

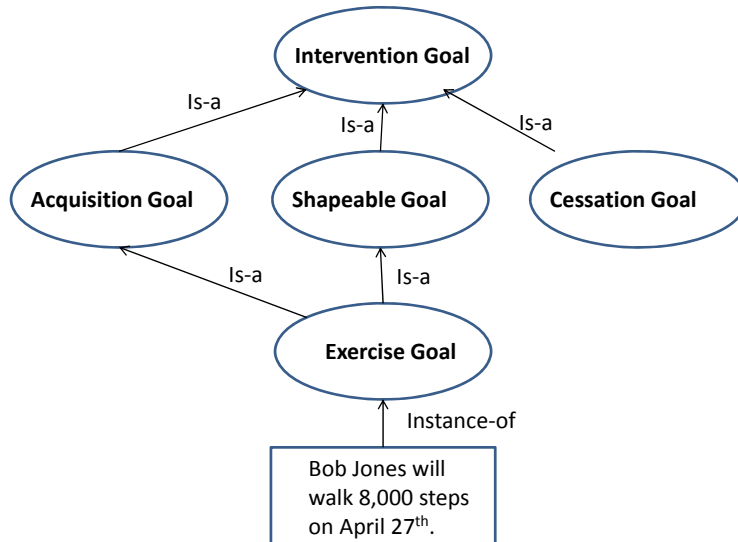
Ontologies in Behavioral Informatics

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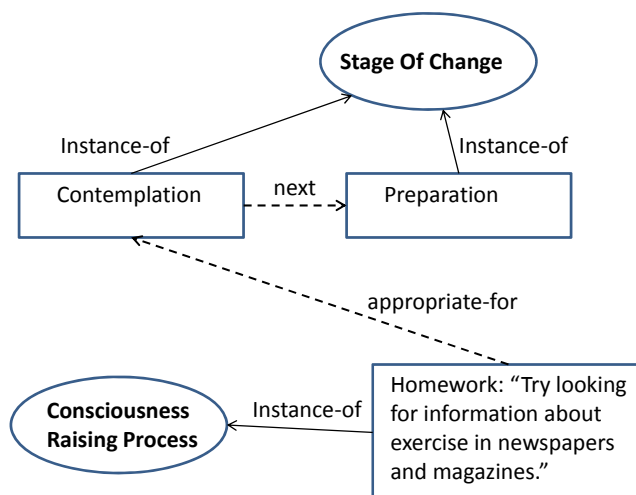
What's an ontology?

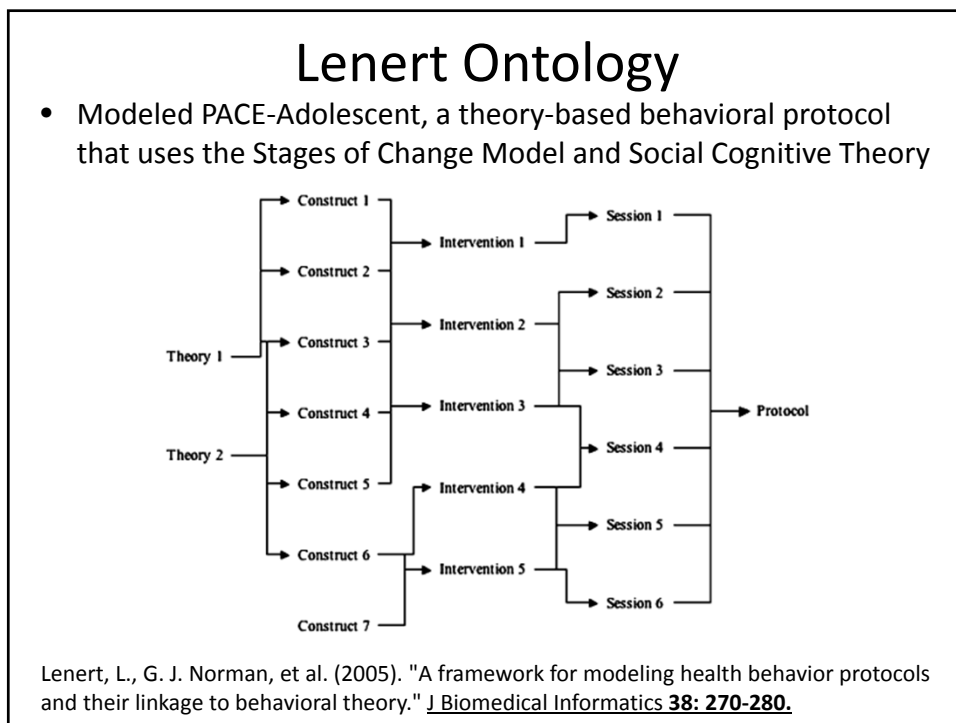
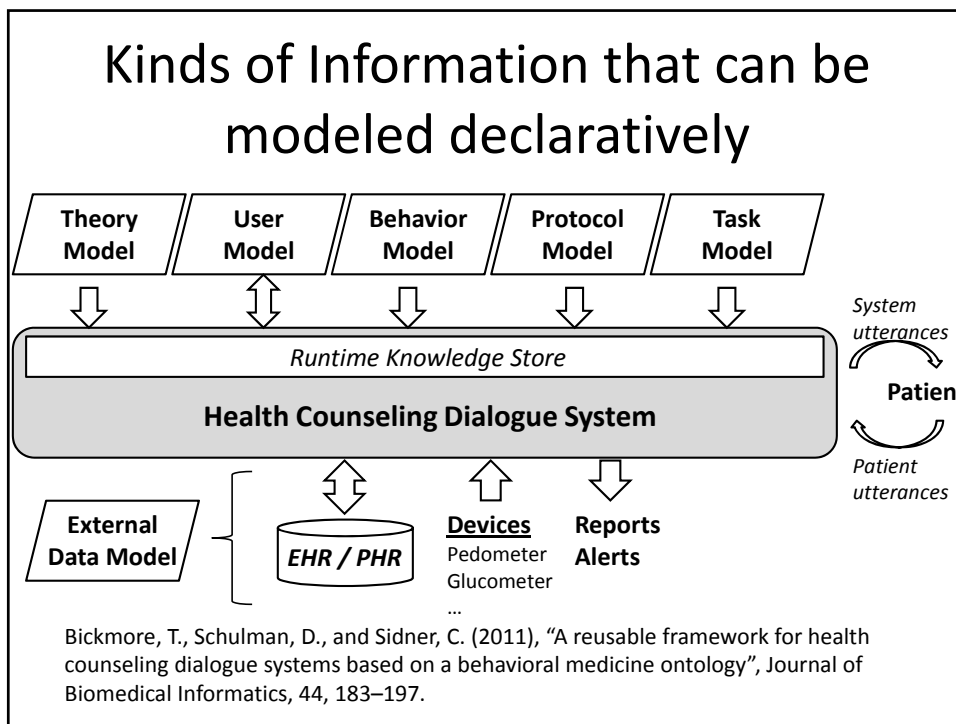
- An ontology is a kind of controlled vocabulary of well defined terms with specified relationships between those terms, capable of interpretation by both humans and computers.
- Natural language is inherently ambiguous, “controlled vocabulary” grounds the meanings of all terms to a single (consensus) definition.
- Good introductions (biomedical focus):
<http://www.bioontology.org>

Example – terms and relationships



Example - Other Kinds of Relationships

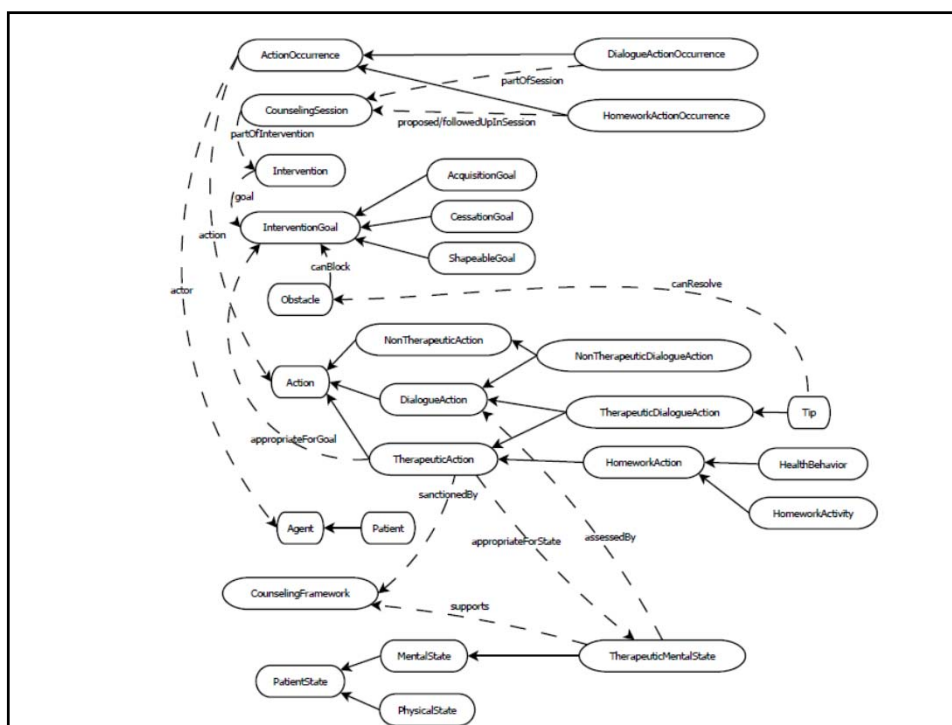


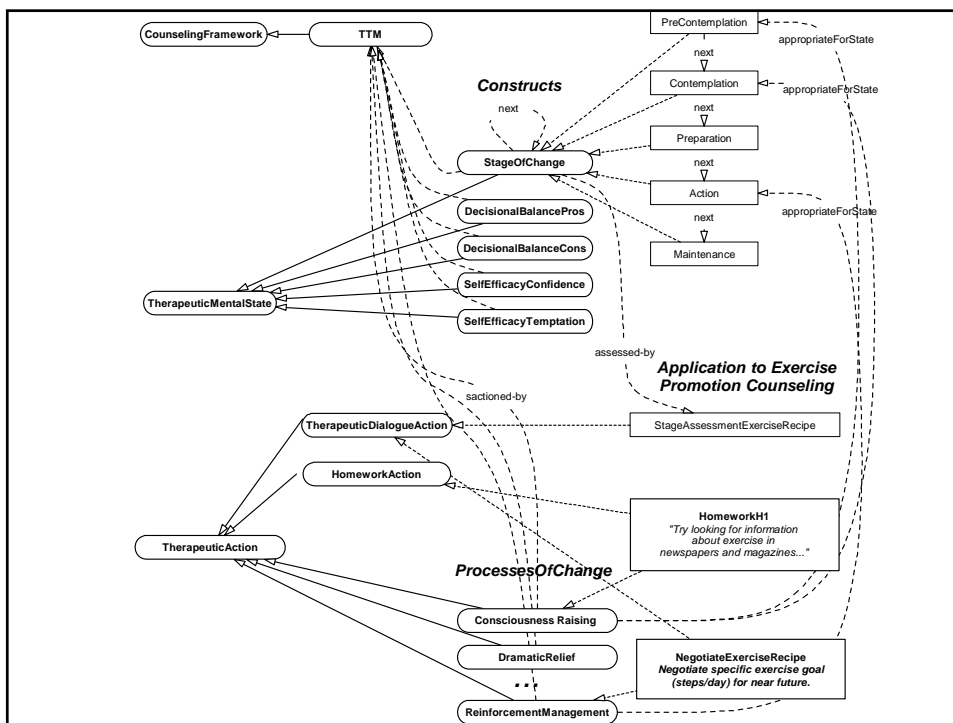
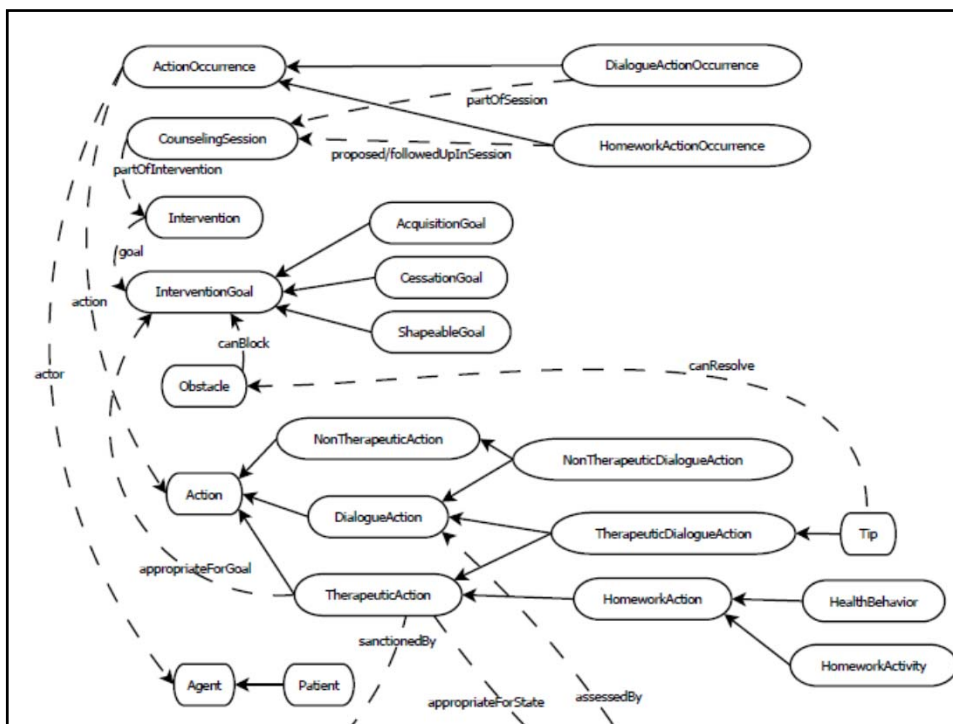


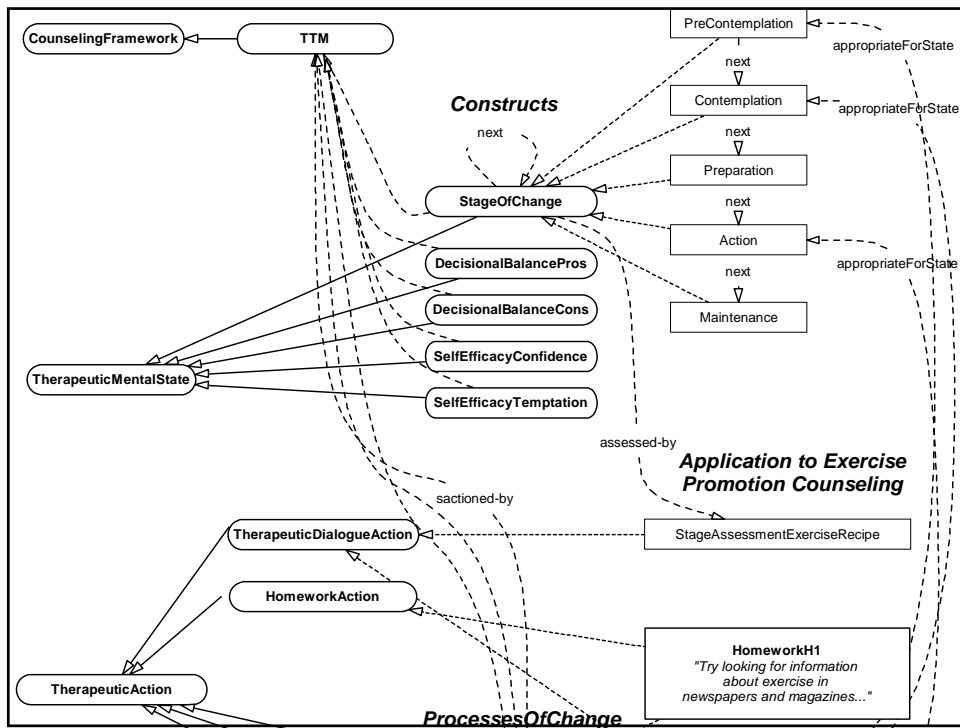
Health Behavior Change Ontology

- Developed under NLM grant
- Modeled in OWL and RDF
- Covers Transtheoretical Model, Motivational Interviewing as applied to Exercise (walking) promotion and Diet (fruit & vegetable) promotion
- Available open source:
<http://relationalagents.com/hbco.html>

Bickmore, T., Schulman, D., and Sidner, C. (2011), "A reusable framework for health counseling dialogue systems based on a behavioral medicine ontology", *Journal of Biomedical Informatics*, 44, 183–197.







Tasks & Recipes - Example

task Conversation

input parameters: behavior

precondition: (applicable when session > 1)

steps:

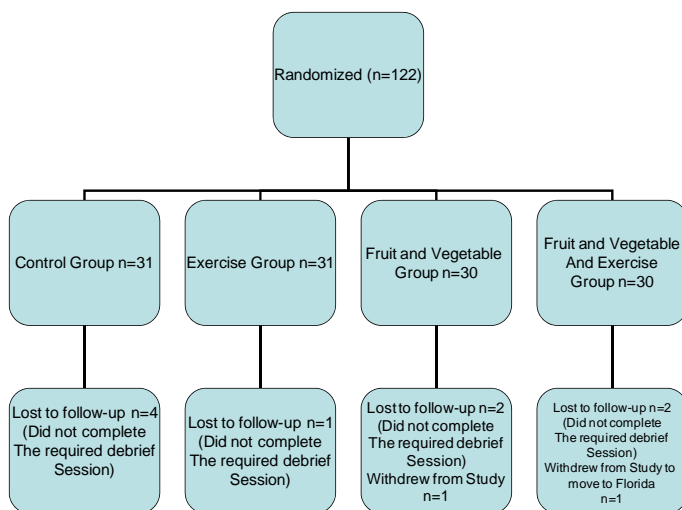
1. Opening
2. RitualSocial
3. ReviewTasks
4. Assess
5. Counseling
6. AssignTasks
7. PreClosing
8. Closing

...

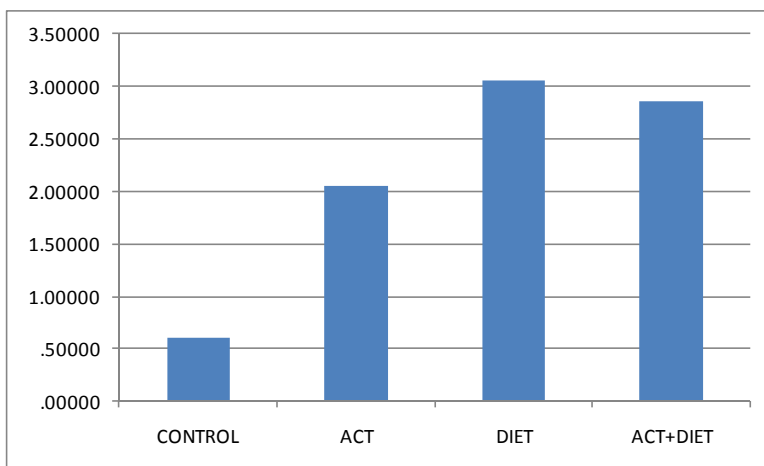
Demonstrated Re-Use Exercise -> F&V

- First developed exercise promotion intervention, then extended to fruit & vegetable promotion
 - Ontology concepts: 60, 100% reuse
 - Recipes: 150, 98% reuse
 - Utterances: 6,000, 14% reuse
 - SLOC: 110K, 22%
 - F&V took 9% of the calendar time and 4% of the labor hours of the original exercise intervention

Pilot & Field Evaluations



F&V Servings/Day



Questions?

Towards Standardization and Reuse in Behavioral Informatics

Closing & Discussion

Issues for Discussion

- Is there something inherently different about behavioral medicine (wrt biomedicine) that makes standardization efforts more difficult or less useful?
 - Primary driver in biomed is linkage across data stores for secondary analyses
- How to best promote dissemination & sharing?
 - Proprietary vs. Open source

Next Steps

- Behavioral Informatics SIG actions?

Plugs

- Behavioral Informatics SIG breakfast Friday (7:30-8:30AM) Columbia Hall 11
- Computers & Games session – Thursday 3pm
- Advances in Information Technology for Increasing Dissemination and Engagement - Symposium #30, Friday 3

Thanks!

<http://relationalagents.com/sbm>