

Design and Its Relationship to Human Behavior

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**WHO
WILL?
SPARTANS
WILL.**



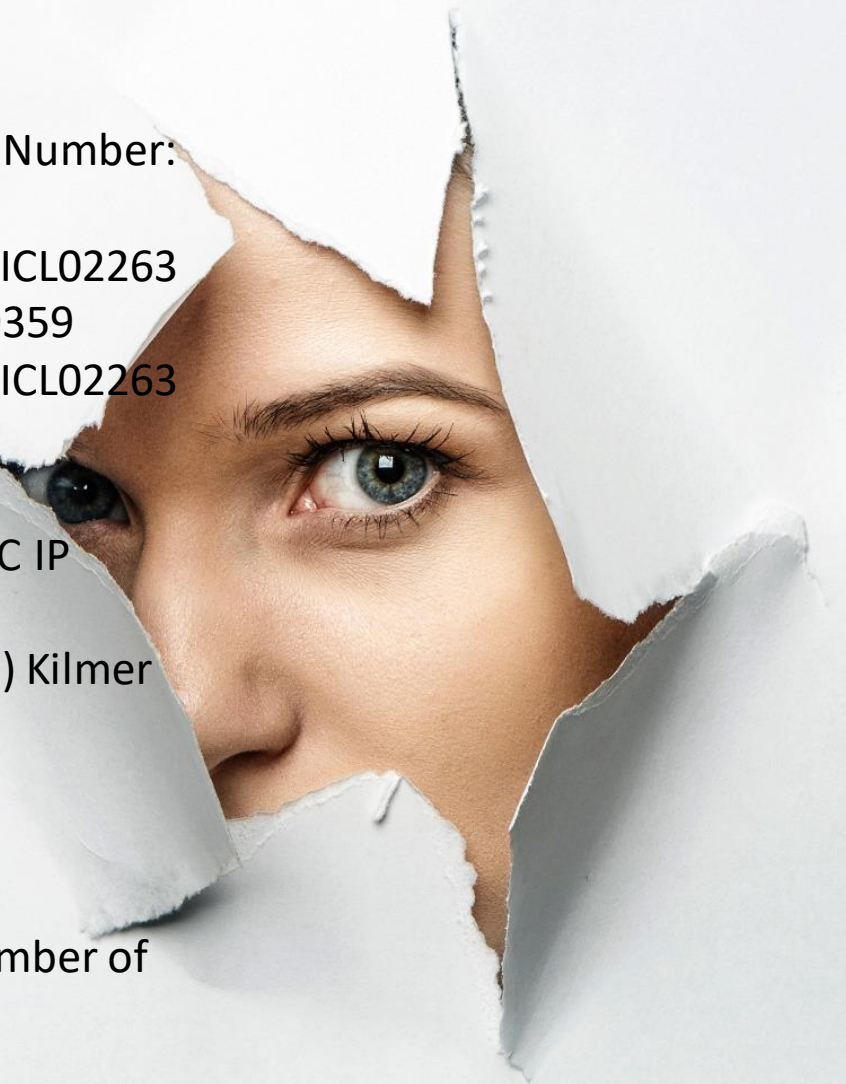
Disclosures

- ## Funded Proposals

- NIH- R01-Agency for Healthcare Research and Quality, Grant/Award Number: R01HS025386 KCIP 00337227
- National Institute of Food and Agriculture, Grant/Award Number: MICL02263
- NSF SBIR-National Science Foundation: Grant Award 014357 00549359
- National Institute of Food and Agriculture, Grant/Award Number: MICL02263
- Consumer Healthcare Products Association (CHPA), Grant Award # KC IP 00653393
- Association for the Advancement of Medical Instrumentation (AAMI) Kilmer Foundation Grant/Award #- KC IP 00653393(PD 62329)

- ## Sponsored Travel/Advisory Roles

- Centers for Disease Control and Prevention (US CDC) Sponsored Member of PROTECT/PROTECT Rx
- Edwards Life Sciences- Sponsored Travel



Objectives

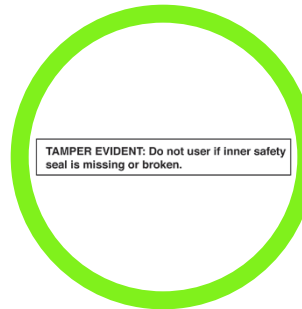
Introduce our work and its relevance to disposal behaviors



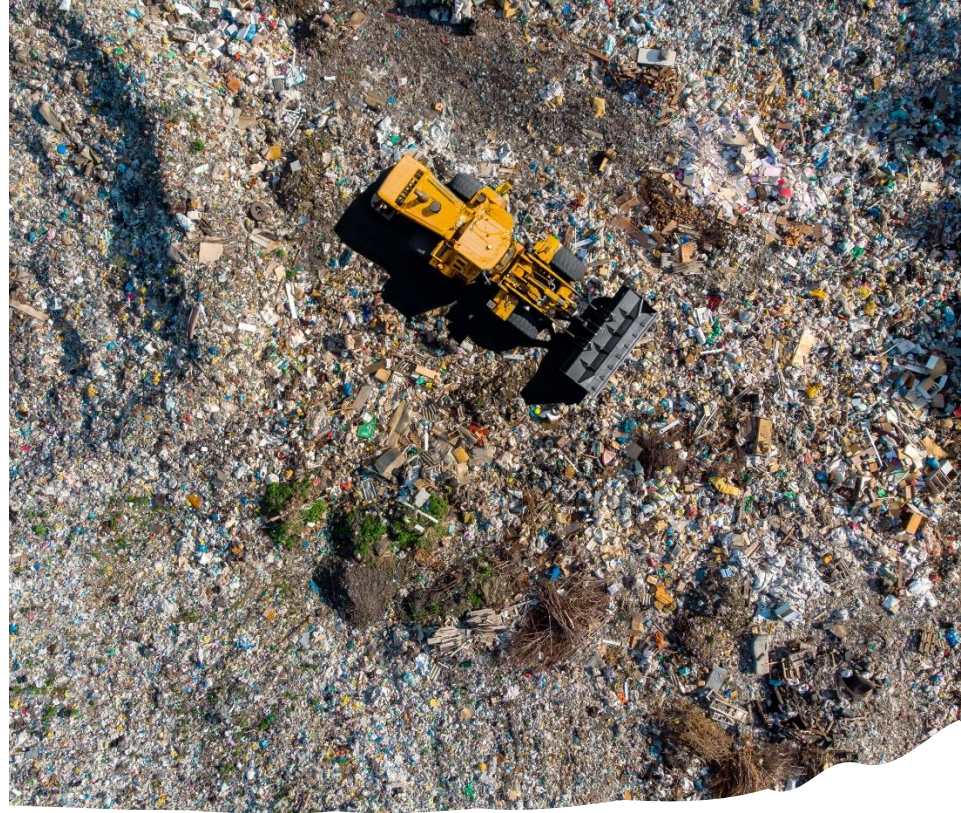
Historical and emerging approach to pollution



Provide a model for designing and evaluating human behavior



Present applicable lessons from previous work/other studies



Historical approach to
mitigate pollution is
dilution

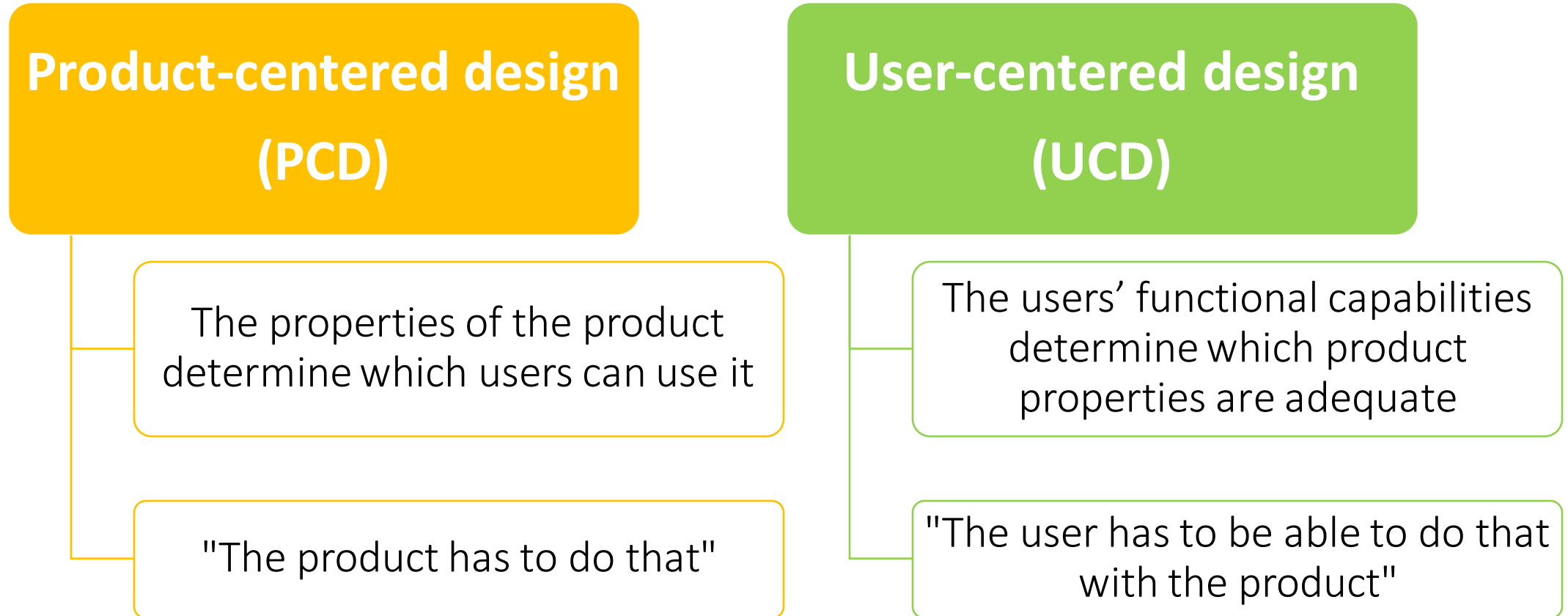


Concentration/Aggregation Render innocuous/inert

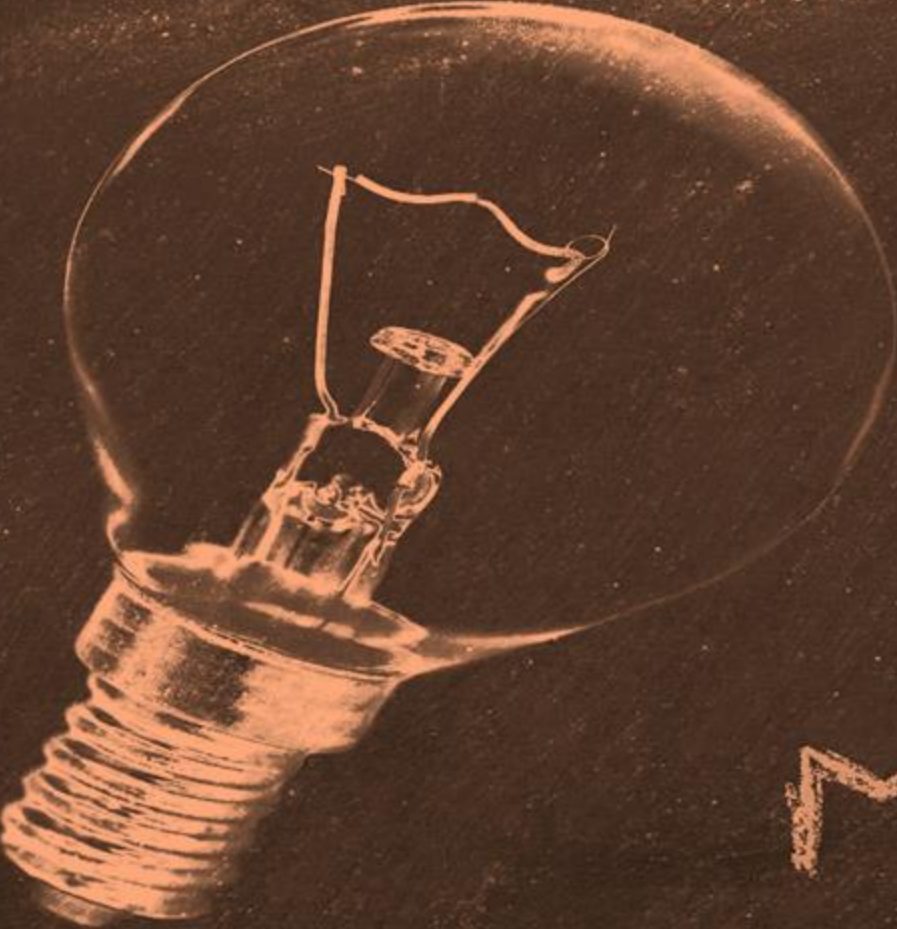
- Take back programs
- Permitted hazardous waste combustors
- Permitted non-hazardous waste combustors
- Home disposals systems
- Hoarding within household



A More Encompassing Approach to Package Design

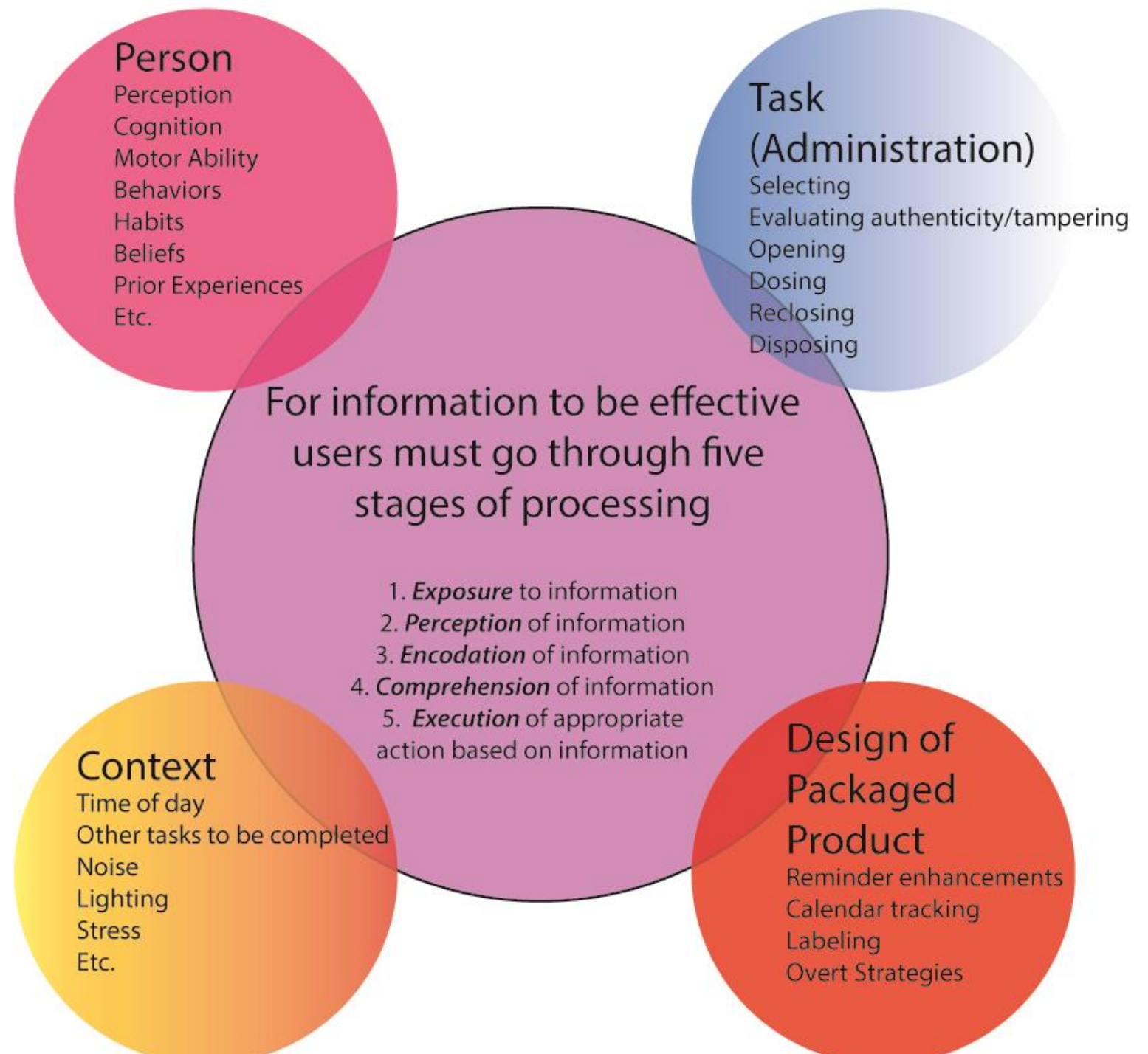


Source: Keates S, Clarkson J (2004). "Chapter 11: Countering design exclusion" in "Countering Design Exclusion: An Introduction to Inclusive Design". London, Springer-Verlag: 141-156.

A glowing lightbulb is positioned on the left side of the image. The lightbulb is illuminated from within, casting a warm, orange glow. The background is dark and textured, resembling a chalkboard or a rough surface. The lightbulb's filament is visible, and the base of the bulb is detailed with its screw threads.

HUB researchers employ a user-centered approach to package design, informed by science, to inform policy and design with the goal of improving health outcomes

OUR
Mission



de la Fuente and Bix (April, 2011). "A tool for designing and evaluating packaging for healthcare products." *Journal of Patient Compliance* 1(1). Pp. 48-52.

Adapted from

Shackel, B (1991) Usability; Context framework definition design and evaluation. In: Shackel B and Richardson S (ed) Human Factors for Informatics Usability. Cambridge University Press, Cambridge, pp. 21-37.

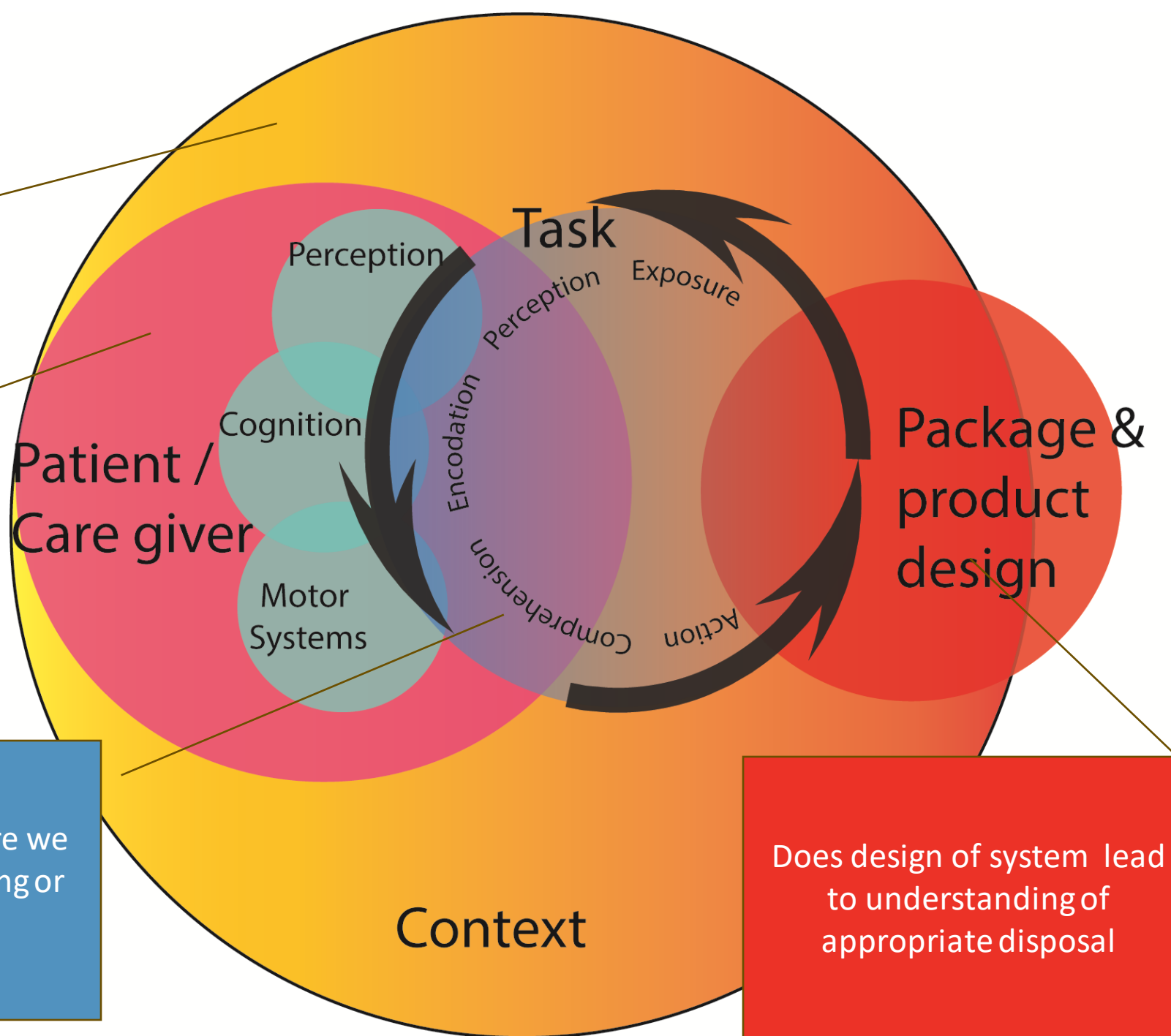
DeJoy, D. (1991). A revised model of the warnings process derived from value-expectancy theory. In Human Factors Society, 22nd Annual Meeting (pp. 1043–1047). Santa Monica, CA: Human Factors Society

Task/decision related to disposal

Hospital, Home?
Take backs near by?
Take backs convenient?

Chronic/Persistent Pain?
Others in the home?
Mobility/transportation?
Concern about others perceptions?

What behavior/task are we interested in motivating or catalyzing?



Does design of system lead to understanding of appropriate disposal

Early Work



- **OTC (1982) 21 CFR 211.132 (FDA)**

- “OTC drug product for retail sale that is not packaged in a tamper-resistant package or that is not properly labeled under this section is adulterated under section 301 of the Act or misbrand under section 302 of the Act, or both”



- **Specific Cosmetics 21 CFR 700.25b (FDA)**

- **Alcohol (2005) 27CFR 19.662 (TTB)**

- “Closure or other devices on containers having a capacity of one gallon or less shall be securely affixed to the containers so as to leave a portion remaining on the container when the container is opened. In addition, the closure or other devices shall be constructed in such a manner as to require that they be broken to gain access to the contents of the container” (Affixed prior to customs custody)”



- **Milk (2006) Item 19p of the Grade” A” Pasteurized Milk Ordinance (FDA)**

- “The cap or closure shall be designed and applied in such a manner that the pouring lip is protected to at least its largest diameter and with regard to fluid product containers, removal cannot be made without detection.”
- Can serve as a “vehicle of disease transmission” and has been associated with disease outbreaks of major proportions
- Reference to **pesticide containers (40 CFR 165.65.f.1)**

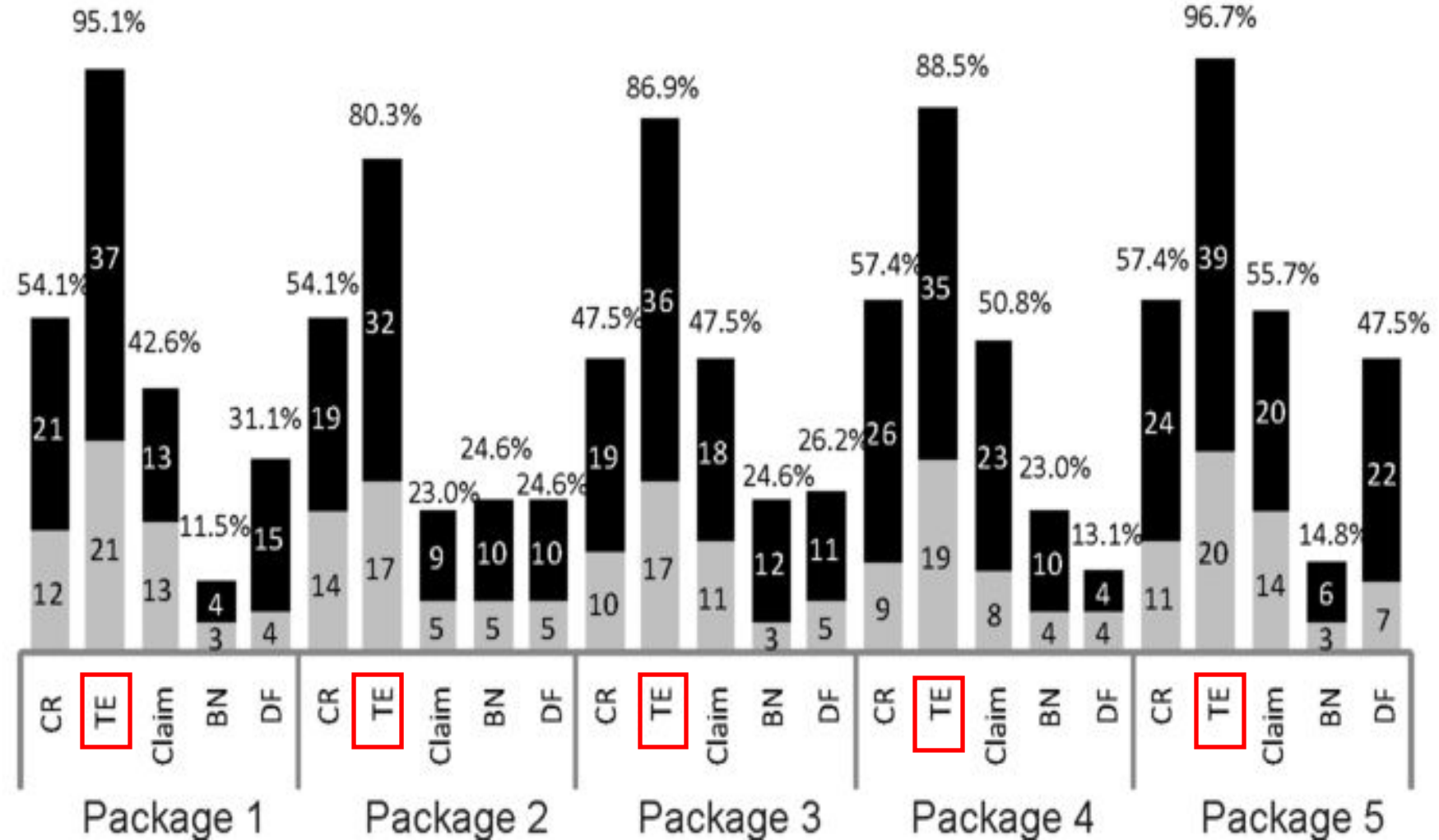
Requirements for Tamper Evidence



- Brand Name
- Indications/Claims
- Drug Fact Label (DFL)
- CR Warning
 - Must be **conspicuous** (PPPA)
- Warning alerting of TE features (required to be **prominent** according to 21 CFR 211.132
 - To alert consumers to the presence of TE features that are “distinctive by design”

With Children Without Children

- More than 80% of the participants failed to record time in the TE warning gaze zones across all packages



Bix, Laura, et al. "Examining the Conspicuousness and Prominence of Two Required Warnings on OTC Pain Relievers."

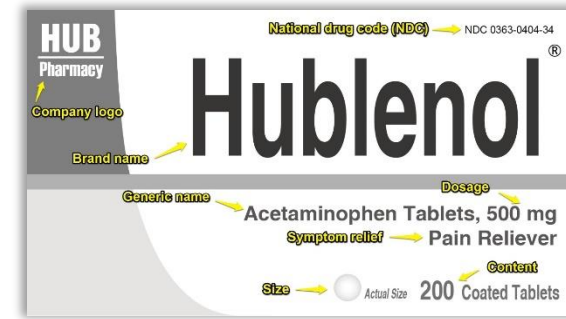
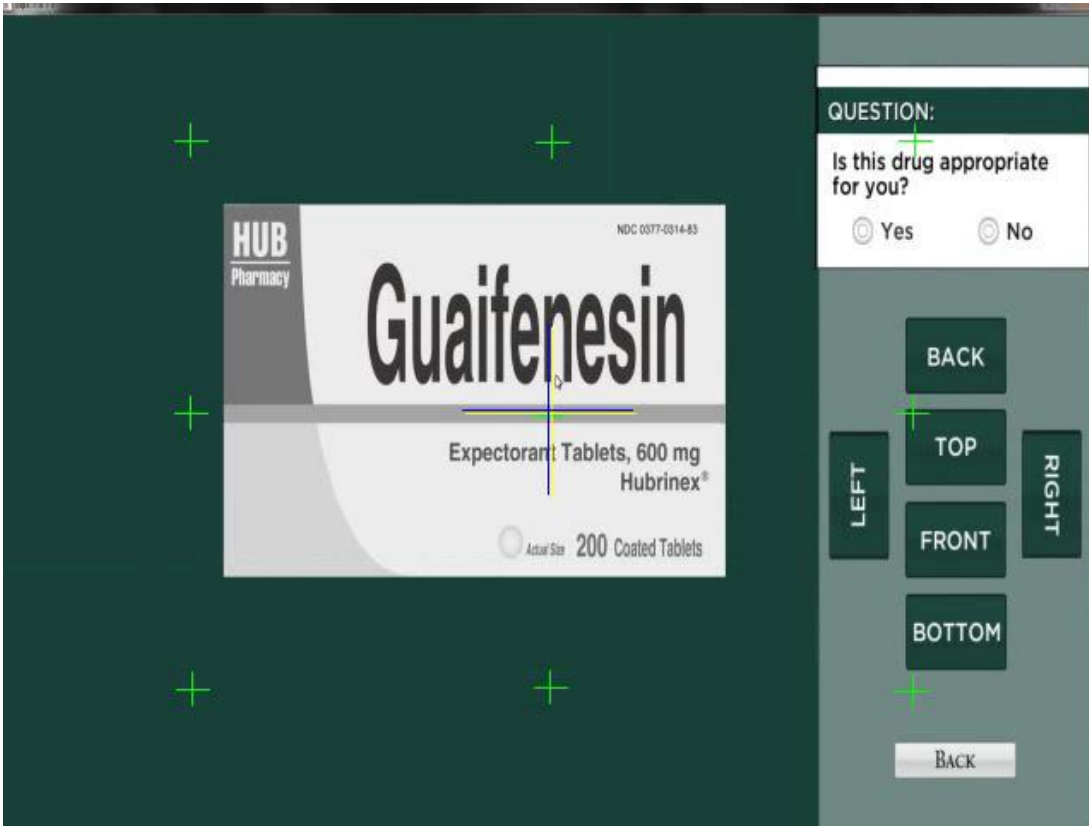
PNAS Proceedings of the National Academy of Sciences of the United States of America, vol. 106, no. 16, 2009, pp. 6550-6555.

ProQuest, <http://ezproxy.msu.edu/login?url=https://www.proquest.com/scholarly-journals/examining-conspicuousness-prominence-two-required/docview/621928472/se-2>,

doi:<https://doi.org/10.1073/pnas.0810665106>.

- Package stimulus design

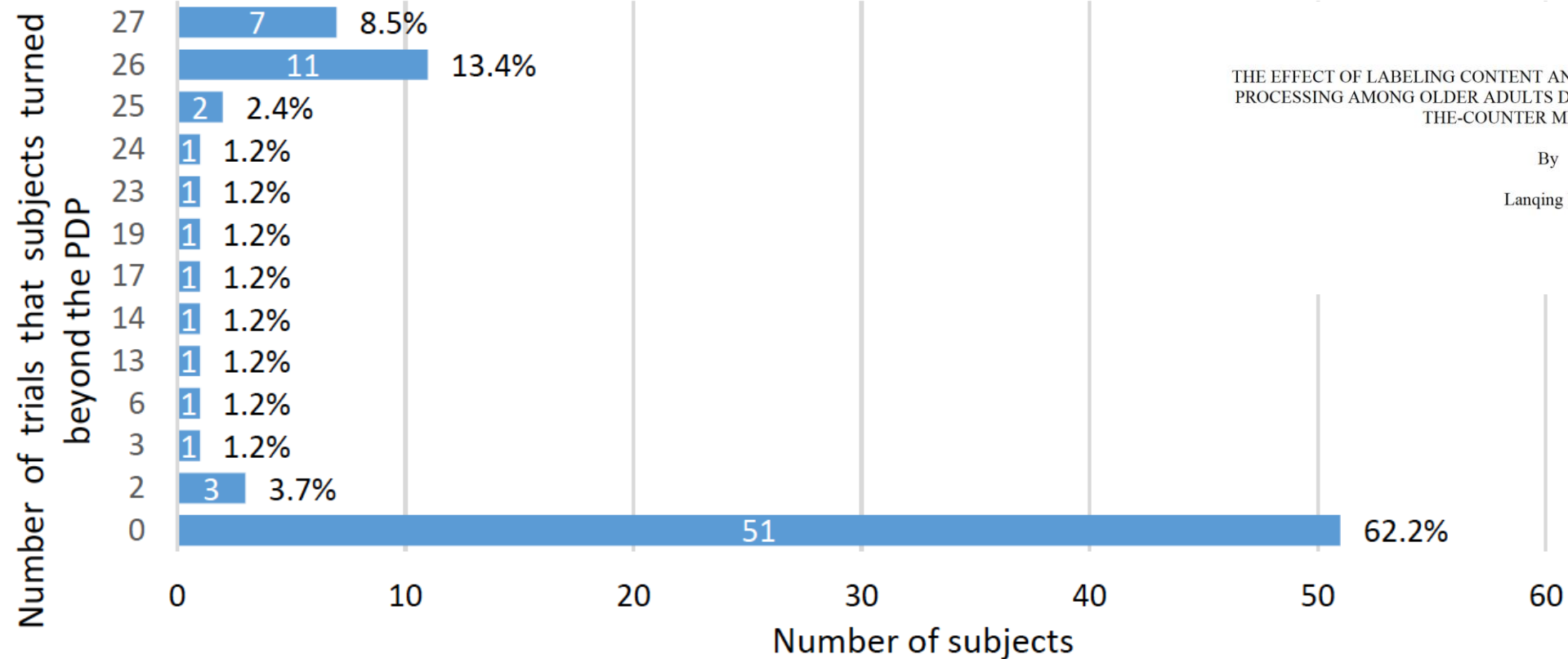
- 3 drug categories x 3 active ingredients x 3 levels of formatting



Liu, Lanqing. *The Effect of Labeling Content and Prominence on Information Processing among Older Adults during Self-Selection of Over-the-Counter Medications*, Michigan State University, United States -- Michigan, 2016. ProQuest, <http://ezproxy.msu.edu/login?url=https://www.proquest.com/dissertations-theses/effect-labeling-content-prominence-on-information/docview/1786652457/se-2>.

Key Results

Frequency of the Number of Trials that Participants closely Examined other information in Experiment 2



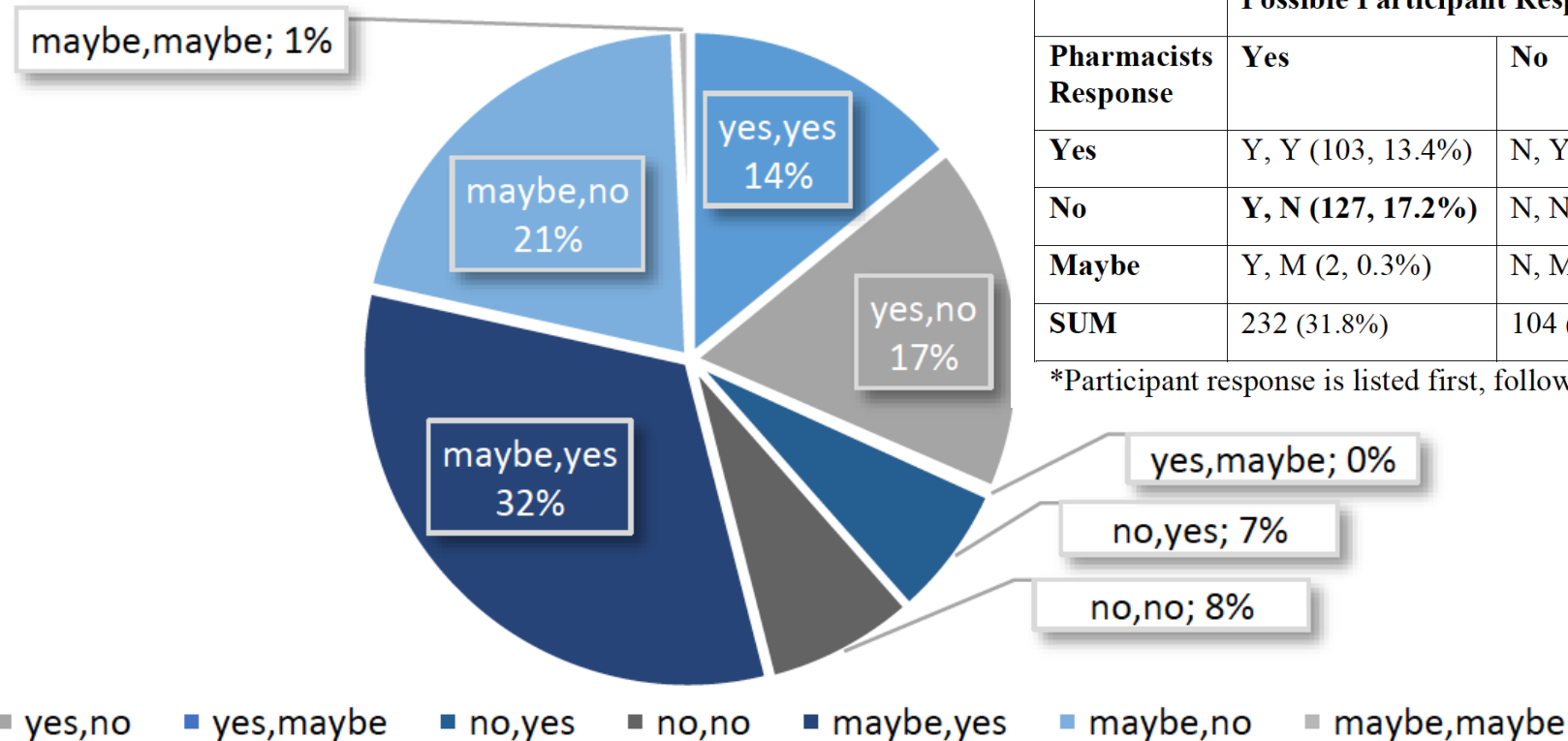
THE EFFECT OF LABELING CONTENT AND PROMINENCE ON INFORMATION PROCESSING AMONG OLDER ADULTS DURING SELF-SELECTION OF OVER-THE-COUNTER MEDICATIONS

By

Lanqing Liu

Key Results

Patient Response vs. Pharmacist Response Frequency and Percentage (Survey Data)



	Possible Participant Responses (N=82); total possible responses =730			
Pharmacists Response	Yes	No	Maybe	SUM
Yes	Y, Y (103, 13.4%)	N, Y (49, 6.6%)	M, Y (237, 32.1%)	389 (53.3%)
No	Y, N (127, 17.2%)	N, N (55, 7.5%)	M, N (152, 20.6%)	334 (45.8%)
Maybe	Y, M (2, 0.3%)	N, M (0, 0.0%)	M, M (5, 0.7%)	7 (0.9%)
SUM	232 (31.8%)	104 (14.2%)	394 (54%)	730 (100%)

*Participant response is listed first, followed by pharmacist

Lack of evidence

Identification and preliminary evaluation of the most viable short and long term TE solutions for a food puree that was aseptically packaged in plastic

Evaluate and develop the most promising strategies for TE

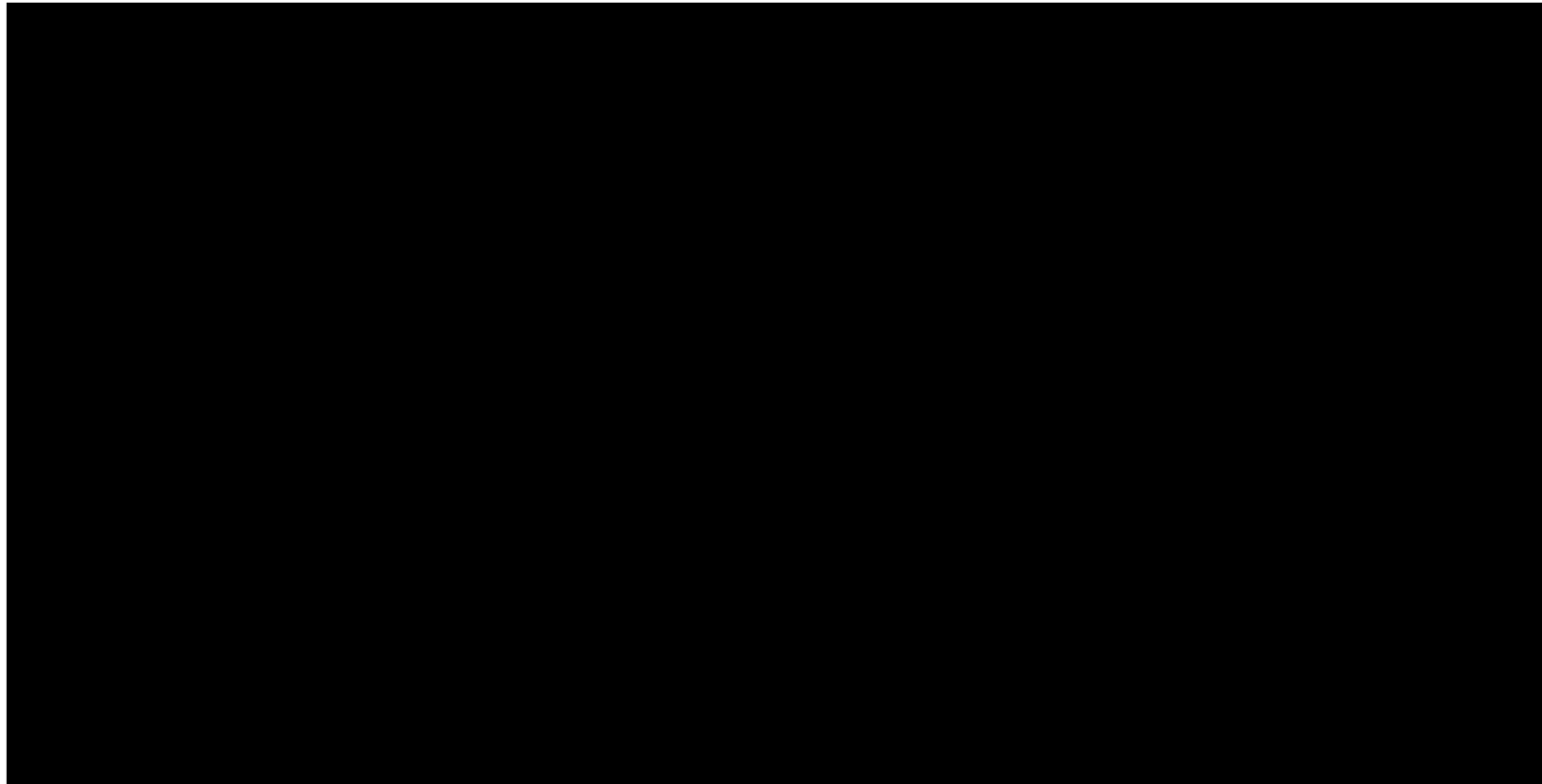


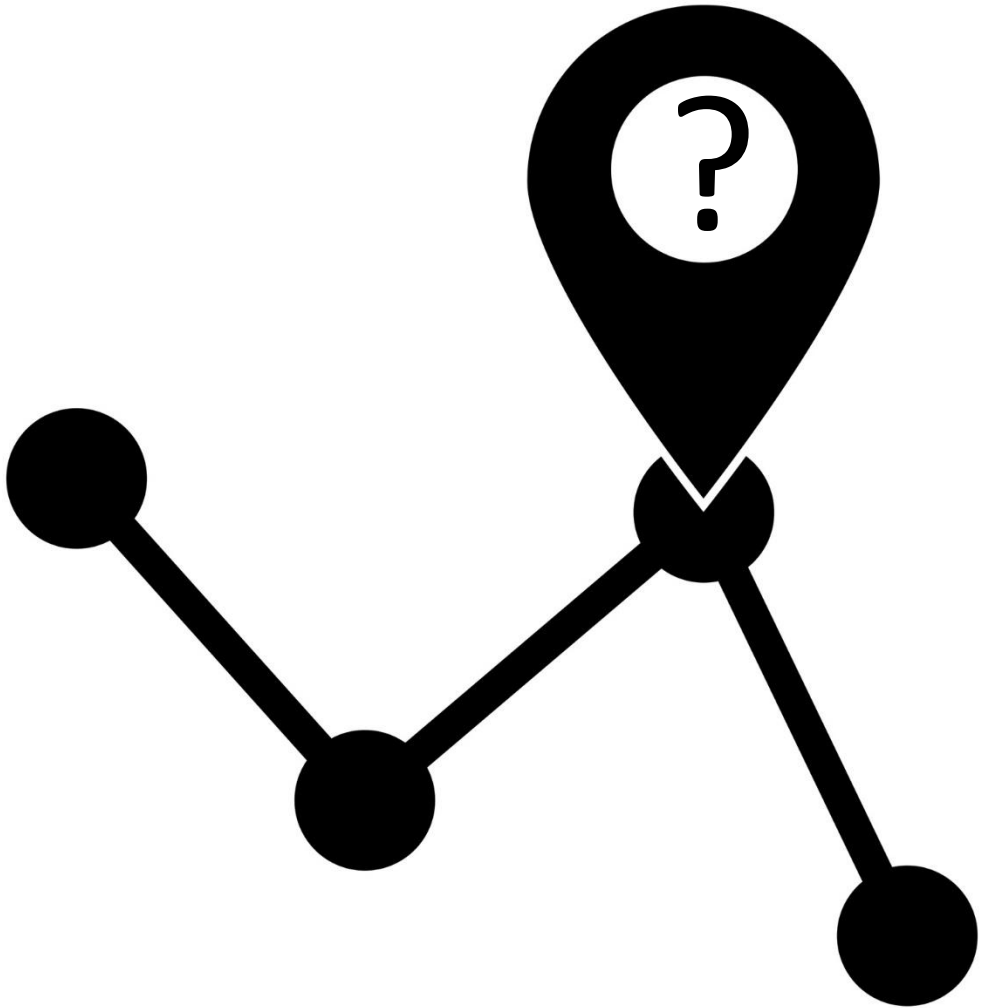
Tampering Focus Groups Recurring Themes

- Four packaging experts
- Faculty member from BAE
- Six Team members
- Don't rely on the consumer
 - I need this and don't want to hassle
 - It's not going to happen to me, it will happen to someone else
 - They just don't see it
 - It is difficult to see
 - They are busy



Proposed





- Multifactorial problem
 - Tool for arranging the multitude of factors that have the potential to impact decisions
 - Understanding where your system design is failing is important to proposing a new solution
- Even when you create a design that is successful through processing, consumers/patients may behave in ways incongruent to what you desire/intend
 - Designs that don't rely on consumer behavior may be the best bet

Questions?

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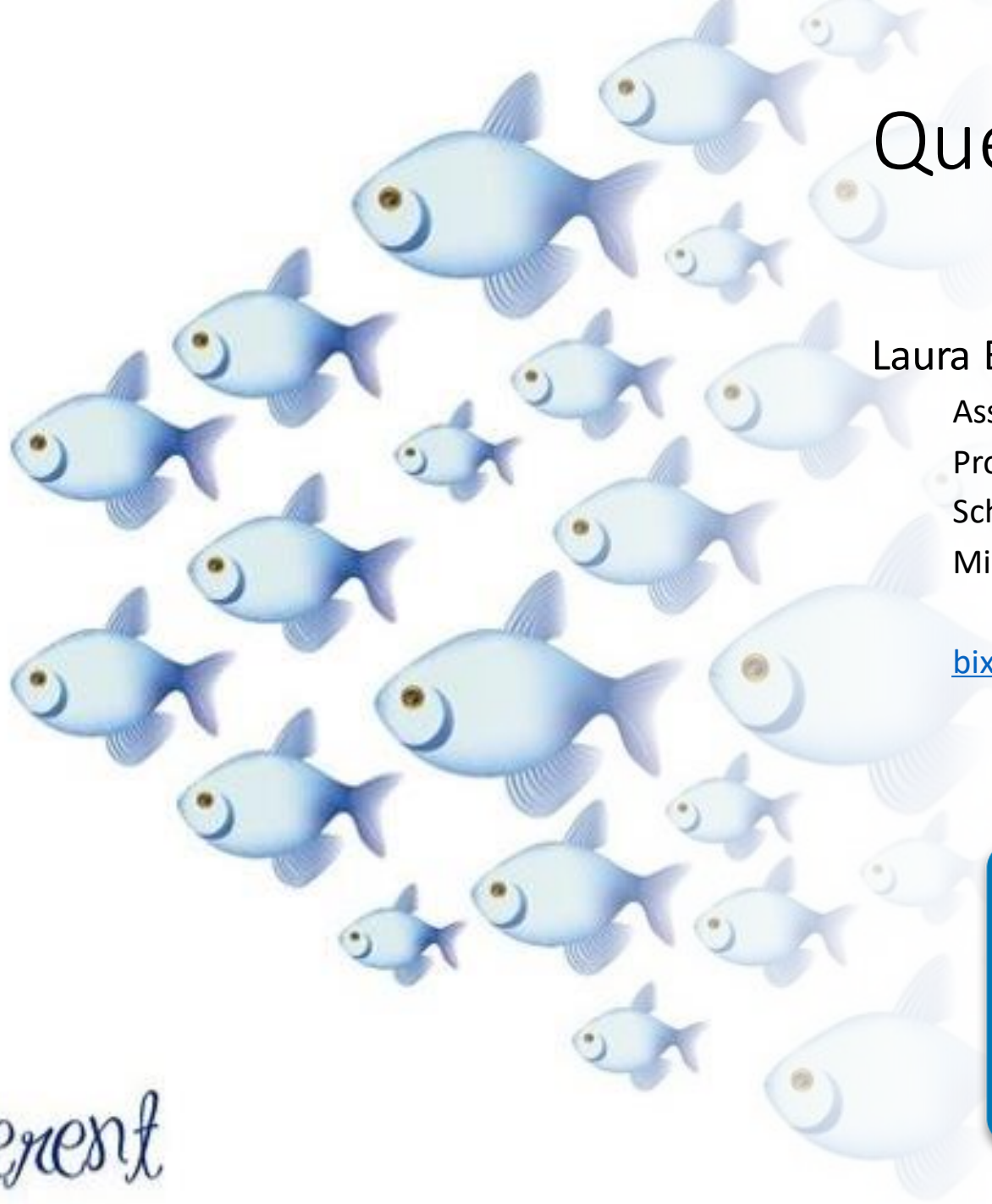
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Think Different



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