Supplementary materials: The relational processing limits of classic and contemporary neural network models of language processing

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1 Concepts

Table 1: Concepts used in all the scripts.

Roles	**Concepts**
agents	Albert, Clement, Gary, Adam, Andrew, Lois, Jolene, Anne, Roxanne, Barbara, he, she, jeep, station-wagon, Mercedes, Camaro, policeman, waiter, judge, AND
topics	decided, distance, entered, drove, proceeded, gave, parked, swam, surfed, spun, played, weather, returned, mood, found, met, quality, ate, paid, brought, counted, ordered, served, enjoyed, tipped, took, tripped, made, rubbed, ran, tired, won, threw, sky
patients or themes	Albert, Clement, Gary, Adam, Andrew, Lois, Jolene, Anne, Roxanne, Barbara, he, she, jeep, station-wagon, Mercedes, Camaro, ticket, volleyball, restaurant, food, bill, change, chardonnay, prosecco, credit-card, drink, pass, slap, cheek, kiss, lipstick, race, trophy, frisbee
recipients or destinations	Albert, Clement, Gary, Adam, Andrew, Lois, Jolene, Anne, Roxanne, Barbara, he, she, jeep, station-wagon, Mercedes, Camaro, beach, home, airport, gate, restaurant, waiter, park
locations	beach, airport, restaurant, bar, race, park
manners	long, short, fast, free, pay, big, small, not, politely, obnoxiously
attribute	far, near, sunny, happy, raining, sad, cheap, expensive, clear, cloudy

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2 Story Scripts

Table 2: Park Script.

Script
<agent-1> and <agent-2> decided to go to the park The distance to the park was <near/far> <agent-1> got in <vehicle> <agent-1> drove <vehicle> to the park for a <short/long> time <agent-1> proceed to the park fast <agent-1> parked at the park for <free/pay> The weather was sunny <agent-1> ran through the park <He/She> threw a Frisbee to <agent-1/agent-2>
Concept restrictions
The roles agent-1 and agent-2 never correspond to 'Clement' or 'Roxanne'
Deterministic rule
The distance to the park determines driving time completely: $near \rightarrow short$, $far \rightarrow long$

Table 3: Airport Script.

Script
<agent-1> decided to go to airport Distance to airport <near/far> <agent-1> found change <agent-1> drove <vehicle> to airport <short/long> <agent-1> ran to gate <agent-1> met <agent-2> at airport <agent-1> <agent-2> returned home
Concept restrictions
The roles agent-1 and agent-2 never correspond to 'Gary' or 'Jolene'
Deterministic rule
The distance to the airport determines driving time completely: $near \rightarrow short$, $far \rightarrow long$

Table 4: Bar Script.

Script

<agent-1> met <agent-2> at the bar
AND if agent1 = rich (1.0):
  <agent-1> enjoyed expensive-wine at the bar
AND if agent1 = cheap (1.0):
  <agent-1> did not enjoy expensive-wine at the bar
<agent-2> ordered a drink to the waiter at the bar
AND if agent2 = rich (1.0):
  The drink was expensive
AND if agent2 = cheap (1.0):
  The drink was cheap
OR (2):
  (0.5):
  <agent-2> made a polite pass at <agent-1>
  OR (2):
  (0.3):
  <agent-1> gave a slap to <agent-2>
  <agent-2> rubbed cheek
  (0.7):
  <agent-1> gave a kiss to <agent-2>
  <agent-2> rubbed lipstick
  (0.5):
  <agent-2> made a obnoxious pass at <agent-1>
  OR (2):
  (0.7):
  <agent-1> gave a slap to <agent-2>
  <agent-2> rubbed cheek
  (0.3):
  <agent-1> gave a kiss to <agent-2>
  <agent-2> rubbed lipstick

Concept restrictions
The roles agent-1 and agent-2 never correspond to 'Andrew' or 'Barbara'
Deterministic rule
The action of agent-1 determines what agent-2 rubes completely: $slap \rightarrow cheek$, $kiss \rightarrow lipstick$

Table 5: Beach Script.

Script
<agent> decided to go to the beach The beach was far away OR (2): (0.5): <agent> entered <vehicle> <agent> drove <vehicle> to the beach for a long time AND if agent1 = male (1.0): <agent> proceeded <vehicle> to the beach fast AND (0.5): The policeman gave a ticket to <agent> (0.5): <agent> drove <vehicle> to the beach for a long time AND (0.8): <agent> swam in the beach <agent> won the race in the beach AND if agent1 = male (0.87): <agent> surfed on the beach <agent> spun AND if agent1 = female (0.33) <agent> surfed on the beach AND (0.33): <agent> played volleyball in the beach OR (2) (0.8) The weather was <sunny> <agent> returned home for a long time <agent> was in a <happy> mood (0.2): The weather was <cloudy> <agent> returned home for a long time <agent> was in a <sad> mood
Concept restriction
The roles recipient and patient never correspond to 'Camaro'
Deterministic rule
The weather determines the agent's mood completely: *sunny* $\rightarrow$ *happy*, *cloudy* $\rightarrow$ *sad*