



## Generics as reflecting conceptual knowledge

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With thanks to Alessia Passanisi, Martin Jönsson and Ou Lan



## Today's talk

- Largely a review of the psychological literature on intensions and intensional reasoning
- Will discuss evidence that categorization (robins are birds) is generic in the same way as property ascription (robins fly)
- Will describe research with Martin Jönsson and Alessia Passanisi on the *modifier effect*, and the *Inverse Conjunction fallacy*
- Conclusion will support Leslie, Khemlani & Glucksberg's proposal of a *Generic Overgeneralization Effect*
  - *Generics can encompass categorical statements as well as properties*
  - *Universal quantification has only a moderating effect on generic truth*





## Conceptual intensions revealed

- Feature listing task (Hampton, 1979)
  - “What features make something a fruit rather than not a fruit?”
  - “What features would make something a typical fruit?”
  - “What would something have, or be lacking, if it was an atypical fruit?”
  - “Why might something be only loosely speaking a fruit?”
  - “Why might something be technically speaking a fruit?”
  - “What might it mean to describe something metaphorically as a fruit?”
  - “What might it mean to describe someone metaphorically as a fruit?”
  
- All answers listed by frequency



## Features of two concepts – generic properties

### Furniture

- Has a specific function, used by humans
- Is found in buildings
- Is made of wood
- Is for sitting on or in
- Is attractive
- Is for comfort, convenience or satisfaction
- Is found in the home
- Is man-made, manufactured
- Is for putting things on or in
- Is not just decorative
- Has legs

### Fruit

- Is a plant, organic, vegetation
- Is edible, is eaten
- Contains seeds
- Grows above ground, on bushes or trees
- Is juicy, thirst quenching
- Is brightly coloured
- Is sweet
- Has an outer layer of skin or peel
- Is round
- Is eaten as a dessert, snack or on its own
- Is a protection for seeds



## Structured representations

- There is good evidence that intensions have structure
  - Not just lists of features
  - Contain different types of information (Wu & Barsalou, 2009)
  - Modality specific as well as amodal information
  - Centrality vs Mutability – principled and statistical properties (Prasada & Dillingham, 2006, 2009)
  - Causal essences for biological kinds (Gelman)



## Intensional/ intuitive reasoning

- Intensions can be the basis of (fallacious) reasoning
- Tversky & Kahneman (1983)
  - The Linda problem (Linda was a radical in college)
    - Which is more likely
      - Linda is a bank-teller
      - Linda is a feminist bank-teller
  - Explained as a similarity/feature-matching heuristic
  - The better the description, the more likely to be true
  - Likelihood that a property is true is a function of how well embedded it is in the concept intension





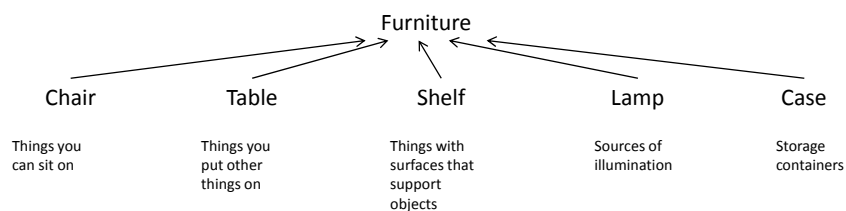
## Categorical reasoning

- While properties are often treated as defaults (*birds fly*) categorization has tended to be treated as essential, based on a class inclusion hierarchy (*birds are creatures, robins are birds*)
- Categories provide a general ontology –
  - “birds are creatures which ....”
  - “robins are birds that ....”
  - “Vehicles are man-made objects that ...”
- Default hierarchies (e.g. Collins & Quillian, 1969) tend to treat IS A links as universals, and other IS or HAS A links as defeasible



## Intensional/ intuitive reasoning

- Hampton (1982) Intransitivity of categorization



Pattern of categorization broke transitivity  
 Car-seat is a Chair. Chair is Furniture. Car-seat is not Furniture

Conclude that categorization is also “default” or generic





## Fallacies resulting from intensional/ intuitive reasoning

- In “logical” conceptual combination, the same phenomenon is seen (Hampton, 1987, 1988, 1996)
- Chess is more likely to be called “A sport that is a game” than “A sport”
- A horse is more likely to be called “A vehicle that is not a machine” than “A vehicle”
- A mushroom is more likely to be called “A fruit or a vegetable” than “A vegetable”, although no-one ever calls it a fruit
- Conclusion – even logical formulae can turn out to be generic
  - “A sport that is a game is a sport”
 can apparently have counterexamples, and must be considered generically true rather than necessarily true



## The modifier effect

- With Martin Jönsson and Alessia Passanisi
- Investigated a phenomenon involving generic statements
- It is known that particular modifiers can increase or decrease the likelihood of generic statements
  - Glass is fragile vs Thin glass is fragile vs. Safety glass is fragile
  - Potatoes are hard vs. Fossilized potatoes are hard vs Boiled potatoes are hard
- When an unrelated modifier is applied to the subject noun of a generic statement, the judged likelihood is reduced (Connolly et al., 2007)
  - Strawberries are red
  - Early Lithuanian strawberries are red
- Connolly et al. established that the typicality of the modifier is important – atypical modifiers give a larger effect
- We were interested in using the effect to explore conceptual structure
- Is the effect moderated by the centrality of the property?





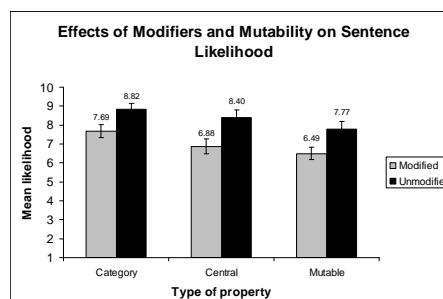
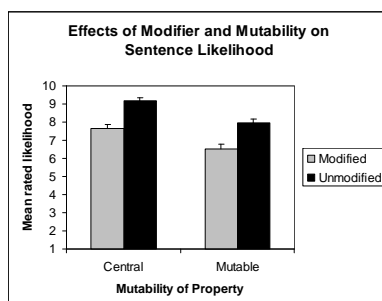
## Centrality and the modifier effect

- Given our account of generics, it is reasonable to expect a modifier effect
- The modifier alters the conceptual content of the noun, reducing the salience of other generic properties
- But mutual properties should show the effect more than central properties
- And categorization should not show the effect at all, if category membership is a necessary property



## Hampton, Passanisi & Jönsson, 2011

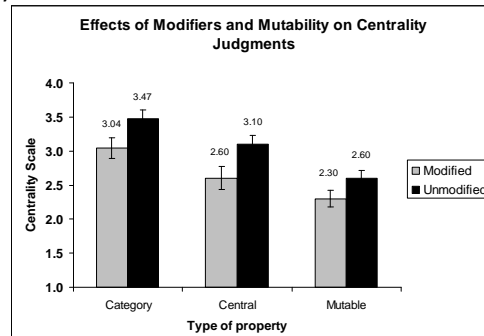
- We presented sentences for likelihood judgments
  - With our without an atypical modifier
  - With mutable or central properties or categories as predicates
  - Effects of centrality but no interaction with the modifier





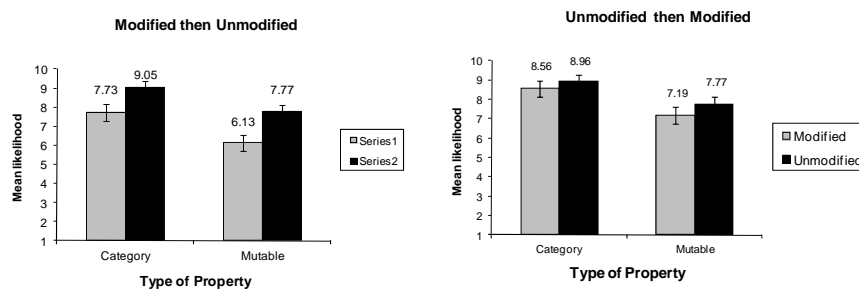
## Hampton, Passanisi & Jönsson, 2011

- We tried a more categorical scale (definitely true, possibly etc..)



## Hampton, Passanisi & Jönsson, 2011

- We tried asking the same people to make both judgments

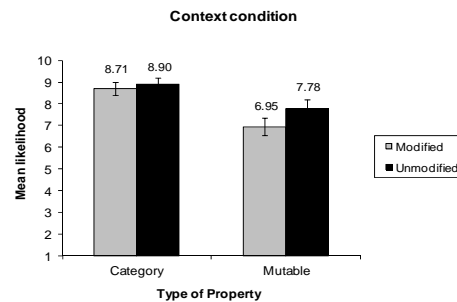


- No interaction with centrality, but order to testing did matter
- When modified sentence judged first, effect was larger



## Hampton, Passanisi & Jönsson, 2011

- Final study found a condition in which category statements were unaffected by modifiers, but mutable statements were.



- Providing a wiki context finally generated the expected interaction



## Hampton, Passanisi & Jönsson, 2011

- Conclusion – a large part of the modifier effect is probably pragmatic. Suspicion of unfamiliar or atypical subsets, which applies equally to their category membership as to their central and mutable properties
- Given a suitable context, category membership and generic properties do respond differently to subject noun modification
- Raises the question of how people make judgments of
  - Acceptability of a sentence
  - Likelihood that a sentence is true
  - Degree to which a sentence is true



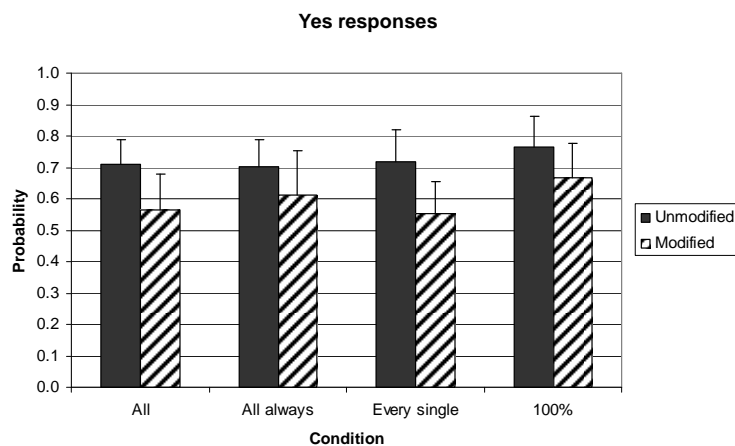


## Category statements as generics

- There is however other evidence that category statements are treated as defaults – even when universally quantified
- Jönsson & Hampton, 2006: Inverse Conjunction Fallacy
  - All lambs are friendly      - All sofas have backrests
  - All dirty lambs are friendly - All uncomfortable sofas have backrests
- Same effect of modifier was seen across 5 experiments
- E.g. Compared modified and unmodified sentences in four formats
  - All A are B
  - All A are always B
  - Every single A is a B
  - 100% of As are Bs



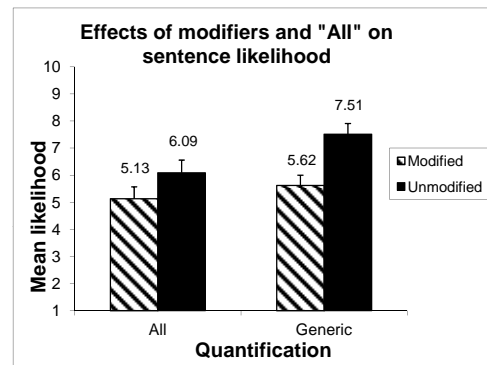
## Results (Jönsson & Hampton, 2006)





## Quantifier Effect

- Unpublished study (Hampton & Lan, 2006)
  - Modified and unmodified sentences
  - With or without “All”
- Modifier effect was reduced with “All” compared to bare plural generic form (significant interaction)
- But inverse conjunction fallacy was still present



## Category-based induction

- Related work by Osherson et al., Sloman and others
- Even though people accept All A are B as clearly true, inclusion of such premises in an argument can reduce argument strength

All Robins have property P, therefore all Birds have property P

All Robins have property P, therefore all Ostriches have property P

All Fruit has property P, therefore all oranges have property P

All Citrus Fruit has property P, therefore all oranges have property P



## Conclusions

- Genericity is not just confined to property predicates, but also spills over into categorization
- Judgments of acceptability/likelihood of truth are very susceptible to pragmatic indeterminacy
- Maybe when we understand how information comes to be part of a conceptual representation we will be able to explain which statements are acceptable as generics



## THANK YOU!

- Jönsson & Hampton (2006). The inverse conjunction fallacy. *Journal of Memory and Language*.
- Jönsson & Hampton (2011). The modifier effect. *Language and Cognitive Processes*.
- Hampton, Passanisi, & Jönsson (2011). Mutability and the modifier effect. *Journal of Memory and Language*.

