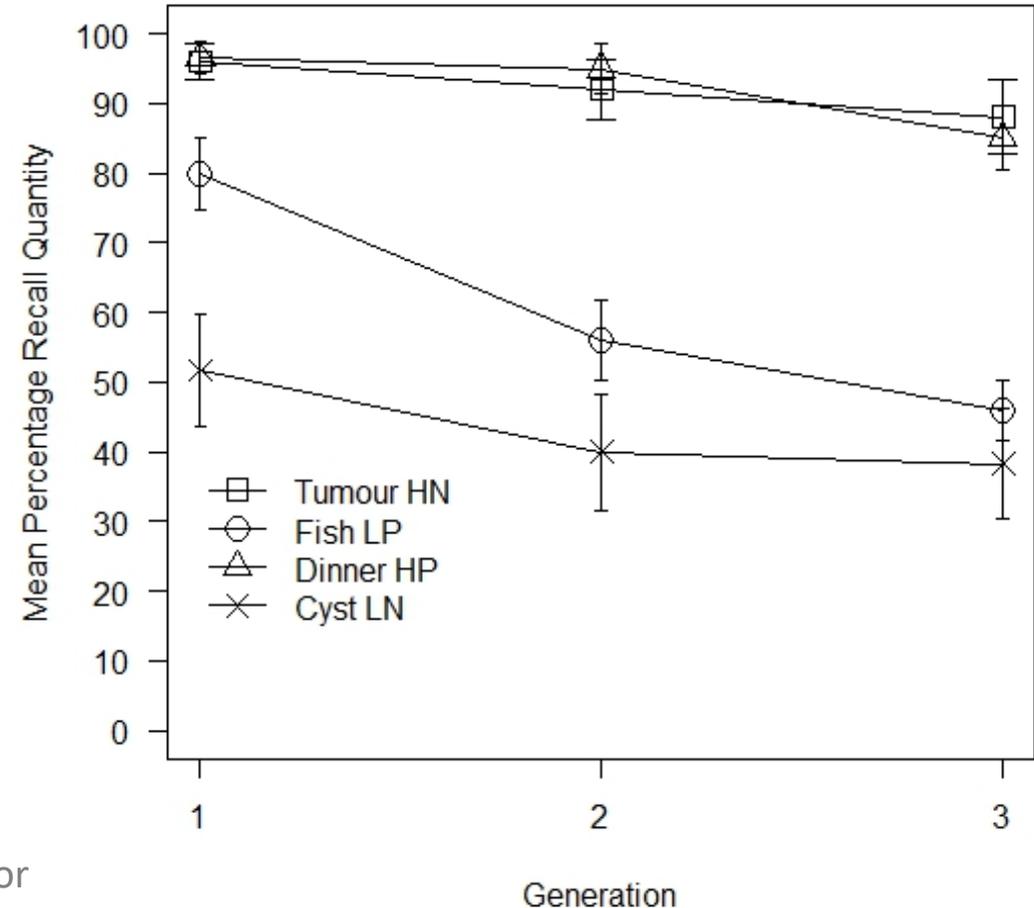
Emotional bias

- Examine emotional bias as general phenomenon
- Varied in emotion evoked, included disgust, amusement, surprise etc.
- High emotional urban legends vs low urban legends emotion legends in linear transmission chain



Emotional bias

- High emotion legends showed greater transmission fidelity than low emotion legends
- No effect of valance, no particular effect of disgust
- Evidence of level of emotion being key rather than specific emotion



Emotional bias

- Amusing content was the most frequently coded emotion in urban legends - 47% (disgust – 13%)
- Eriksson, Coultas and de Barra (2016) – Disgust bias not found in Indian sample, although amusement successful in both
- General phenomenon – not exclusive to disgust
- Importance of valence is unclear...



Negativity Bias

Bebbington et al 2017

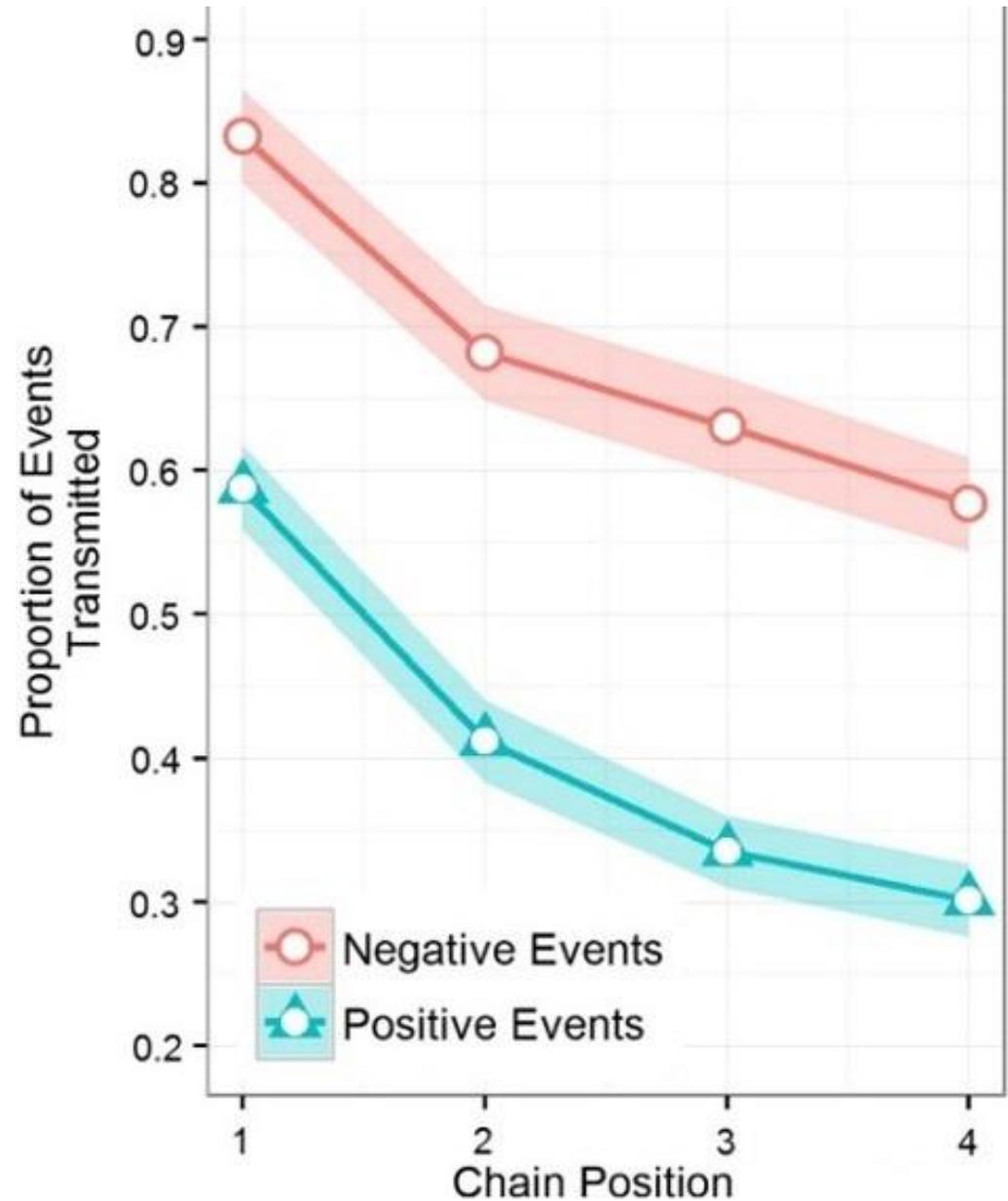
- Transmission chain design
- Story about a woman flying to Australia
- Positive: “When (the air hostess) returned she told Sarah that she would be moved to business class”
- Negative: “The man in the seat next to her seemed to have a nasty cold”
- Ambiguous: “Walking down the concourse, Sarah saw a young man take an old women's bag” i.e. stole the women's bag (negative) or helped her carry it (positive)

Bebbington, K., MacLeod, C., Ellison, T. M., & Fay, N. (2017). The sky is falling: Evidence of a negativity bias in the social transmission of information. *Evolution and Human Behavior*, 38(1), 92-101.

Negativity Bias

Bebbington et al 2017

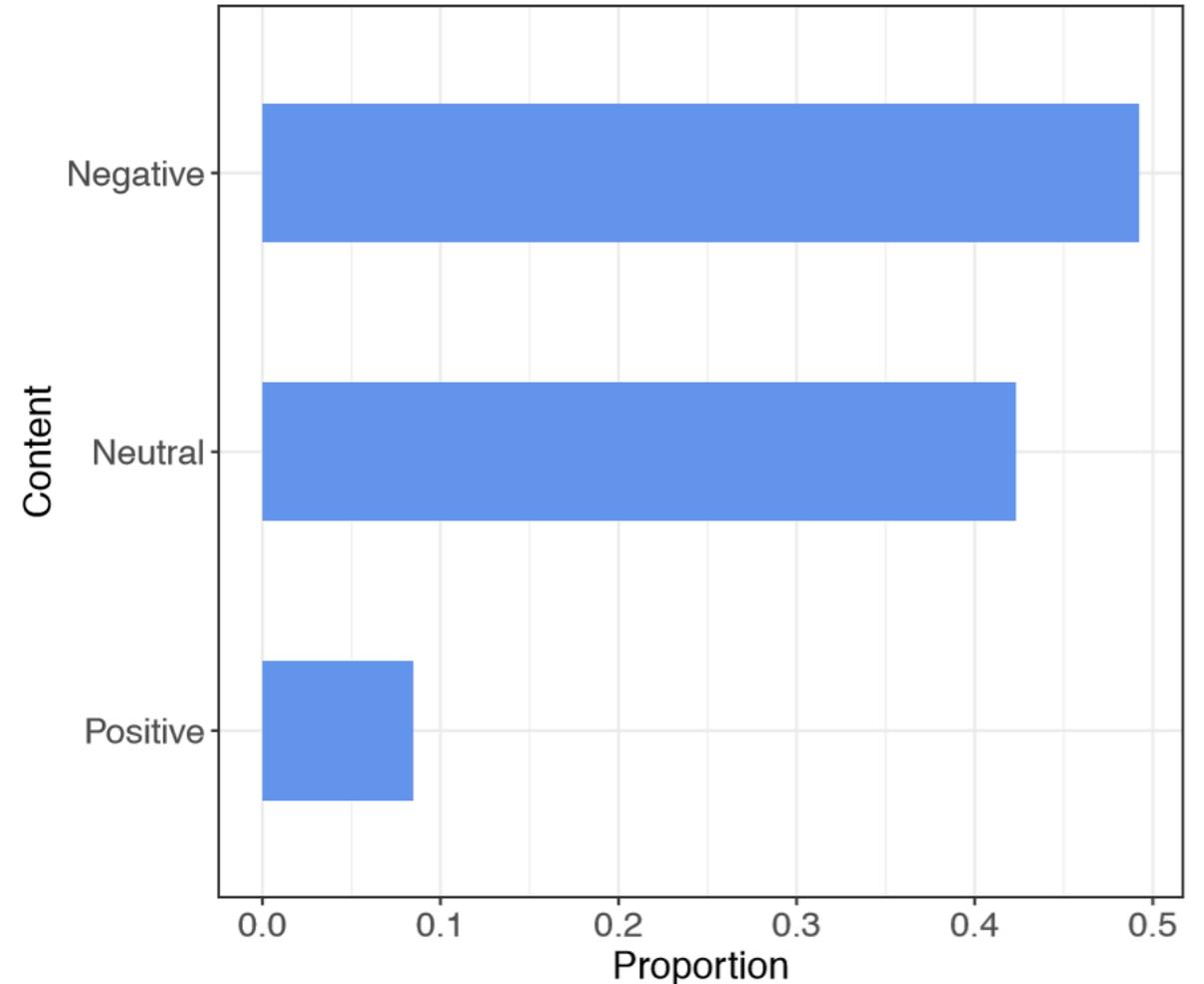
- Negative events survived better
- 60% of negative events preserved in final version
- 30% of positive events preserved in final version



Negativity Bias in Fake News

Acerbi 2019

- < 10% coded as positive
- Negative 5 x more numerous
- Why would negativity have an advantage?





Survival threat bias

Ecological survival information

- Human memory 'tuned' towards encoding and recalling fitness related information such as the locations of food sources or predators
- Robust support for survival processing compared to other forms of processing
 - Nairne, et al., 2007; Nairne & Pandierada, 2008, 2010; Kang, et al., 2008; Otgaar, Smeets, & van Bergen, 2010; Weinstein, Bugg, & Roediger, 2008

Nairne, J. S., Thompson, S. R., & Pandierada, J. N. (2007). Adaptive memory: Survival processing enhances retention. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 33(2), 263.



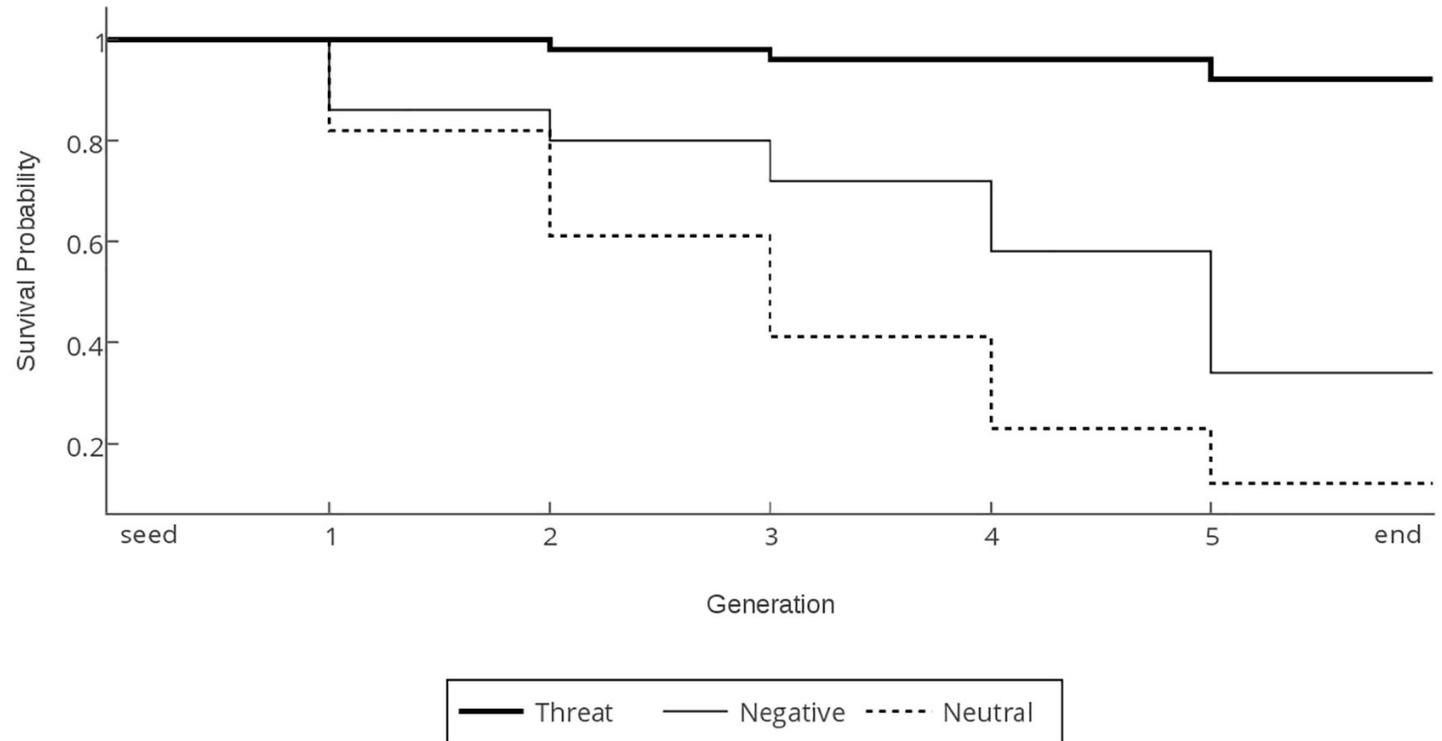
Threat bias: Blaine & Boyer 2018

- Transmission of danger-related rumours
- Format of a consumer reports (e.g. for acne cream)
 - May burn if applied to certain skin types (threat)
 - May smell strong while being applied (negative)
 - Is a cream-based acne medication (neutral)



Threat bias: Blaine & Boyer 2018

- Selection based transmission design
- Select 7 of 8 items to tell friend
- Generated new survey for next participant



Blaine, T., & Boyer, P. (2018). Origins of sinister rumors: A preference for threat-related material in the supply and demand of information. *Evolution and Human Behavior*, 39(1), 67-75.

Survival Threats in Folktales

Urban Legends

- Ecological survival info - 27% of legends
- Subdivided into two levels: high, concerning serious injury or death, and low, concerning injury or potential injury
- High survival information - 20% of legends
- Low survival information - 7% of legends.

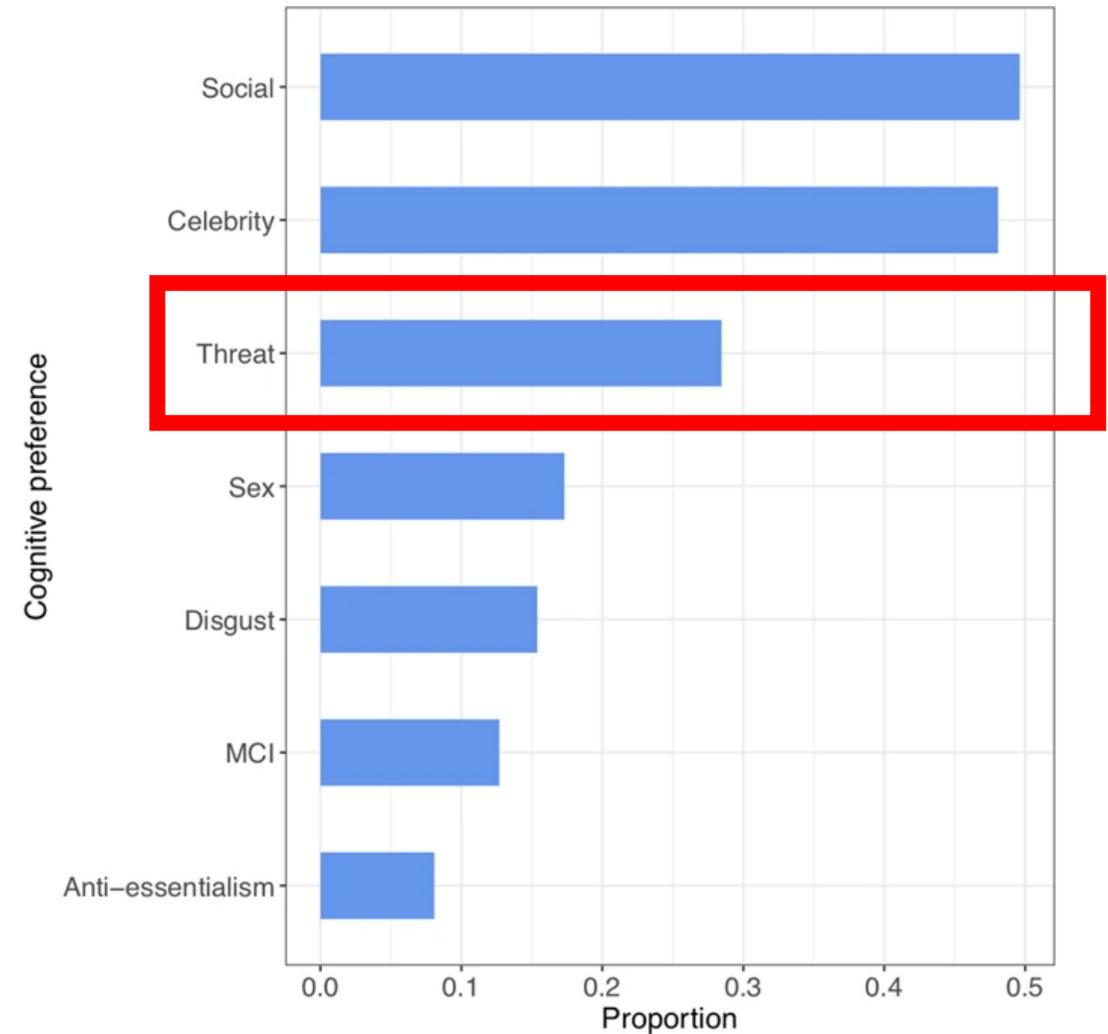
Oral tales

- Suggested that oral tales of foraging peoples are used as to transmit this survival relevant information (Sugiyama, 2001)

Survival Threats in Fake News

Acerbi 2019

- ~30% were threat related
- Fake News about killers, bombers, sexual offenders



What's more believable?

“Despite their fierce appearance, German shepherds are considered loyal and intelligent pets. A recent study in the U.S. notes that other breeds of dog are responsible for 89% of dog attacks”



“Although proponents consider German shepherds loyal and intelligent pets, a recent study in the U.S. notes that this breed is responsible for 11% of dog attacks”



Negativity Credulity: Fessler et al 2014

- Online survey: “Truth or Trash? How Believable is the News today?”
- Two versions with items framed positively or negatively
- Rated statements from 1 - 7
- Rated negatively framed items as more likely to be true



Social Information Bias



The Social Brain & Machiavellian Intelligence Hypotheses

- Forming and keeping track of relationships in a complex social network
- Effective communication within large groups

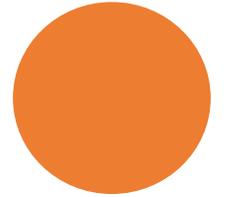


Consequences of a Social Brain

Social information bias

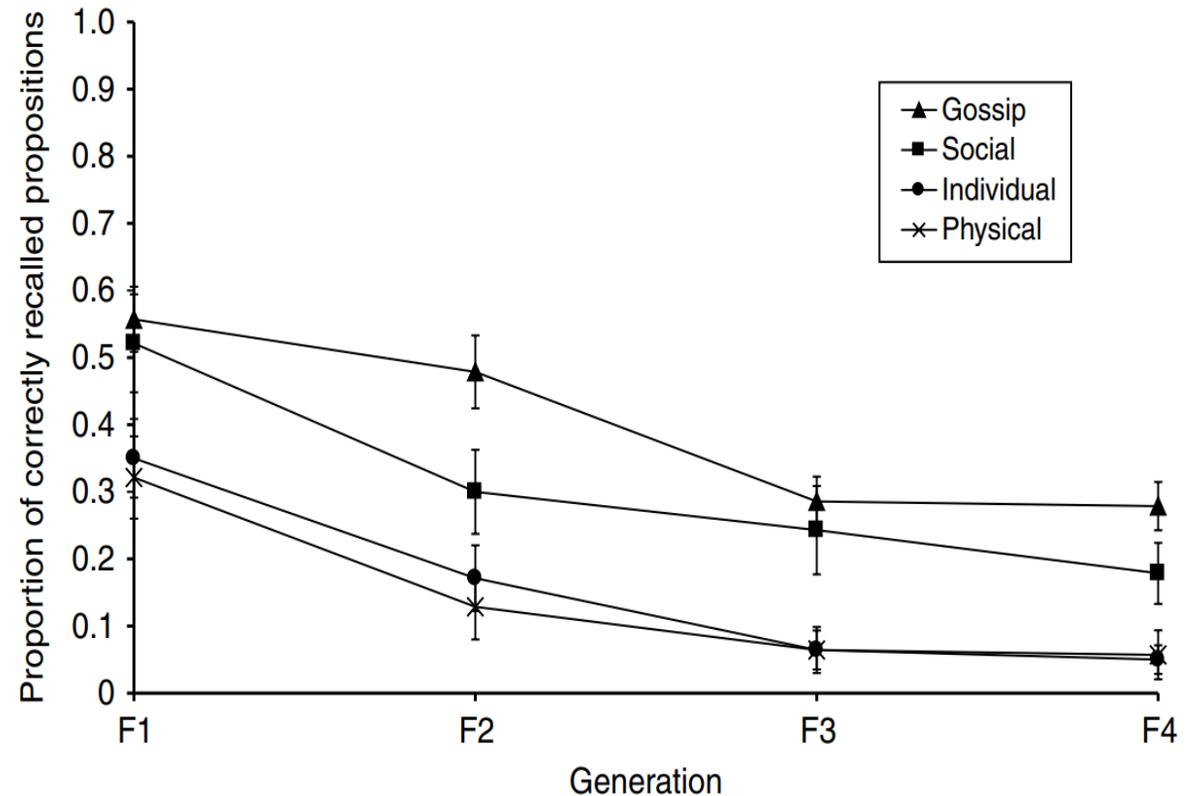
(Mesoudi, Whiten & Dunbar, 2006)

- Disposed towards social info over equivalent non-social info
- Susceptible to content which exploits bias
- Also biased towards fictional social relationships



Social information bias: Mesoudi et al, 2006

- Social information and equivalent non-social information passed along linear transmission chains
- Social information advantaged over non-social information



Mesoudi, A., Whiten, A., & Dunbar, R. (2006). A bias for social information in human cultural transmission. *British journal of psychology*, 97(3), 405-423.

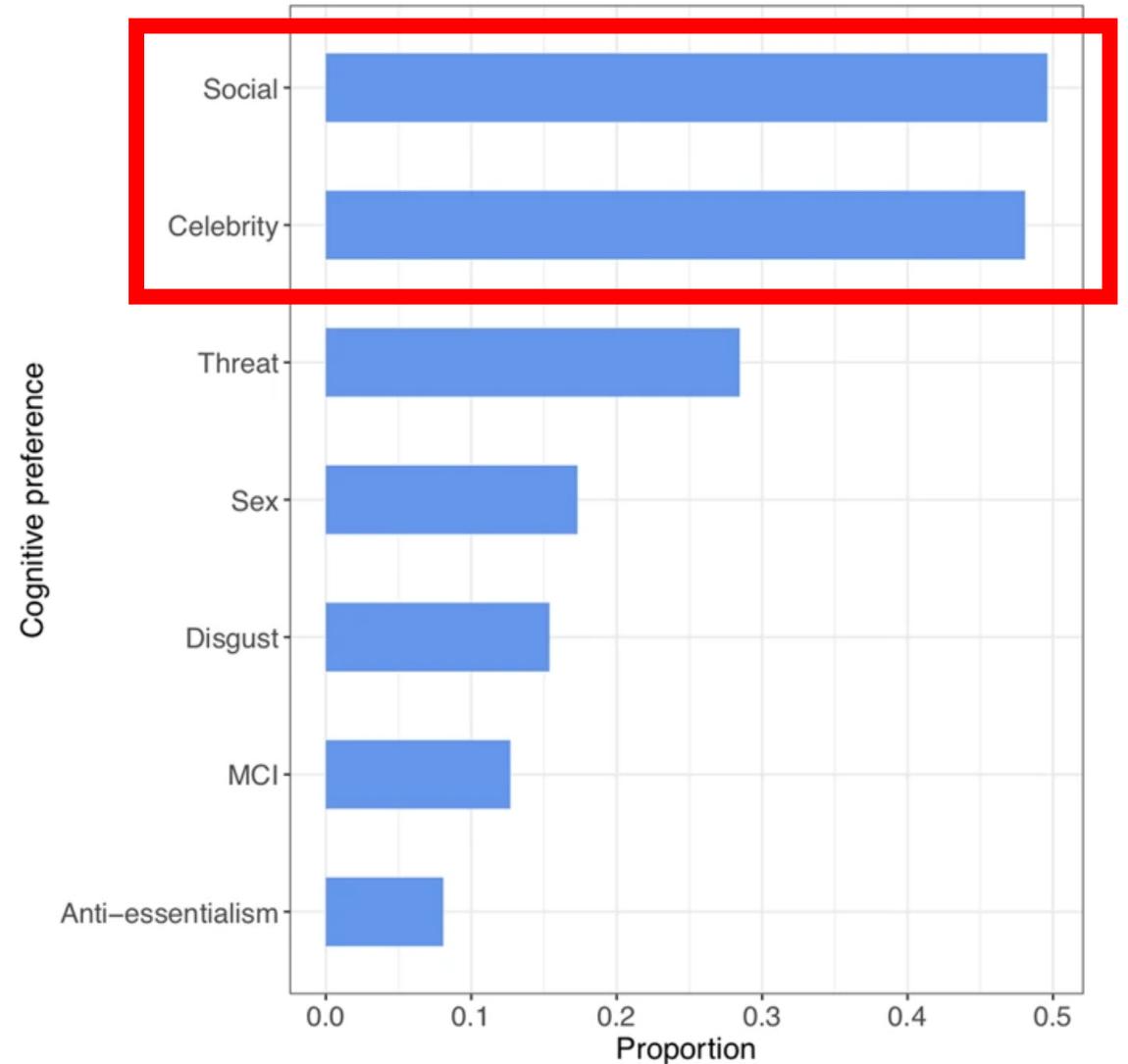
Social information in Urban Legends

- One of the most frequently coded - 77% of legends
- Subdivided into three levels: social context, social and social gossip
- Social was the most frequently coded - 49%
- Social context - 18%
- Social gossip - 9%

Social Information in Fake News

Acerbi 2019

- Social interactions and gossip (50%)
- Celebrity content (48%)



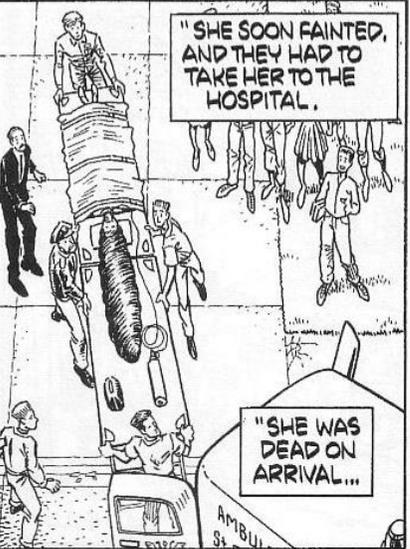
What happens if content biases
compete or combine?

Social and Survival Info Bias

- Testing both social information bias and survival information bias in transmission
- How does combining both effect transmission?
- Three phases of transmission:
 1. Choose to receive
 2. Encode and retrieve
 3. Choose to transmit

Social and Survival Info Bias

The SPIDER in the HAIRDO



Social and Survival Info Bias



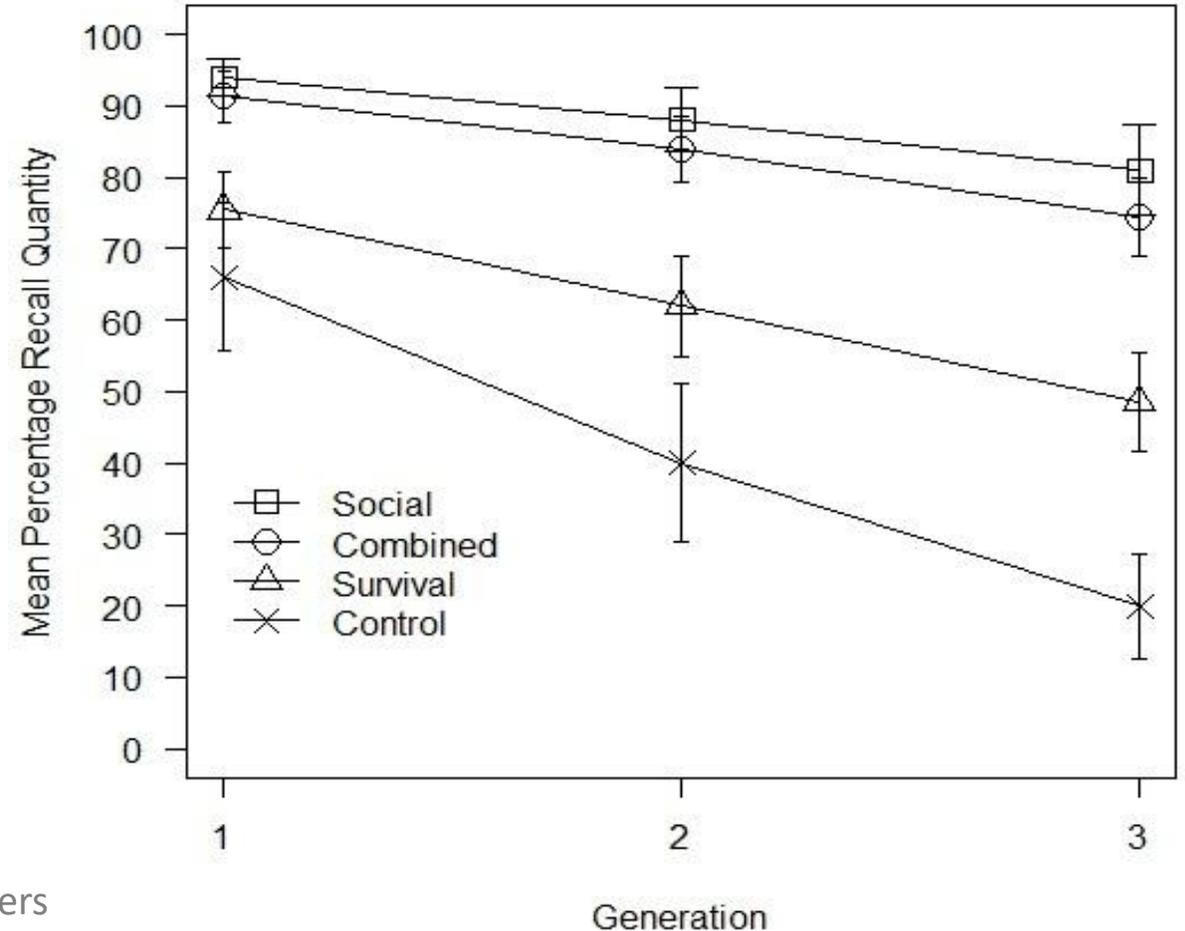
Social and Survival Info Bias

Combined legend

One night a woman heard a baby crying outside her door. She rang the police because it was late and she thought it was weird. The police told her “whatever you do, do NOT open the door.” The woman said that she was worried that the baby would crawl into the street and get run over but the police then told her that a serial killer has a baby’s cry recorded and has been using it to coax women out of their homes so he can kill them.

Social and Survival Info Bias

- Recall based transmission
- Urban legends containing social info were most faithfully transmitted
- Higher than survival information and control



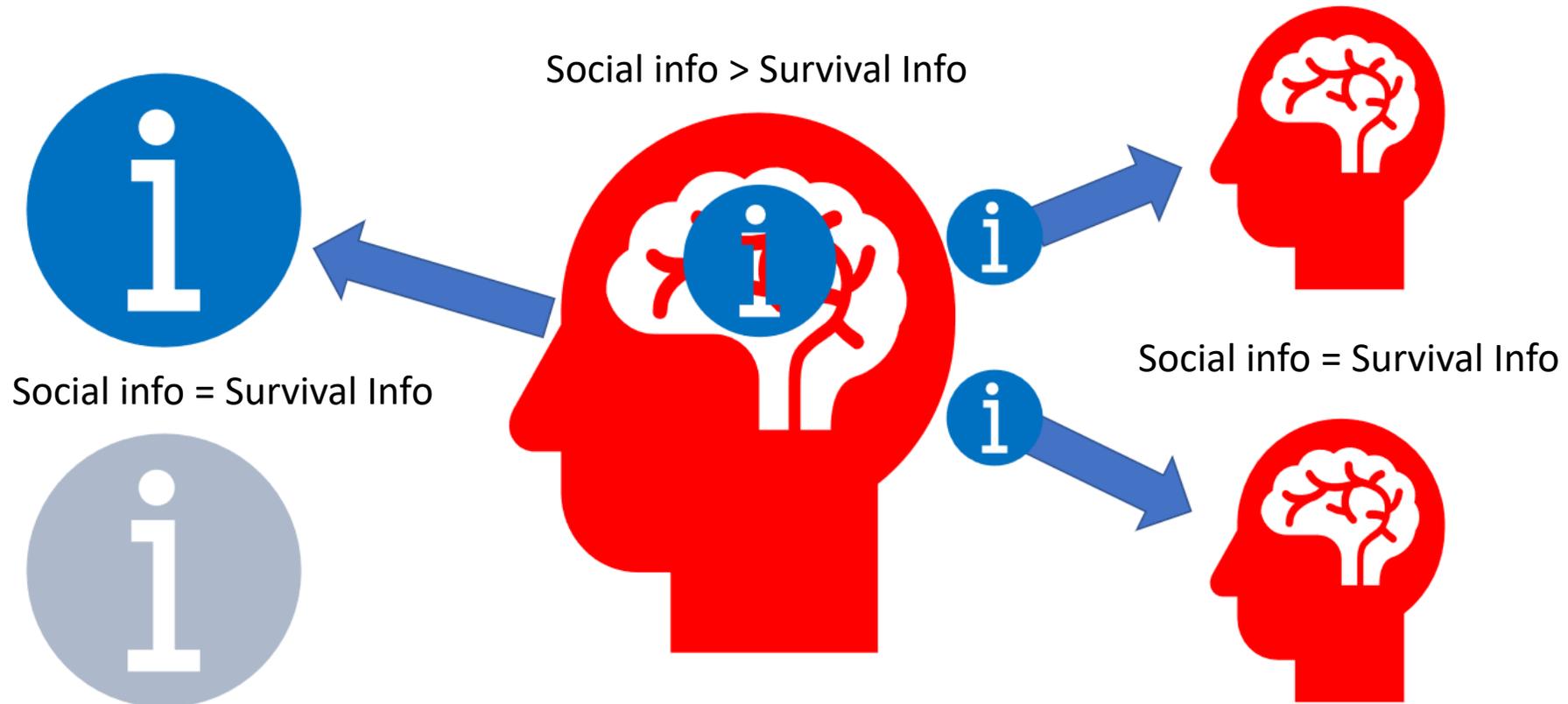
Social and Survival Info Bias

Selection based - Choose to receive and choose to transmit

- 'Headlines' created representing each legend
 - Woman killed by spiders in her hair
 - Serial killer lures women with a recording of a crying baby
 - Man caught naked by surprise birthday party
- Participants asked to put them in order based on interest of reading the story behind the headline
- Read legends (random order)
- Asked to order them in preference of passing on to another person

Social and Survival Info Bias

- No significant differences between legend types in either selection phase



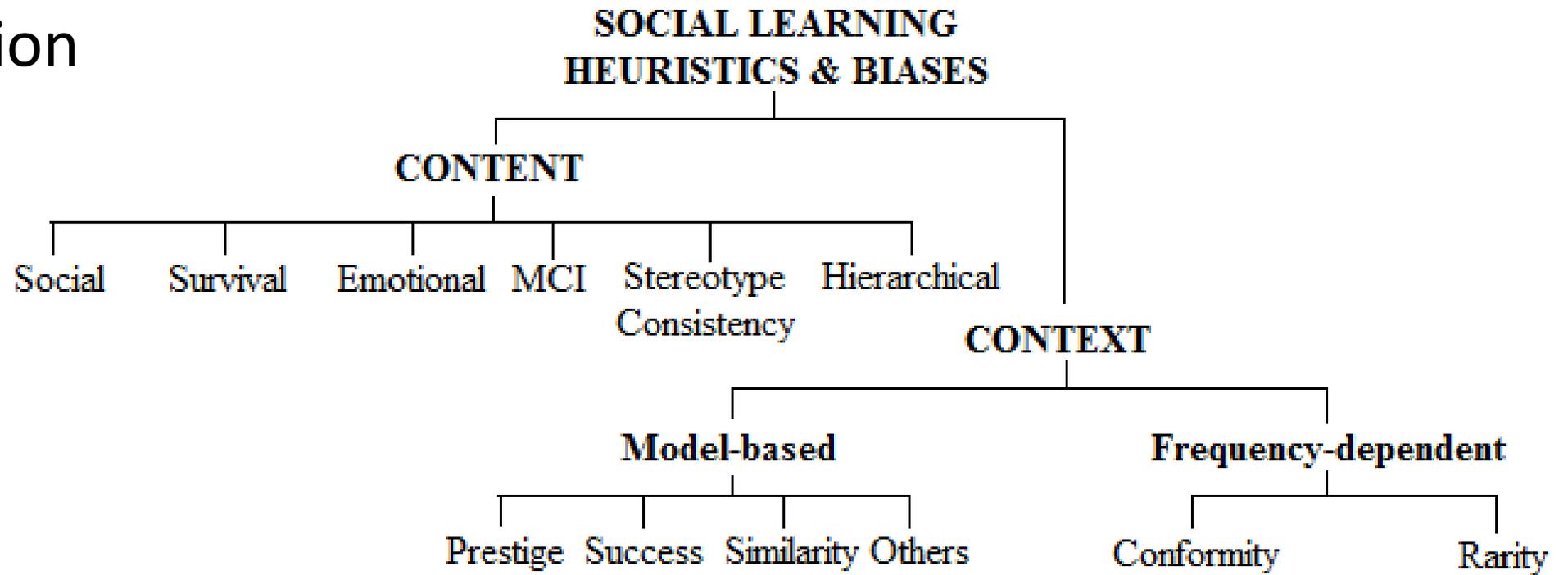


Future directions



What about context biases?

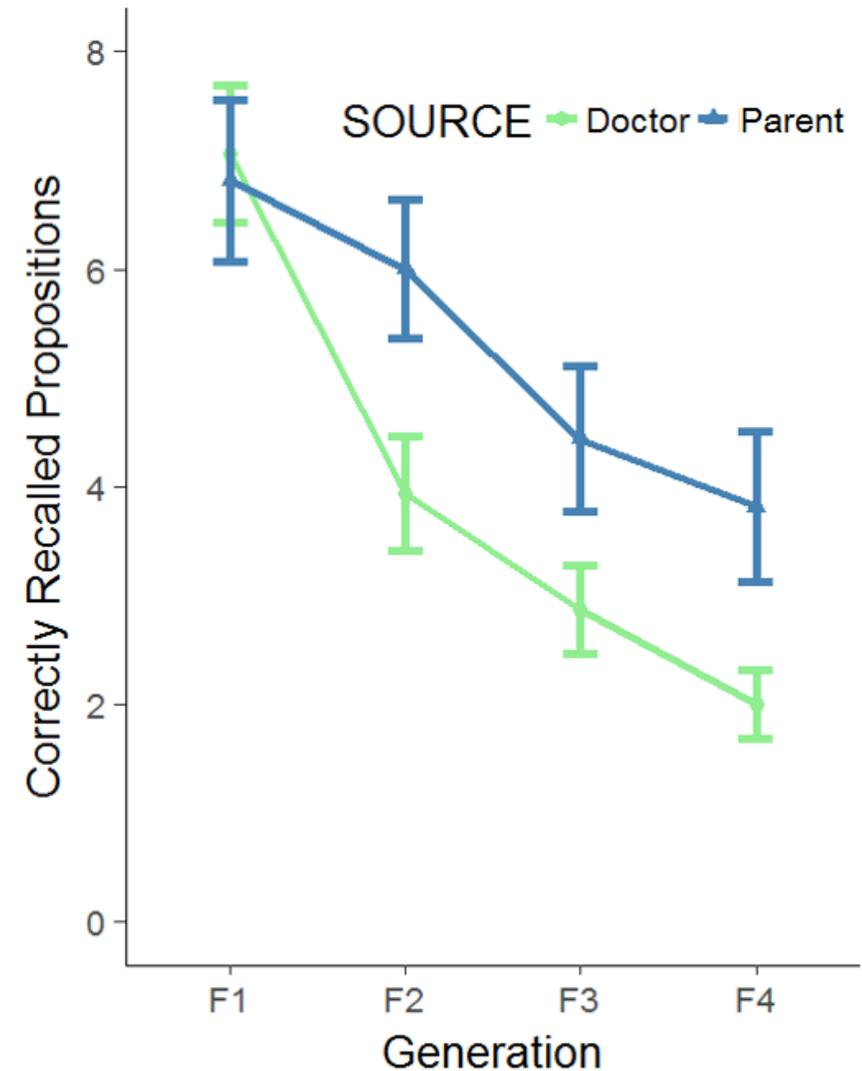
- Relative importance
- Interaction



Prestige/success?

- Transmission of vaccine messages
- Doctor – Expertise based vs Parent – Experience based
- Experience-based message more faithfully transmitted than the medical message provided by a doctor
- Can't separate from content – more emotional
- Could be parent perceived as more similar

Jiménez, Á. V., Stubbersfield, J. M., & Tehrani, J. J. (2018). An experimental investigation into the transmission of antivax attitudes using a fictional health controversy. *Social Science & Medicine*, 215, 23-27.



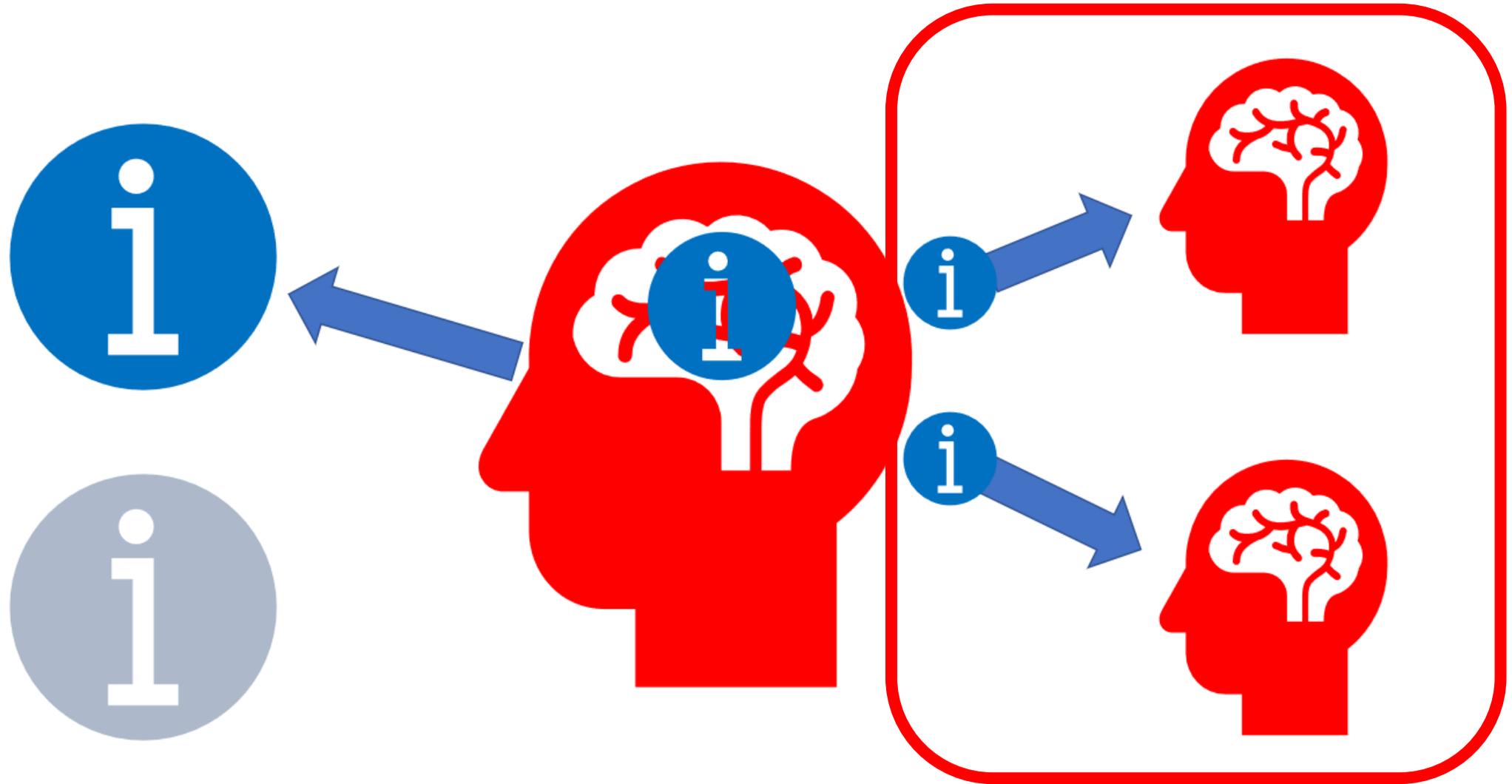
Content and Context

Berl et al (2020 pre-print)

- Examined effects of a high- or low-prestige model with the presence content containing social, survival, emotional, moral, rational, or counterintuitive information
- Used creation stories – Rich in types of content relevant to cultural transmission
- Measured the importance of prestige relative to other effects
- Prestige = Significant factor in salience and recall
- But several content biases (social, survival, negativity, biological MCI) significantly more influential

Berl, R. E. W., Samarasinghe, A. N., Roberts, S., Jordan, F., & Gavin, M. C. (2020, August 8). Prestige and content biases together shape the cultural transmission of narratives. <https://doi.org/10.31235/osf.io/9jk6g>

Audience effects



Stereotype consistency bias

- Lyons and Kashima (2006) – SC in transmission
 - Only found in chains with communicative intent
 - Cumulative recall chains showed no SC bias
 - Some content biases might influence the selection of information for transmission, rather than its encoding and recall

Lyons, A., & Kashima, Y. (2006). Maintaining stereotypes in communication: Investigating memory biases and coherence-seeking in storytelling. *Asian Journal of Social Psychology*, 9(1), 59-71.

Positivity vs Negativity in Transmission

- Stubbersfield et al 2019 – Transmission of moral information
 - No advantage for moral content in individual recall
 - Recall better predicted by Emotions, survival info, social info
 - Morally good content predicted more faithful transmission over emotive content

Stubbersfield, J. M., Dean, L. G., Sheikh, S., Laland, K. N., & Cross, C. P. (2019). Social transmission favours the 'morally good' over the 'merely arousing'. *Palgrave Communications*, 5(1), 1-11.

Positivity vs Negativity in Transmission

- Van Leeuwen et al 2018
 - Chose to transmit positive, low arousal vignettes to strangers
 - Chose to transmit negative, high arousal vignettes to friends (and disliked strangers)
 - Suggest that motivations for seeking social support influence transmission
- Altay & Mercier (2020 pre-print)
 - Prefer to share happier beliefs when wishing to appear nice and kind rather than competent and dominant
 - Sharing happier beliefs does lead to being perceived as nicer and kinder

Transmitter vs Receiver Biases

Potential distinction between:

- *Receiver Biases*

- Product of encoding and processing of individual brains
- Likely to be present as an individual recall and/or attention advantage
- Social information, survival threat information etc

- *Transmitter Biases*

- Product of mechanisms of communication and transmission to another
- Only emerge when there is communicative intent
- May serve a social function – promote group cohesion
- Stereotype consistency, positive content (?)

Thank you



Kate Cross



Kevin Laland



Jamie Tehrani



Emma Flynn



Sana Sheikh



Lewis Dean



Ángel Jiménez

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The Neverending Story: Cultural Evolution and Narratives

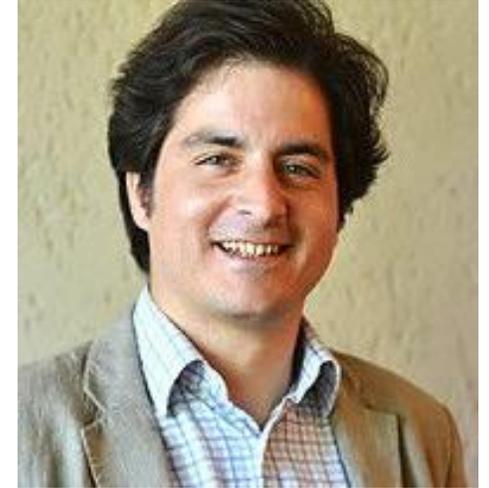
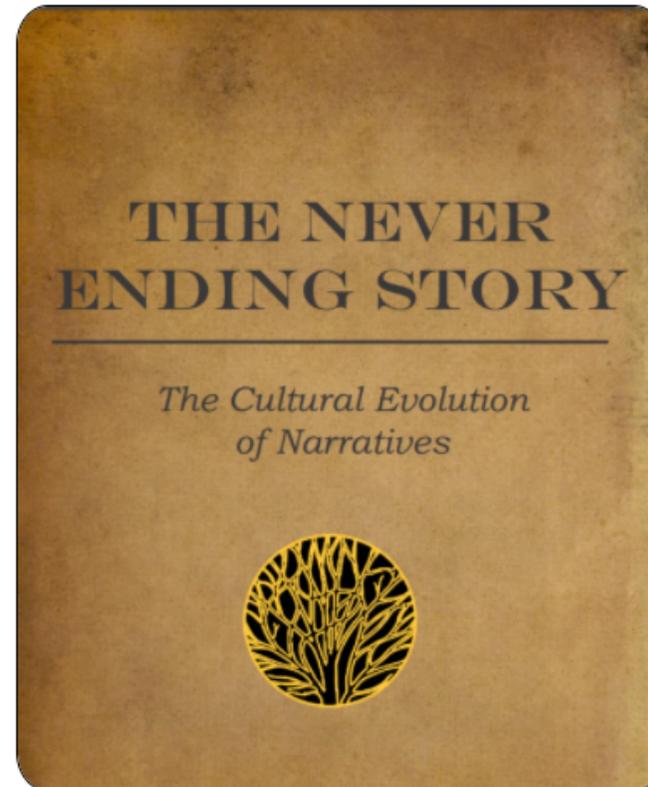
Subject area

The cultural evolution of narratives is the application of cultural evolution theory and approaches to the study of narrative culture, including oral folktales, literature, film and conspiracy theories. Fictional narratives, or stories, are a uniquely human example of culture and have played a vital role in human life for 100,000 years, being the foundation of many of our creative arts and playing a crucial role in religion worldwide. Cultural evolution provides an excellent framework, in both theory and approaches, to better understand how narratives have changed over millennia, why they diversify into different versions, how they are shaped by the pressures of human minds and societies, and why some narratives are more likely to spread than others.

Module description

The module explores the universal and uniquely human behaviour of narrative, using a cultural evolution framework to provide vital insights into the transmission and evolution of narratives. Each lecture uses a narrative genre as its basis, from romance to horror, and includes contemporary tales such as conspiracy theories and fake news. The lectures introduce relevant cultural evolution theory and explain how research methods such as transmission chains, phylogenetic analysis, corpus analysis and text mining have been applied to understanding the appeal, transmission and evolution of narratives in these genres. Each lecture has a related exercise which introduces these research techniques in more detail and provides the opportunity to use them in the coding or analysis of narratives.

To access the lectures: [Click here](#) or use the dropdown menu above under "Lectures."



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THANK YOU FOR LISTENING!



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