Effect of valence framing on inferring cause normalities

Background and motivation

This project builds on *Inference from Explanation* (Kirfel, Icard, & Gerstenberg, 2022) and *A Communication-First Account of Explanation* (Harding, Gerstenberg, & Icard, 2025). Both argue that, if a listener knows either the event's normality status or its causal structure, they can reliably infer the other. I propose that this assumption does not hold universally. To investigate, I adapt their framework to two valence framing of output, **positive**(can be considered as credit) and **negative**(can be considered as blame), to see whether inference patterns differ. The original studies also claim that knowing both normality and causal structure enables accurate prediction of the likely utterance. I contend that this is oversimplified, as utterance choice can also depend on speaker personality, social context, and strategies such as deceptively cooperative communication.

Research questions

Q1. How does the valence framing of the outcome (positive vs. negative) affect participants' inference of causal structure, given knowledge of the norms?

Q2. How does this effect changes between the role of speaker and a listener?

Design:

In experiment 1, participants are forced to be in the role of speaker and choose a cause based on the normalities. There are in total 4 vignettes:

1. disjunctive negative valence framing
2. disjunctive positive valence framing
3. conjunctive negative valence framing
4. conjunctive positive valence framing

In experiment 2, participants are in role of listener and their task is to infer the cause normality based on the causal structure and the valence framing. There are in total 8 vignettes:

1. disjunctive negative valence framing, blaming player B

2. disjunctive negative valence framing, blaming speaker
3. disjunctive positive valence framing , blaming player B
4. disjunctive positive valence framing, blaming speaker
5. conjunctive negative valence framing, blaming player B
6. conjunctive negative valence framing, blaming speaker
7. conjunctive positive valence framing, blaming player B
8. conjunctive positive valence framing, blaming speaker

Variables design and procedure

Variables' definition over all experiments:

- Valence framing of outcomes **(categorical?: positive vs. negative):** Refers to whether the outcome event is described in positive/prosocial terms (e.g, credits, success) or in negative/antisocial terms (e.g., blaming, failure).
  - *Positive framing example:* “Alice won because... ”
  - *Negative framing example:* “Alice lost because ... ”
- Cause normality **(categorical: normal vs. abnormal):** Refers to whether the cause of an outcome is described as typical and in line with expectations (normal) or as unusual and unexpected (abnormal).
  - *Normal example:* "Sara is good at biology and she passed biology in the exam too."
  - *Abnormal example:* "Sara is good at biology but she failed it in this exam."
- Causal structure **(categorical: conjunctive vs. disjunctive):** Refers to whether an outcome depends on multiple causes acting together (conjunctive) or on at least one of several alternative causes being present (disjunctive).
  - Conjunctive example: "Sara needs to pass both biology and anatomy to get into med school."
  - Disjunctive example: "Sara needs to pass at least one of the biology or anatomy to get into med school."
- Selected cause: Refers to the utterance that speaker chooses to talk about a cause of the event: two factors are in this one, 1. the agent to blame, 2. the normality of cause

Experiment 1 Speaker:

Independent variables: valence framing (within participants), cause normality (within participants), causal structure(between participants- in order to make the experiment less complicated)

Dependent variable: selected cause

In each vignette, each player has 2 types of cards in their deck of 10 cards and the number of each type is defining the normality(the more frequent type is more normal- or expected- to be drawn) and each card has some point for a specific player. The rule of the game is determining the causal structure (Alice needs at least one point/ exactly 2 points).

Then the participant is in the rule of speaker (who is the main player-Alice) and choose the cause for her win/lost. The options are: (ordinal/categorical)

1. because I drew the card type A (in some scenarios it is normal to drew that because it is >5)
2. because Bob drew the card type A'(in some scenarios it is normal to drew that because it is >5)
   one of the cards is abnormal and the other one normal.

Based on the hypothesis from *Inference from Explanation* (Kirfel, Icard, & Gerstenberg, 2022) and *A Communication-First Account of Explanation* (Harding, Gerstenberg, & Icard, 2025), in conjunctive cases the abnormal event should be chosen and in disjunctive event the normal one. but these hypothesis are not considering the valence framing.

Experiment 2 Listener:

Independent variables: valence framing of the outcome, causal structure (between participants- in order to make the experiment less complicated), selected cause

Dependent variable: inferred cause normality (three options: less than 5, 5 or more than 5 for the cards which indicate the norm of that event)

Participants are presented with one round of the game with all the data(winning rules and the card that player drew) and then Alice will utter one sentence similar to what participants has to choose in experiment1, but this time they dont know the norms and they are in the rule of listener. their task is to determind the norms from the sellected cause.

Participants should rate at leaset 2 things:

1. number of type A cards in Alices deck
2. number of type A' cards in Bobs deck
3. if they fall into the same range(for example participant rate both of them as less than 5), they should compare which is more (to have a better stimation of which one they consider as more abnormal or more normal.)

Based on the hypothesis from *Inference from Explanation* (Kirfel, Icard, & Gerstenberg, 2022) and *A Communication-First Account of Explanation* (Harding, Gerstenberg, & Icard, 2025), in conjunctive cases, the cause that Alice mentioned must be abnormal, therefor less than 5 cards of that type in corresponding deck. and in disjunctive case it should be the normal event(which means more than 5). they again do not consider the valence framing.

Procedure:

1. Participants complete the instruction of the first game for the first part of the experiment
2. Participants do a warm-up question feedback in order to be sure they fully understood the game
3. Main question for experiment 1(the causal structure is randomized between participants.
4. Main experimental phase 2.
5. Submission form asking for age and first language and education. Submission.

Hypotheses

1. Valence framing of the outcome(positive vs. negative) affect participants' inference of cause normality, given the knowledge of the causal structure.
2. Change of rule (speaker to listener) have an effect on causal selection and inference of cause normality.

Links:

https://aidayg24.github.io/causal_selection/