

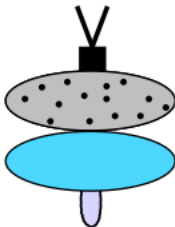
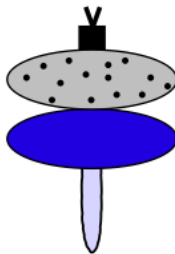
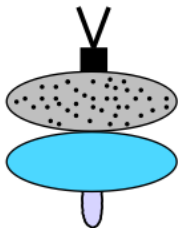
Less is more? Is overall similarity classification less effortful than single-dimension classification?

Andy Wills and Fraser Milton

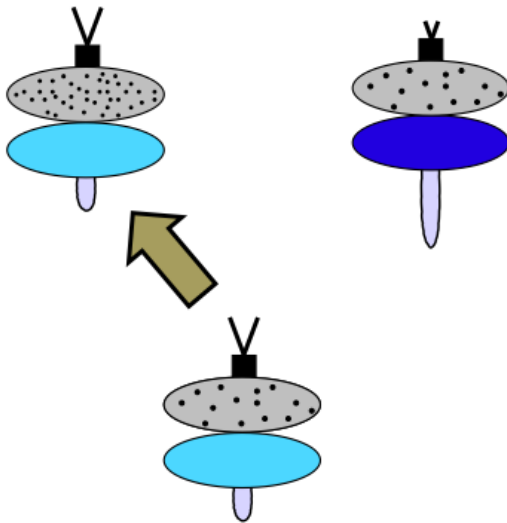
Plymouth University and Exeter University

11 April 2013

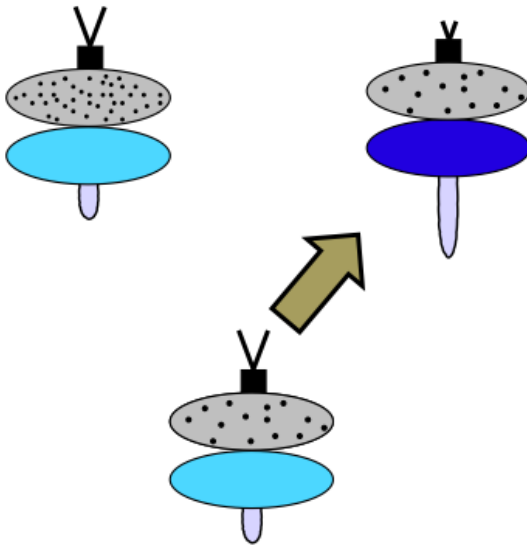
Milton et al. (2008, Exp. 1) - Procedure



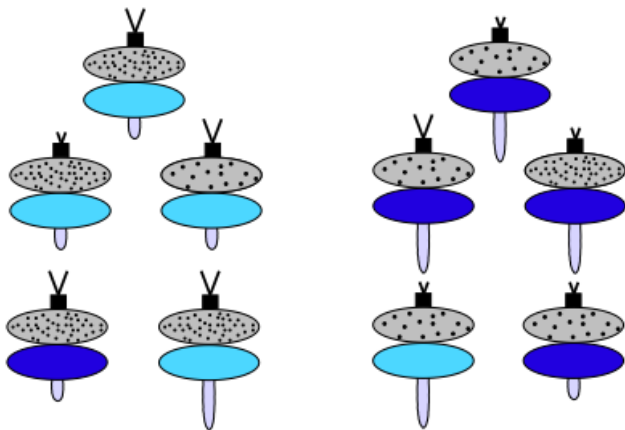
Milton et al. (2008, Exp. 1) - Classification



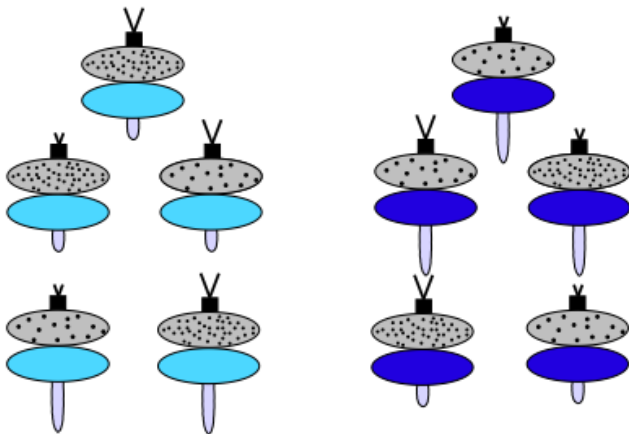
Milton et al. (2008, Exp. 1) - Classification



Milton et al. (2008, Exp. 1) - Overall similarity



Milton et al. (2008, Exp. 1) - Unidimensional



Milton et al. (2008, Exp. 1) - Results

Condition	UD sort	OS sort	Other sort
High time pressure	.92	.08	.00
Low time pressure	.42	.58	.00

OS classification more effortful than UD classification

Ten experiment series:

- Milton, Longmore & Wills (2008)
- Wills, Milton, Longmore, Hester & Robinson (2013)
- Wills, Longmore & Milton (accepted)

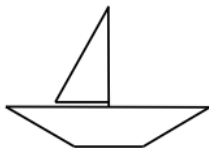
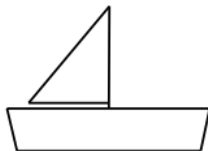
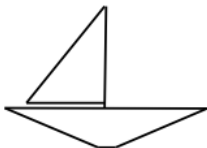
Key results

- Time pressure decreases OS (3 experiments)
- Concurrent load decreases OS (4 experiments)
- Instructions to respond meticulously increase OS
- Large working-memory capacity predicts OS classification
- Impulsive personality predicts UD classification

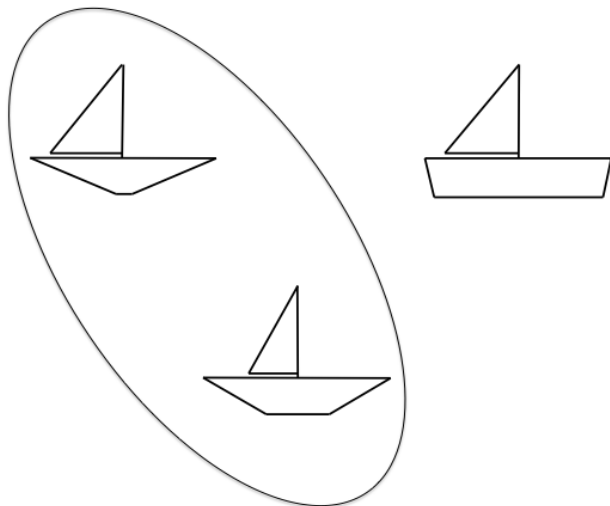
OS classification *less* effortful than UD classification

- Brooks (1978)
- “Evidence suggests that in many situations, it is easier for people to base similarity and categorization judgments on more, rather than fewer, properties” (Goldstone & Barsalou, 1998)
- “Family resemblance categorization is the default mode of approach to tasks when full executive functioning is underdeveloped, inhibited, or lacking for any reason” (Couchman et al., 2010)

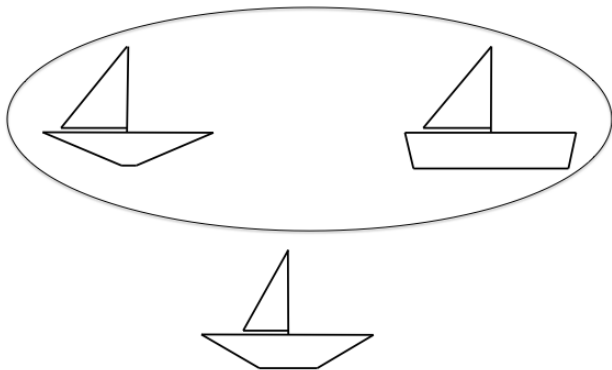
The triad task



Overall similarity



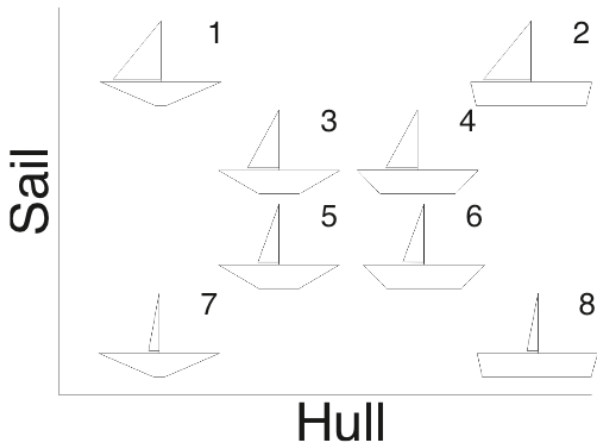
“Dimensional” (identical attribute)



Triad task - Stimulus set

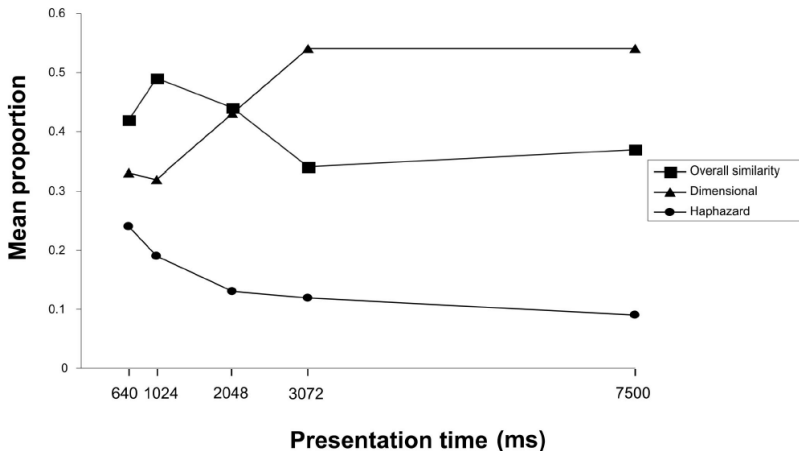
Sail identity triplets: 1-2-3, 1-2-4, 5-7-8, 6-7-8

Hull identity triplets: 1-3-7, 1-5-7, 2-4-8, 2-6-8



Triad task and time pressure

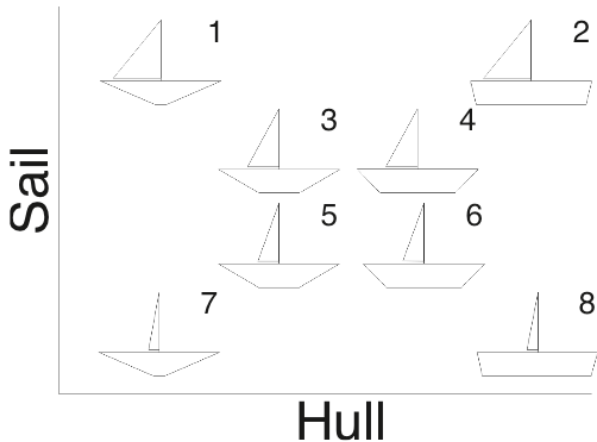
- Ward (1983)
- Smith & Kehler Nelson (1984)
- Milton et al. (2008), Experiment 5.



Triad task - Ambiguity

Sail identity triplets: 1-2-3, 1-2-4, 5-7-8, 6-7-8

Hull identity triplets: 1-3-7, 1-5-7, 2-4-8, 2-6-8



Triad task - Model-based analysis

- Unidimensional (hull) - Classify on the basis of the hull, ignoring the sail.
- Unidimensional (sail) - Classify on the basis of the sail, ignoring the hull.
- Overall similarity - Classify on the basis of overall similarity using both the sail and hull attributes.
- Identical attribute - Classify on the basis of the identically matching attribute, ignoring the information from the dimension without an identical match. Note that this is a multidimensional strategy, because the dimension with the identity varies unpredictably from trial to trial.

We then collapse across the two Unidimensional strategies when presenting results, as in the match-to-standards procedure.

Re-analysis: Results

Condition	UD	OS	IDENT
640ms	.74	.22	.04
1024ms	.76	.24	.00
2048ms	.76	.10	.14
3072ms	.44	.20	.36
7500ms	.28	.36	.36

Experiment 1 - Replicating Ward (1983)

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2 seconds vs. 5 seconds presentation time.

Experiment 1 - Results - Traditional analysis

Condition	OS	IDENT	HAPHAZARD
2 sec	.66	.22	.14
5 sec	.58	.32	.10

Experiment 1 - Results - Model-based analysis

Condition	UD	OS	IDENT
2 sec	.30	.67	.03
5 sec	.40	.42	.18

Experiment 2 - Results

- Traditional analysis

Condition	OS	IDENT	HAPHAZARD
2 sec. T/O	.63	.13	.24
5 sec. min.	.58	.32	.10

- Model-based analysis

Condition	UD	OS	IDENT
2 sec. T/O	.09	.88	.03
5 sec. min.	.22	.56	.22

Experiment 3 - Replicating Smith and Kemler Nelson (1984)



- 1 sec. vs. 5 sec. presentation time.

Experiment 3 - Results

- Traditional analysis

Condition	OS	IDENT	HAPHAZARD
1 second	.37	.55	.08
5 seconds	.12	.85	.03

- Model-based analysis

Condition	UD	OS	IDENT
1 second	.38	.14	.48
5 seconds	.10	.00	.90

Summary



UD - up, OS - x, ID - down



UD - up, OS - up, ID - down

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. UD - x, OS - up, ID - down