

Academic English Advanced

英語（上級）

Presentation Skills

Week 6: May 21-27, 2021

Your project

- Find the:
 - 1. Observation
 - 2. Research Question
 - 3. Hypothesis

Could you find them? (Check my feedback)

- 1. Observation
- 2. Research Question
- 3. Hypothesis

PSYCHOLOGY

The origin of pointing: Evidence for the touch hypothesis

Cathal O'Madagain^{1,2*}, Gregor Kachel^{1,3}, Brent Strickland²

Pointing gestures play a foundational role in human language, but up to now, we have not known where these gestures come from. Here, we investigated the hypothesis that pointing originates in touch. We found, first, that when pointing at a target, children and adults oriented their fingers not as though trying to create an “arrow” that picks out the target but instead as though they were aiming to touch it; second, that when pointing at a target at an angle, participants rotated their wrists to match that angle as they would if they were trying to touch the target; and last, that young children interpret pointing gestures as if they were attempts to touch things, not as arrows. These results provide the first substantial evidence that pointing originates in touch.

INTRODUCTION

In every human culture that has been studied, typically, developing infants begin to point at 9 to 14 months (1). The onset of this ability lays the foundation for language acquisition: It is arguably the first purely informative gesture produced by children (2); children who are delayed in pointing are delayed in subsequent language acquisi-

Here, we explore an alternative hypothesis: that pointing originates in touch. There are already good reasons to see pointing and touch as connected. Children use a prototypical pointing hand shape to explore objects tactually from as early as 6 months (11), and as the frequency of pointing gestures increases from around 9 months of age, the frequency of this kind of exploratory touch decreases

Copyright © 2019
The Authors, some
rights reserved;
exclusive licensee
American Association
for the Advancement
of Science. No claim to
original U.S. Government
Works. Distributed
under a Creative
Commons Attribution
NonCommercial
License 4.0 (CC BY-NC).

Two Observations

- 1. Some researchers have speculated that pointing might begin in reaching.
- → However, a clear distinction can be made between gestures that likely result from reaching and prototypical pointing gestures.
- 2. Others have proposed that pointing may be learned by children by imitating their parents.
- → But, if pointing were acquired by imitation, it should vary across cultures. Instead, we find that pointing exhibits remarkably little variation.

Research Question

- If not from reaching or imitation, where does pointing come from?

Hypothesis

- Pointing originates in touch.

SCIENCE ADVANCES | RESEARCH ARTICLE

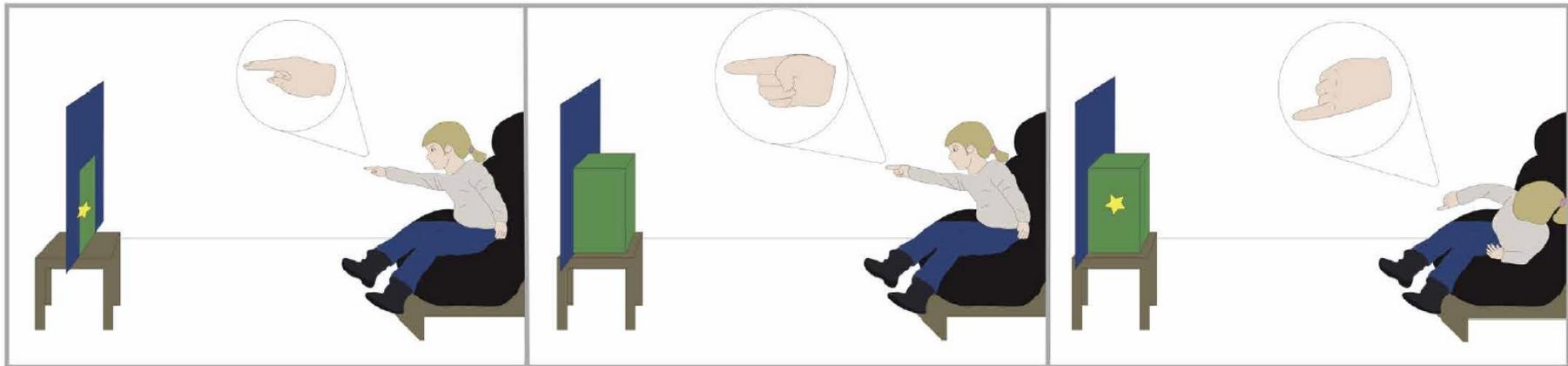


Fig. 3. Rotation experiment, setup. On the left, the 2D condition, in which participants typically point with their hand flat; in the center, the participant rotates her wrist to the right to point at the right side of the box in the 3D condition; on the right, the participant rotates the wrist of her right hand to the left to point at the left side of the box.

SCIENCE

PSYCHOLOGY

The touch

Cathal

Pointing gesture when people pick objects at an angle and last. These r

INTRODUCTION

In every human culture that has been studied, typically, developing infants begin to point at 9 to 14 months (1). The onset of this ability lays the foundation for language acquisition: It is arguably the first purely informative gesture produced by children (2); children who are delayed in pointing are delayed in subsequent language acquisition (3), and other animals who lack language systematically fail to understand informative pointing (4). Determining the origin of pointing is therefore essential to our understanding of human language and uniqueness, and yet, up to now, we have known next to nothing about where it comes from (5).

INTRODUCTION

In every human culture that has been studied, typically, developing infants begin to point at 9 to 14 months (1). The onset of this ability lays the foundation for language acquisition: It is arguably the first purely informative gesture produced by children (2); children who are delayed in pointing are delayed in subsequent language acquisition (3), and other animals who lack language systematically fail to understand informative pointing (4). Determining the origin of pointing is therefore essential to our understanding of human language and uniqueness, and yet, up to now, we have known next to nothing about where it comes from (5).

Some have speculated that pointing might begin in reaching (6). Perhaps a child begins by reaching for objects, and a parent hands her the object she reaches toward. The child learns that she can use that reach to have things handed to her, and the action is “ritualized” into a gesture (4). However, a clear distinction can be made between gestures that likely result from reaching and prototypical pointing gestures. The former are “imperative” (as opposed to “informative”) since children use them to have things handed to them, rather than simply to direct attention; they are produced with an open hand rather than a single index finger; and they feature significantly less vocalizations and joint attention than prototypical pointing gestures (7, 8). Since prototypical pointing gestures are so different, they are unlikely to originate in reaching. Others have proposed that pointing may be learned by children by imitating their parents (8). But, if pointing were acquired by imitation, it should vary across cultures: Learning by imitation is widely understood to be one of the main sources of cultural variation due to the errors that are inevitable in this kind of learning (9). Instead, we find that pointing exhibits remarkably little variation. Its morphology is seemingly universal, with infants in all cultures pointing in the same way, and its age of onset is also invariant across cultures (1). If pointing were acquired by imitation, then we should also expect that it would become more frequent with training, and yet, its acquisition is not affected by training (10).

Here, we explore an alternative hypothesis: that pointing originates in touch. There are already good reasons to see pointing and touch as connected. Children use a prototypical pointing hand shape to explore objects tactually from as early as 6 months (11), and as the frequency of pointing increases with age, the frequency of touching (12), suggesting that the two are related. To investigate this hypothesis, we conducted three experiments about pointing that we thought should be conducted if pointing does indeed originate in touch. First is that, when pointing at a target, people should orient their fingers as though they are aiming to touch it rather than as though creating an “arrow” that picks it out (study 1); second is that, when pointing at a target at an odd angle, people should rotate their wrists as they would if they were trying to touch the target (study 2); and last is that we should interpret pointing gestures more as if they were attempts to touch things than as arrows (study 3).

STUDY 1:

Our first experiment investigated whether pointing gestures work like arrows, much as the direction indicated by a road sign is determined by the orientation of the sign. On this view, a pointing gesture refers to an object found on a vector that extends along the angle of the finger (13, 14). We will call this view the “arrow hypothesis,” and the vector that extends along the finger the “arrow line” (Fig. 1). If pointing gestures originate in touch, however, then this arrow line should not be a good predictor of reference. When someone reaches out to touch something, the angle of her finger is largely irrelevant—it could be horizontal or even vertical—what matters is that the fingertip can make contact with the object she wishes to touch. If pointing originates in touch, then a better predictor of reference ought to be what we will call the “touch line”—the vector that runs between a person’s eye and fingertip while pointing (Fig. 1). This vector, after

Real-World Background / Significance

Observations 1 & 2

can Association
: Advancement
ence. No claim to
U.S. Government
. Distributed
a Creative
ions Attribution
ommercial
e 4.0 (CC BY-NC).

ointing origi-
pointing and
g hand shape
(11), and as
nd 9 months
sh. ~~language~~

INTRODUCTION

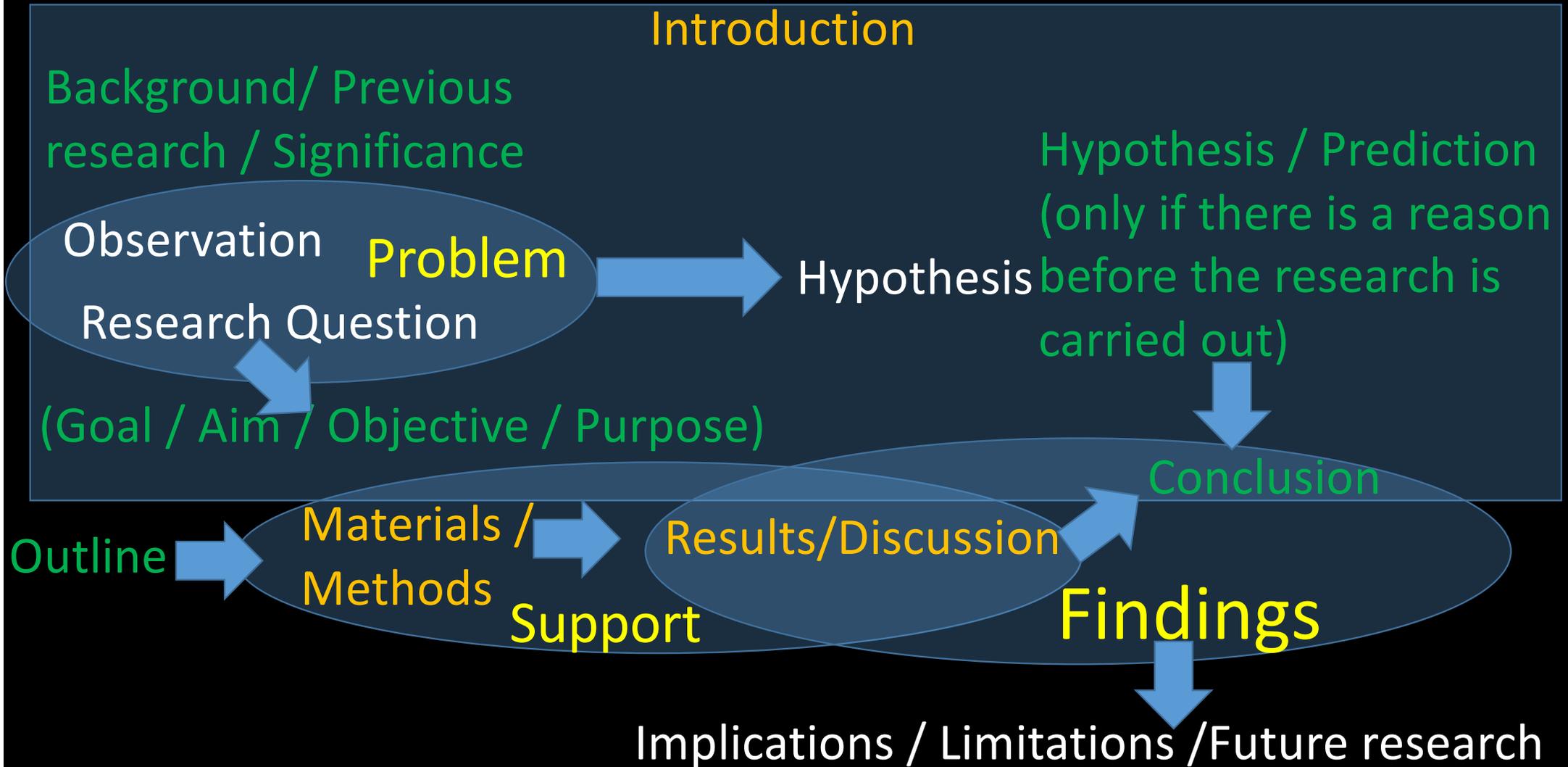
Real-World Background

In every human culture that has been studied, typically, developing infants begin to point at 9 to 14 months (1). The onset of this ability lays the foundation for language acquisition: It is arguably the first purely informative gesture produced by children (2); children who are delayed in pointing are delayed in subsequent language acquisition (3), and other animals who lack language systematically fail to understand informative pointing (4). Determining the origin of pointing is therefore essential to our understanding of human language and uniqueness, and yet, up to now, we have known next to nothing about where it comes from (5).

Some have speculated that pointing might begin in reaching (6). Perhaps a child begins by reaching for objects, and a parent hands her the object she reaches toward. The child learns that she can use

Significance

From Paper to Presentation



Homework

- Find the:
 - 1. Real-World Background
 - 2. Significance
- 3. Continue making your presentation slides:
 - Make about 3-5 slides for: Real-World Background/significance
 - (If you haven't finished yet: Continue making 1 slide each for: Observation, Research Question, and Hypothesis (or Conclusion))
- Finish your slides before next class.

We will discuss this in next week's Zoom meeting

Next week's agenda

We will discuss this in next week's Zoom meeting

- 1) Discuss your slides. (1. Real-World Background/Significance 2. Observation 3. Research Question 4. Hypothesis/Conclusion)

I will discuss this in next week's lecture video

- 2) Methods
- 3) Results
- 4) Discussion