

The dialectical constitution of arithmetic in grocery shopping activity



How to look and What to expect to see

- How shall we think of the environment for action?
- How can we account for the organization of activity?

Some Predictions from the Armchair

- Shoppers decide which item to buy by computing best unit price.
 - People with better math skills are more likely to engage in unit price computations.
 - People with better math skills are more likely to do correct calculations.
- The environment presents problems that shoppers must find solutions to.
- Math problems are represented and solved in shopper's minds.

Ways to look

- What methods did Lave and her colleagues use to investigate arithmetic practices in grocery shopping?

Something to see

- Lave and her colleagues claim that
- **in order to understand arithmetic practices in the supermarket, it is also necessary to understand “the dialectical constitution of grocery shopping activity in the supermarket setting.”**
- What does this claim mean?

Behavior and Arena Are these enough?

- | | |
|-----------------------|-------------------------|
| • Behavior | • Arena |
| • Shopping | • Supermarket |
| • Deciding | • Product display |
| • Attending a lecture | • Lecture hall |
| • Taking notes | • Your seat environment |

Setting

- The arena as experienced by a particular person in activity.
- Shaped by the person's activity
- Includes body position, arrangements of objects, patterns of deployment of attention, memory, habits, expectations, plans....

Activity & Setting

- Behavior as it emerges from interaction of a particular person with a setting.
- Activity shapes the setting...
- And is shaped by the setting.
- Activity and setting mutually shape each other.
- Activity and setting are in a dialectical relationship.

The dialectical relation of activity and setting

- It is not possible to understand the organization of either element without reference to the history of interaction among the elements.

Making a point with enchiladas

- Shopper (speaking hesitantly, eyes searching the shelves to find the enchiladas): Now these enchiladas, they're around 55 cents. They were the last time I bought them, but now every time I come...a higher price.
- Observer: Is there a particular kind of enchiladas you like?
- Shopper: Well, they come in a, I don't know, I don't remember who puts them out. They move things around too. I don't know.
- Observer: What is the kind you're looking for?
- Shopper: Well, I don't know what brand it is. They're just enchiladas. They're put out by, I don't know. (discovers the display of frozen Mexican dinners.) Here they are! (speaking vigorously and firmly.) they were 65 the last time I bought them. Now they're 69. Isn't that awful?

Recall and Recognition

- Shopper (speaking hesitantly, eyes searching the shelves to find the enchiladas): Now these enchiladas, they're around 55 cents. They were the last time I bought them, but now every time I come...a higher price.
- Observer: Is there a particular kind of enchiladas you like?
- Shopper: Well, they come in a, I don't know, I don't remember who puts them out. They move things around too. I don't know.
- Observer: What is the kind you're looking for?
- Shopper: Well, I don't know what brand it is. They're just enchiladas. They're put out by, I don't know. (discovers the display of frozen Mexican dinners.) Here they are! (speaking vigorously and firmly.) they were 65 the last time I bought them. Now they're 69. Isn't that awful?

A narrative schema (interrupted)

- Shopper (speaking hesitantly, eyes searching the shelves to find the enchiladas): Now these enchiladas, they're around 55 cents. They were the last time I bought them, but now every time I come...a higher price.
- Observer: Is there a particular kind of enchiladas you like?
- Shopper: Well, they come in a, I don't know, I don't remember who puts them out. They move things around too. I don't know.
- Observer: What is the kind you're looking for?
- Shopper: Well, I don't know what brand it is. They're just enchiladas. They're put out by, I don't know. (discovers the display of frozen Mexican dinners.) Here they are! (speaking vigorously and firmly.) they were 65 the last time I bought them. Now they're 69. Isn't that awful?

Mutual determination of activity and setting

- Shopper (speaking hesitantly, eyes searching the shelves to find the enchiladas): **Now these enchiladas**, they're around 55 cents. They were the last time I bought them, but now every time I come...a higher price.
- Observer: Is there a particular kind of enchiladas you like?
- Shopper: Well, **they come in a, I don't know, I don't remember who puts them out. They move things around too. I don't know.**
- Observer: What is the kind you're looking for?
- Shopper: Well, I don't know what brand it is. They're just enchiladas. **They're put out by, I don't know.** (discovers the display of frozen Mexican dinners.) **Here they are!** (speaking vigorously and firmly.) they were 65 the last time I bought them. Now they're 69. Isn't that awful?

The dialectic of activity and setting

- The activity of making a point about rising prices frames the search for an illustrating item.
- The search takes place in a setting (one that initially lacks the item sought)
- The activity of searching changes the setting.
- When the item is found, the activity continues in the new setting.

- Setting shapes activity which shapes setting.

The relation of this dialectic to arithmetic activity

- The tension between the abundance of choices and the need to choose.
- Gap filling problem solving: bringing the description of the problem and the solution closer together (smack! They collide in cottage cheese).
- Using the environment as a computational medium
- Problems as snags in routine flow of activity. (and notice the role of memory in the creation of routine activities).

The Predictions from the Armchair

[Were they correct?]

- Shoppers decide which item to buy by computing best unit price. [best price computations are a last resort – a form of rationalization]
 - People with better math skills are more likely to engage in unit price computations. [No]
 - People with better math skills are more likely to do correct calculations. [No, everyone is about 98% correct!]
- The environment presents problems that shoppers must find solutions to. [Not so simple. We need to consider the dialectic of activity and setting to understand how gap-closing problem solving happens. Shoppers encounter problems as snags in routine activity. They choose to engage some and not others.]
- Math problems are represented and solved in shopper's minds. [No, problems are frequently enacted in activity that manipulates the material aspects of the setting.]

Conceptual tools we can use in the projects

- Arena, Activity, Setting and their relations.
- Gap-closing problem solving.
- What shoppers say is DATA, it is NOT analysis.
 - "Routine" activity and
 - Problems seen as "snags" in ongoing activity.
 - Arithmetic as a last resort – a form or rationalization for behavior. A justification for a choice that could not be determined on qualitative grounds.