VISUALIZING TIME USE





Conceptual framework for psychological investigations of time use

Conceptual

Applied

Techniques for visualizing
How do students use their time?

Empirical

External representations of time use by students



History of Time Use Research

Conceptual Frame Data Collection

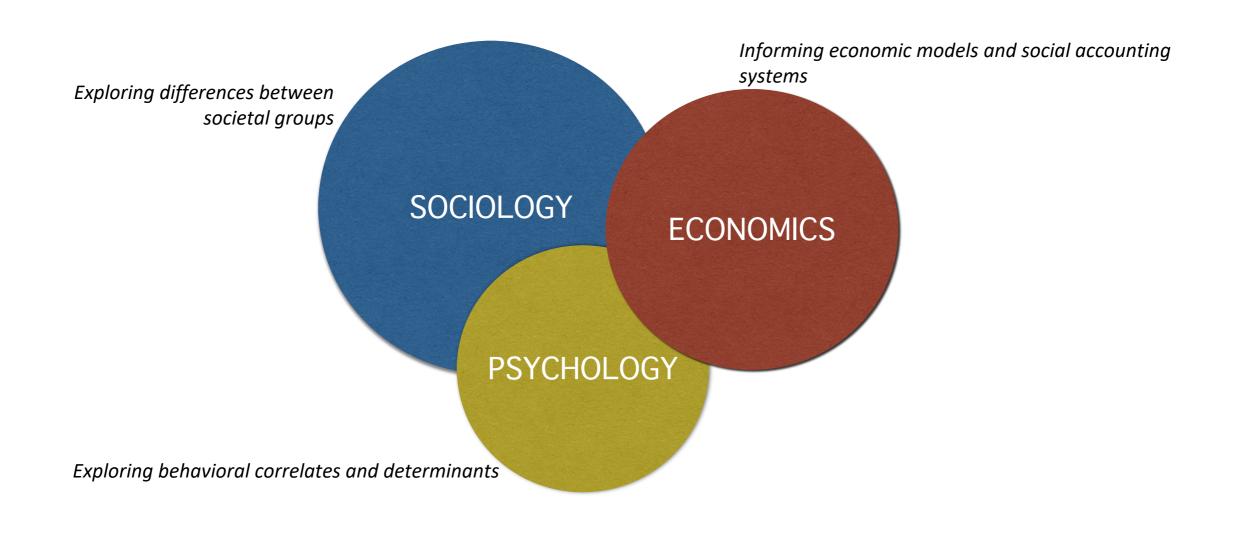
Time Geography Applications



Time can be viewed as the ultimate constraint on human activity. Unlike other resources, it is shared equally by everyone. Each of us 24 hours per day.



Time Use Research





Data Collection

	What were you doing? Record your main activity for each 10-minute period from 04.00 to 07.00!	What else were you doing? Record the most important parallel activity.	Where were you? Record the location or the mode of transport	Were you alone or together with somebody you know?						
		Indicate if you used, in the main or parallel	e.g. at home,	Mark "yes"	by crossing					
		activity, a computer or internet. You do not need to record the use of a	at friends' home, at school, at workplace,	Alone	Partner	th other hou Parent	sehold mem Household		Other	
	Only one main activity on each line! Distinguish between travel and the activity that is	computer or internet during working time.	in restaurant, in shop, on foot, on bicycle, in car,				member up to 9	household member	persons that you	
Time	the reason for travelling.		on motorbike, on bus,				years		know	
04.00 -04.10										
04.10-04.20										
04.20-04.30										
04.30-04.40										
04.40-04.50										
04.50- 05.00										
05.00 -05.10										
05.10-05.20										
05.20-05.30										
05.30-05.40										
05.40-05.50										
05.50-06.00										
06.00 -06.10										
06.10-06.20										
06.20-06.30										
06.30-06.40										
06.40-06.50										
06.50-07.00										



Data Analysis

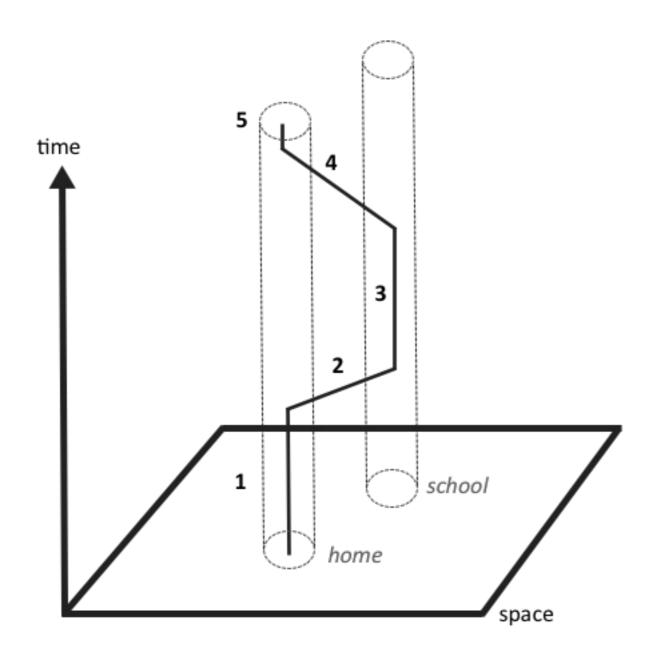
duration	timing	sequence	frequency		
quantity of time	time of day	order of activities	number of occurrences		
How much time do I spend studying?	What time of day do I study?	What do I do before and after studying?	How many times a day do I study?		



As soon as we have come into being we cannot take time off from our bodily existence. We have to leave a space-time trace in the world. And we share this condition with all other living and nonliving entities. As long as something exists it must be somewhere.



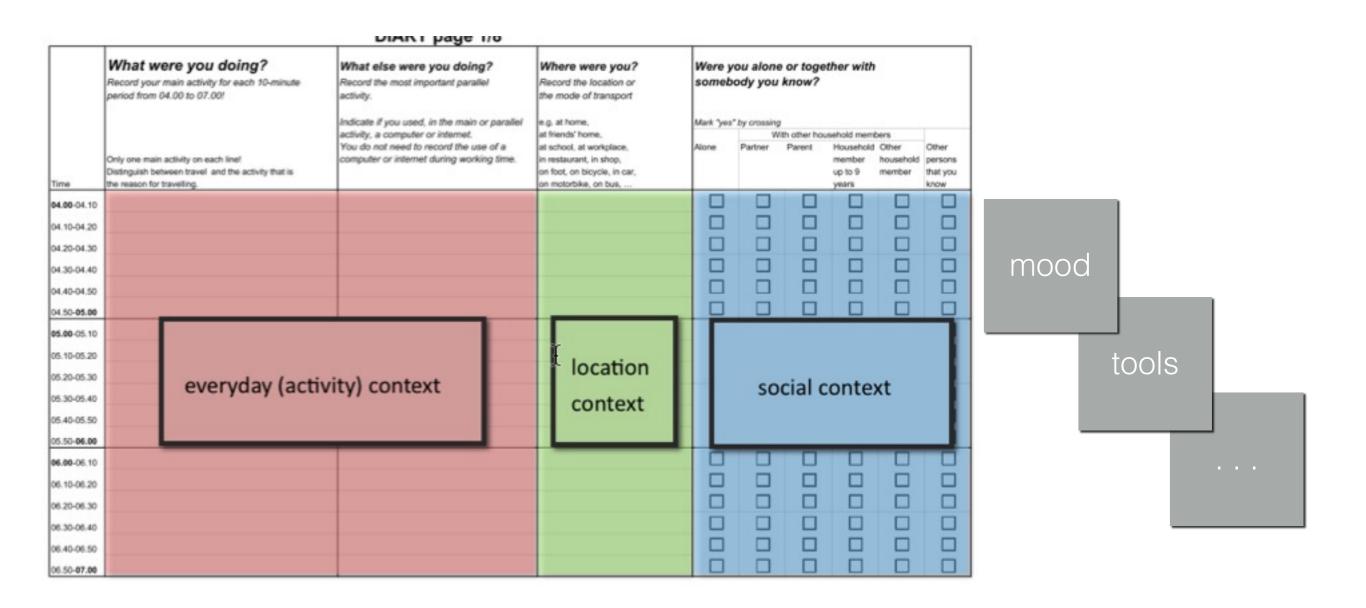
Time Geography



resources
goals
activities
constraints
path
stations
prisms



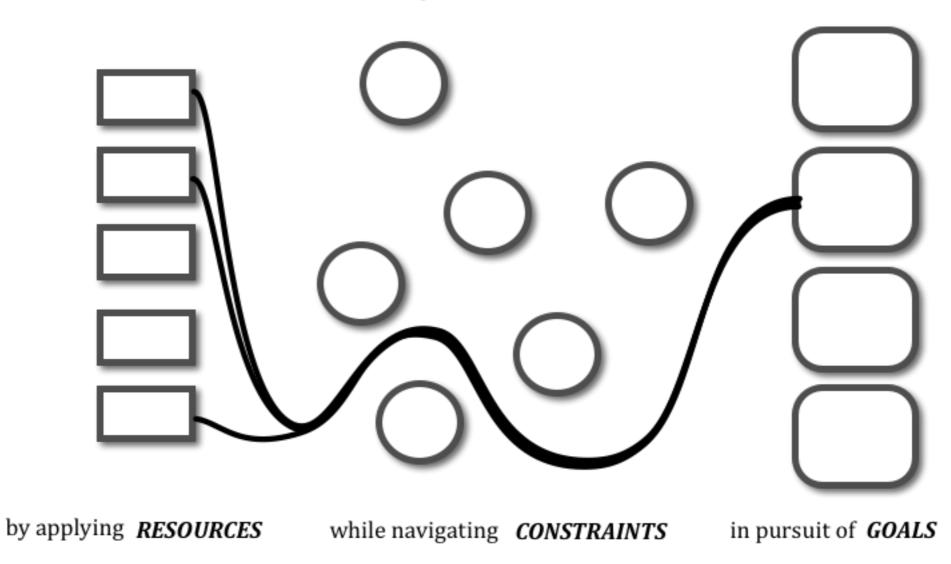
Contexts





Application

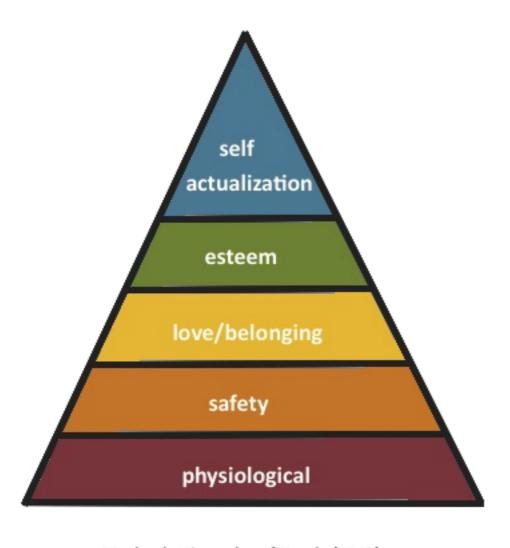
An individual performs an ACTIVITY...

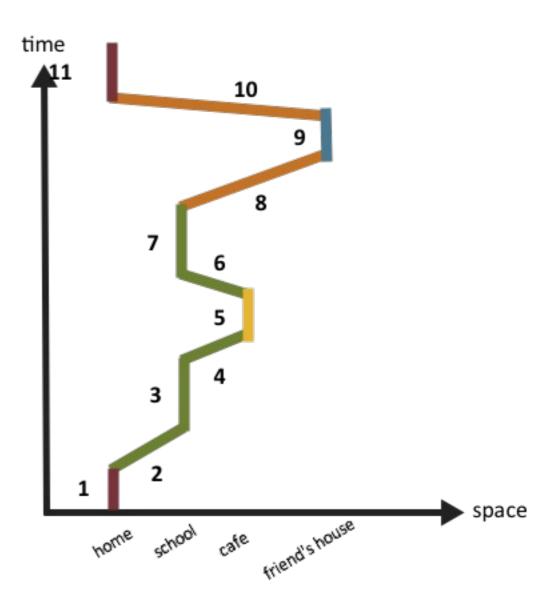


CONCEPTUAL FRAMEWORK



Application





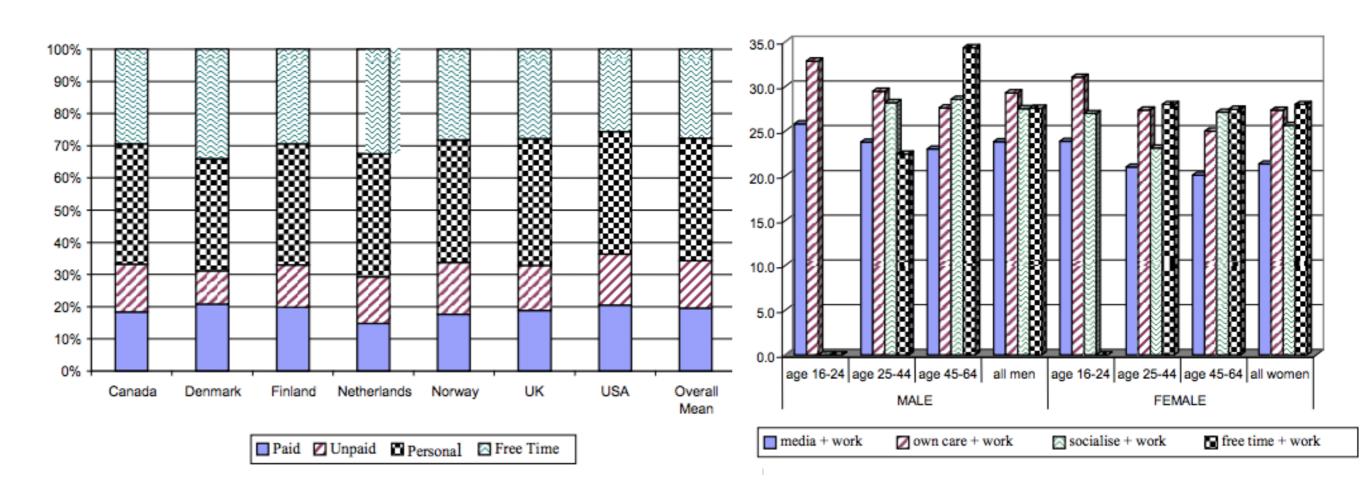




Visualization Technologies Sequence Analysis

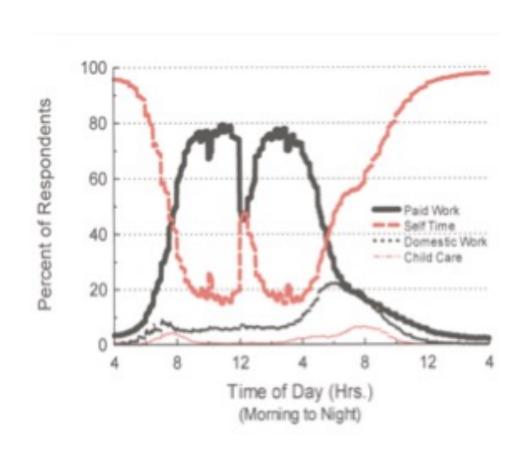


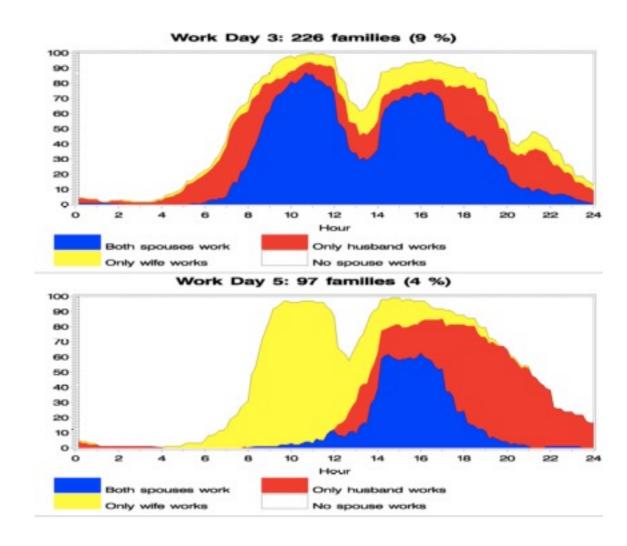
Duration





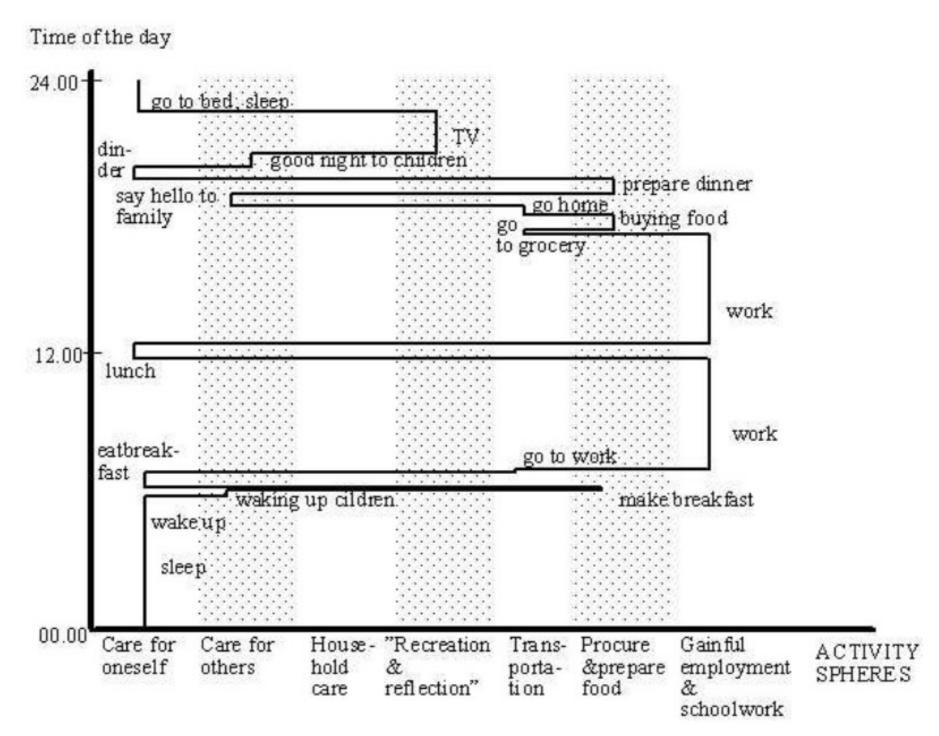
Contexts





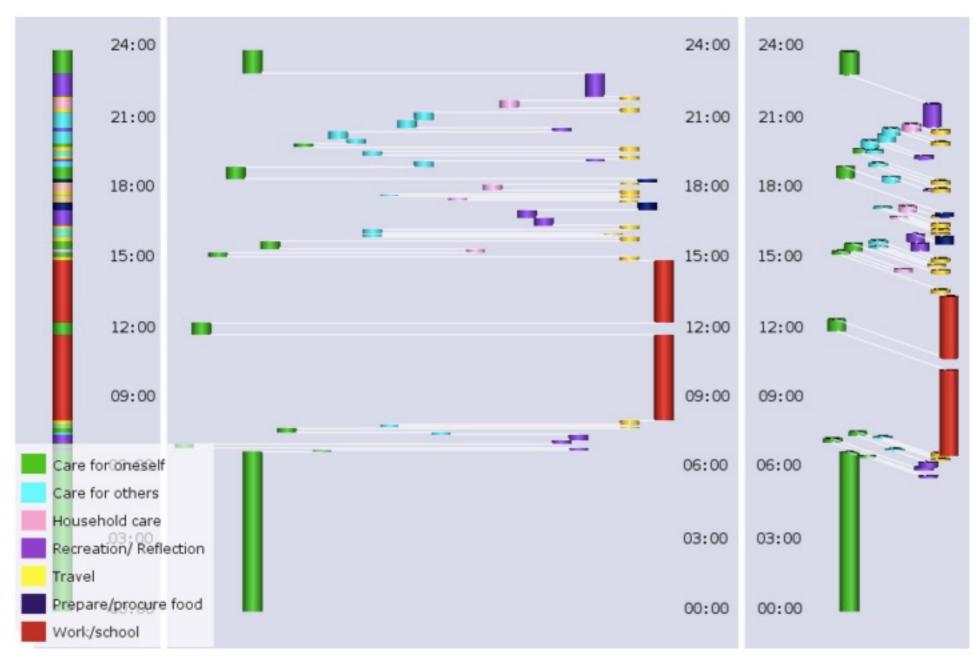


Activity Path



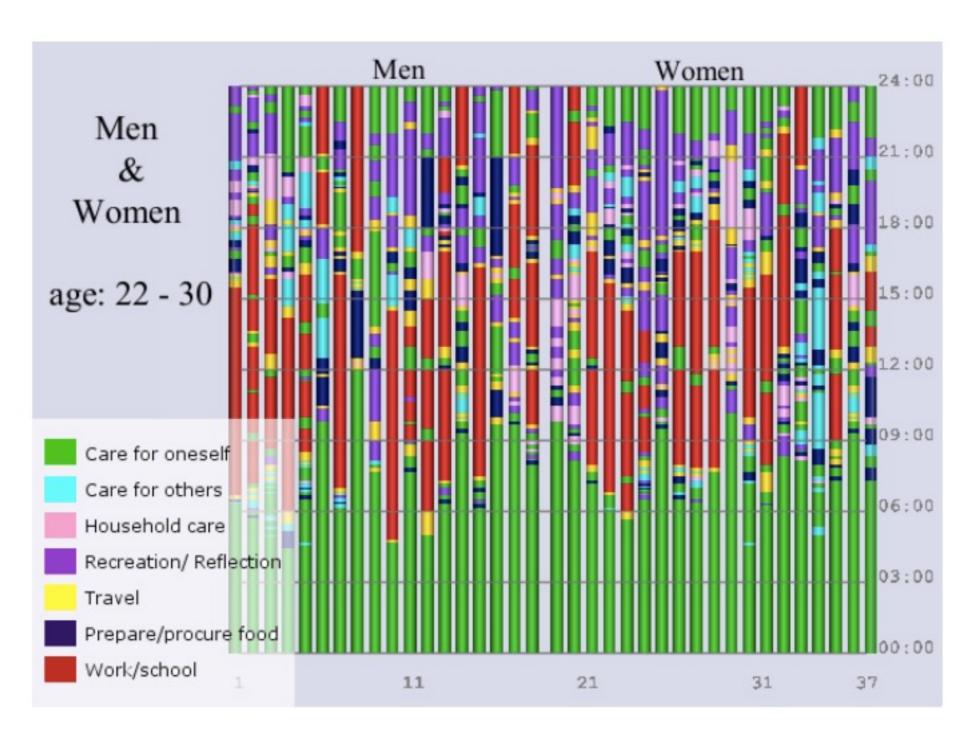


3D Activity Path



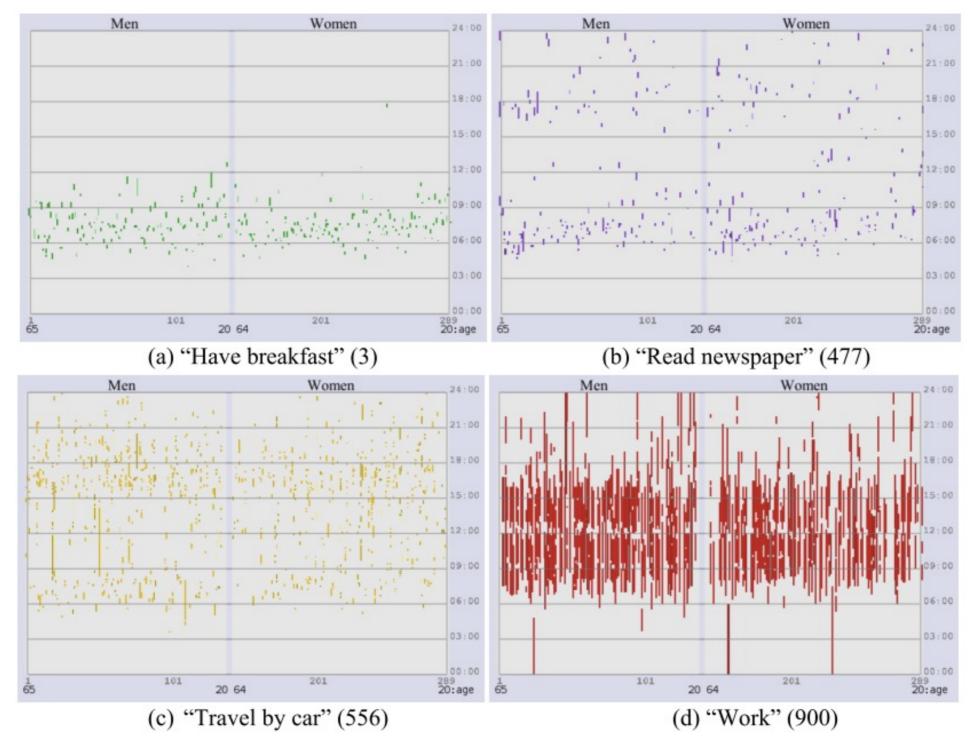


Sequence Analysis



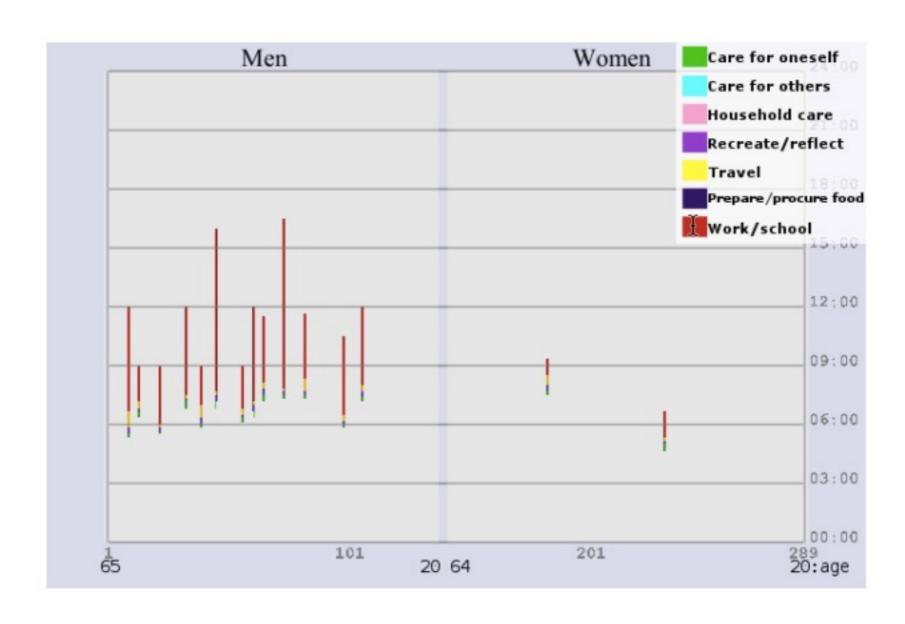


Sequence Analysis





Sequence Analysis







Empirical Study

Research Question
Methods
Results
Discussion



Research Question





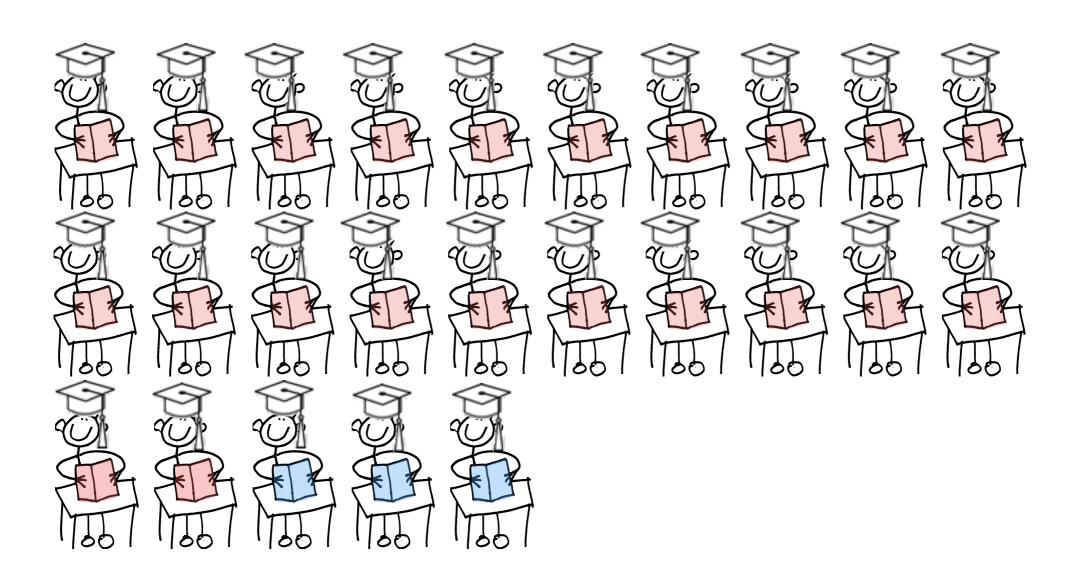
Method

Qualitative content analysis of visual media

- 1. How do students use space to represent time use?
- 2. How do students use form to represent time use?
- 3. Is there any consistency in which mechanisms are used to represent each component of time use?



Sample



n = 25 (22 f, 3 m) Median = 23



Materials

Visualizing the Everyday

Imagine the earth is about to be hit by an asteroid. You are rescued by a race of friendly aliens. The aliens offer to transport you to another planet with human life. In order to choose a suitable plant, they need to understand how you spend your time.

While you cannot communicate by speaking (the aliens do not have ears), you can communicate in writing and drawing. The aliens understand drawings, and French and English writing.

Your task is to create a representation of how you spend your time. You choose to represent a regular school day, in a regular school week. It is of the upmost importance that you accurately present how you actually spend your time (and not how you wish you spend your time). Your representation should communicate the activities you perform, as well as their duration (during the day), timing (during the day), sequencing (during the day) and frequency (over a week). You can create as many representations as you wish, on one piece of paper.

Good Luck!

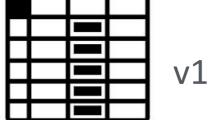


Participant Number _____ First Language ____ Right/Left Handed _____ Date ____



Analysis



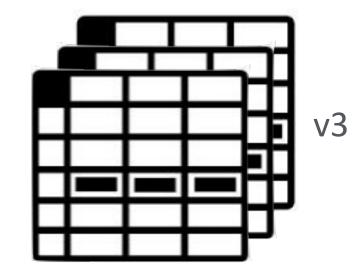




v2



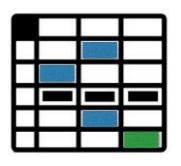


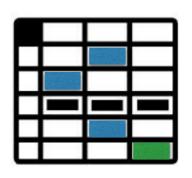


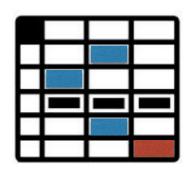


Analysis

4

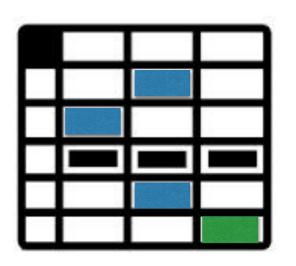






(space) $\alpha = 0.876$ (form) $\alpha = 1.000$ (mechanisms) $\alpha = 0.972$

5





Analysis: Space

Participant Number ____

(1) HORIZONTAL Visualizing the Everyday Imagine the earth is about to be hit by an asteroid. You are rescued by a race of friendly aliens. The aliens offer to transport you to another planet with human life. In order to choose a suitable plant, they need to understand how you spend your time. While you cannot communicate by speaking (the aliens do not have ears), you can communicate in writing and drawing. The (3) CENTER - PERIPHERY aliens understand drawings, and French and English writing. Your task is to create a representation of how you spend your time. You choose to represent a regular school day, in a regular school week. It is of the upmost importance that you accurately present how you actually spend your time (and not how you wish you spend your (4) CW - CCW time). Your representation should communicate the activities you perform, as well as their duration (during the day), timing (during the day), sequencing (2) VERTICAL (during the day) and frequency (over a week). You can create as many representations as you wish, on one piece of paper. Good Luck!

First Language __

Right/Left Handed _



Analysis: Form

Visualizing the Everyday

Imagine the earth is about to be hit by an asteroid. You are rescued by a race of friendly aliens. The aliens offer to transport you to another planet with human life. In order to choose a suitable plant, they need to understand how you spend your time.

While you cannot communicate by speaking (the aliens do not have ears), you can communicate in writing and drawing. The aliens understand drawings, and French and English writing.

Your task is to create a representation of how you spend your time. You choose to represent a regular school day, in a regular school week. It is of the upmost importance that you accurately present how you actually spend your time (and not how you wish you spend your time). Your representation should communicate the activities you perform, as well as their duration (during the day), timing (during the day), sequencing (during the day) and frequency (over a week). You can create as many representations as you wish, on one piece of paper.

Good Luck!

(1) TEXT

- i am some text la la la la lah
- (2) NUMBER
- 12pm 4 am; 2 x

(3) ARROW



(4) DRAWING



(4) COLOR



Participant Number _____

First Language _

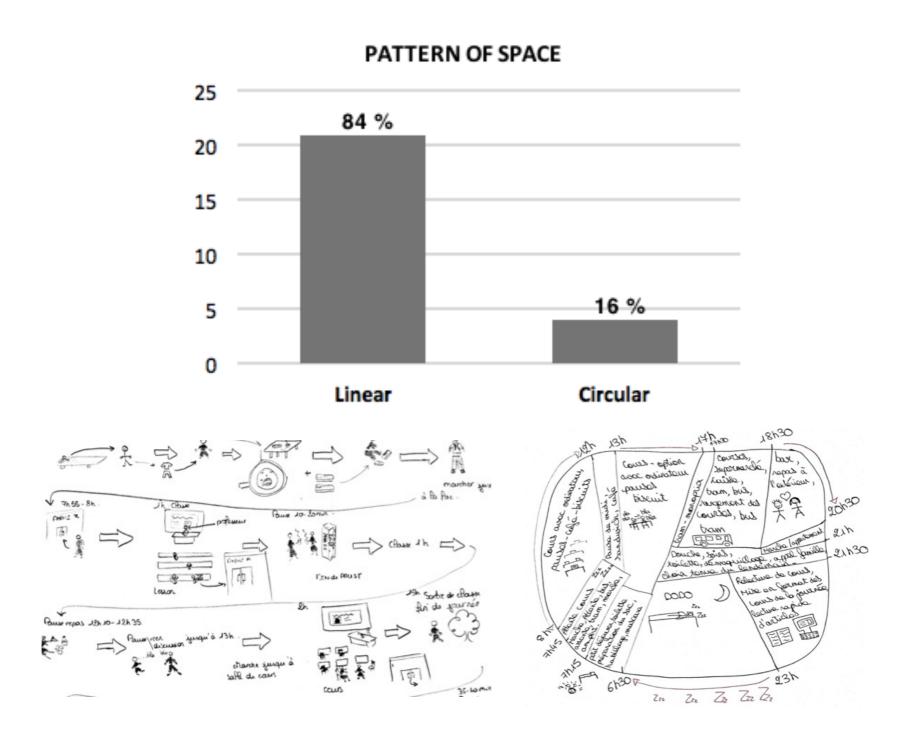
Right/Left Handed _

Date ___

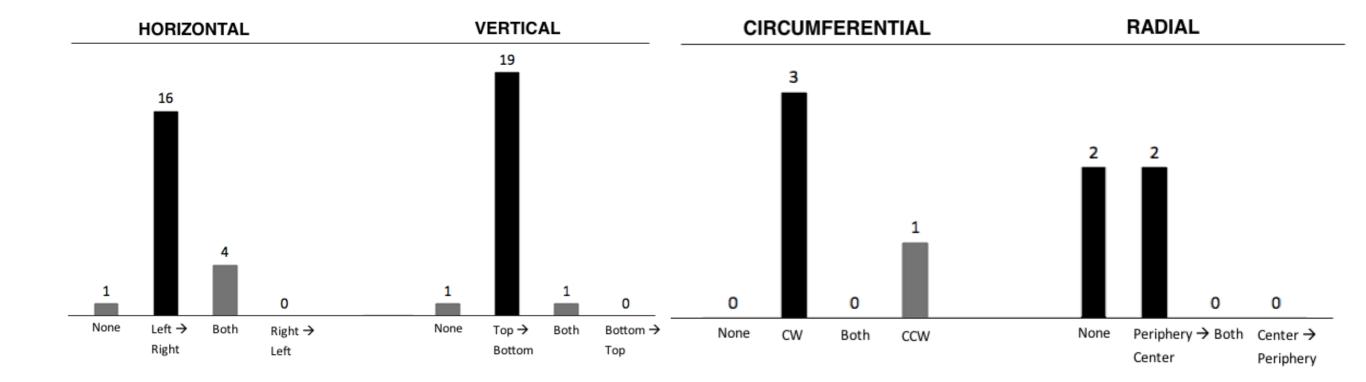


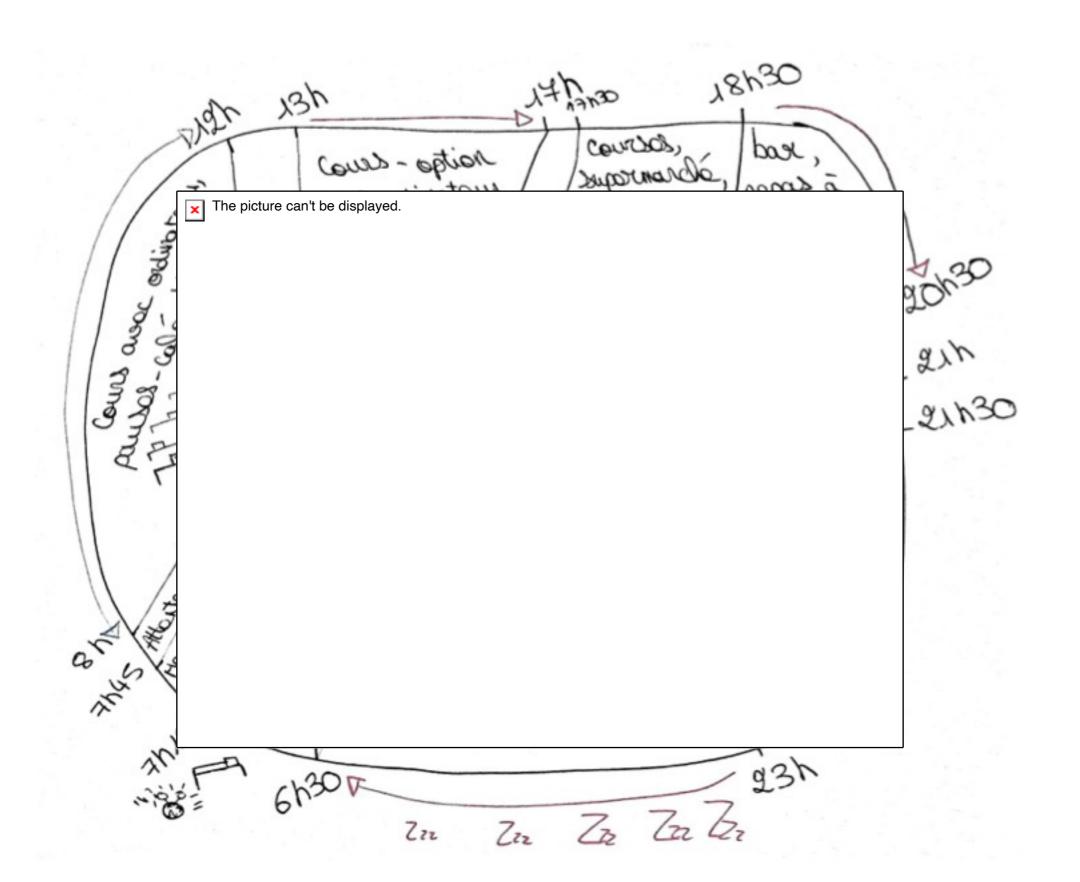


Use of Space











Visualizing the Everyday

Imagine the earth is about to be hit by an asteroid. You are rescued by a race of friendly aliens. The aliens offer to transport you to another planet with human life. In order to choose a suitable plant, they need to understand how you spend your time.

While you cannot communicate by speaking (the aliens do not have ears), you can communicate in writing and drawing. The aliens understand drawings, and French and English writing.

Your task is to create a representation of how you spend your time. You choose to represent a regular school day, in a regular school week. It is of the upmost importance that you accurately present how you actually spend your time (and not how you wish you spend your time). Your representation should communicate the activities you perform, as well as their duration (during the day), timing (during the day), sequencing (during the day) and frequency (over a week). You can create as many representations as you wish, on one piece of paper.

Good Luck!



0)



0

Participant Number _____

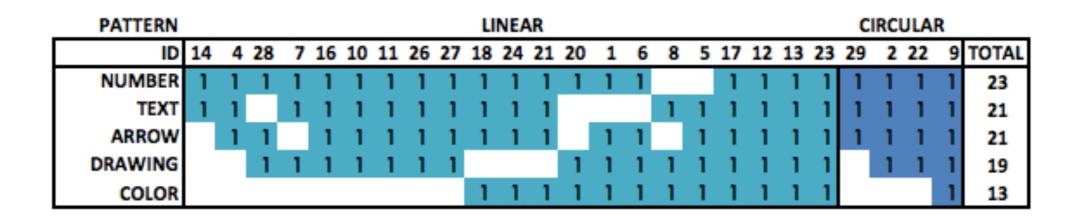
First Language ____

Right/Left Handed ___

Date



Use of Form



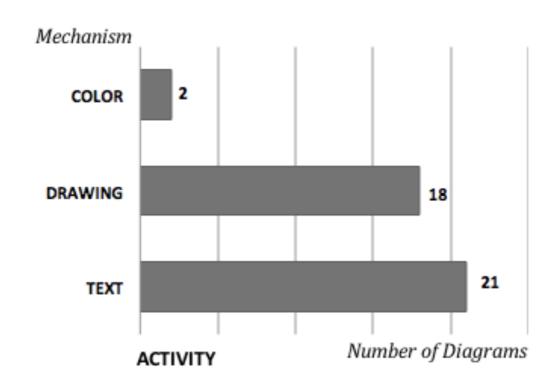
The picture can't be displayed.

The picture can't be displayed.	

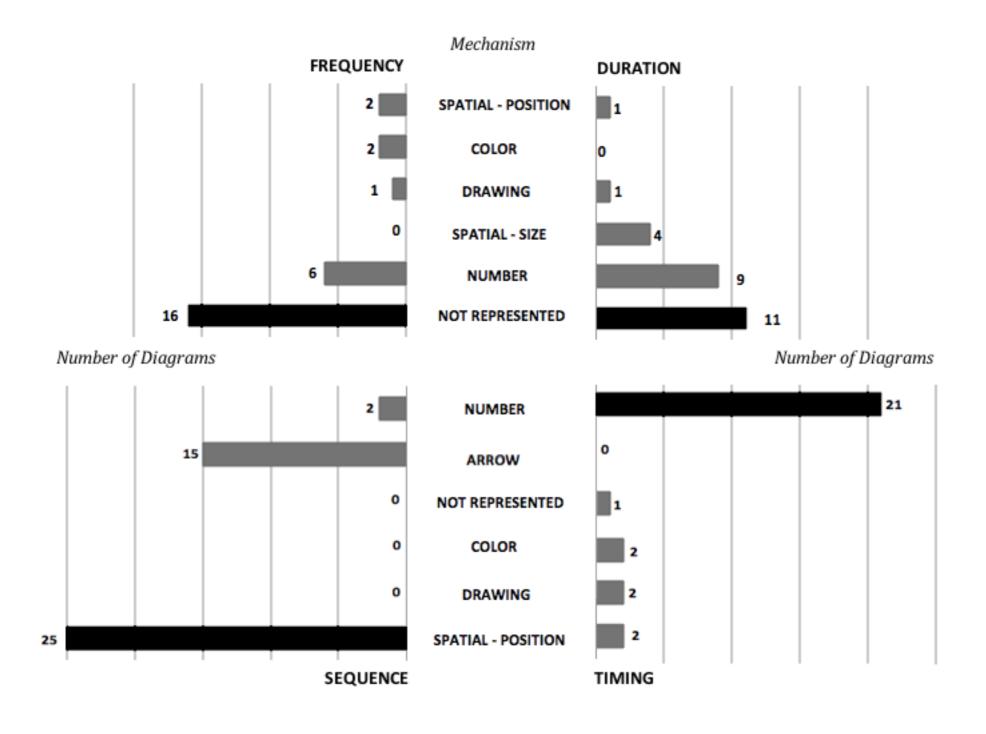
×	The picture can't be displayed.



Primary Mechanisms









Conclusion

- Preference for linear over circular
- Directionality consistent with written language
- Variety of forms
- Difficult to represent all components in 1 diagram
- Spatial-position to represent sequence
- Preference for single integrated diagram
- Many resembled agendas and calendars
- quantitative content analysis w/ large random sample
- differentiate communicative purpose
- students of different majors
- correlation with attitude toward time
- correlation with planning methods





At a first glance, everyday life seems to be very *simple* and everybody has experiences from it, but when we try to investigate it from a scientific perspective, its **complexity is overwhelming**.

- Kajsa Ellegård

(Ellegård, 2004) CONCLUSION



UN. (2013). Guidelines for Harmonizing Time-Use Surveys (p. 129).

Eurostat. (2008). Harmonised European time use surveys: 2008 Guidelines. Statistics Office of the European Union.

Hägerstrand, T. (1989). Reflections On "What About People in Regional Science?" Papers of the Regional Science Association, 66, 1–6.

Thrift, N. (1977). An introduction to time-geography. Geo Abstracts, University of East Anglia.

Ellegård, K., & Cooper, M. (2004). Complexity in daily life—a 3D-visualization showing activity patterns in their contexts. electronic International Journal of Time Use Research, 1(1), 37–59.

Vrotsou, K., Ellegård, K., & Cooper, M. (2009). Exploring time diaries using semi-automated activity pattern extraction. electronic International Journal of Time Use Research, 6(1), 1–25.

Lesnard, L. (2004). Schedules as sequences: a new method to analyze the use of time based on collective rhythm with an application to the work arrangements of French dual-earner couples. electronic International Journal of Time Use Research, 1(1), 60–84.

Michelson, W., & Crouse, D. (2004). Examining large-scale time-use files through graphic representation. electronic International Journal of Time Use Research, 1(1), 85–100.

Aigner, W., Miksch, S., Müller, W., Schumann, H., & Tominski, C. (2008). Visual methods for analyzing time-oriented data. IEEE transactions on visualization and computer graphics, 14(1), 47–60. doi:10.1109/TVCG.2007.70415

Tversky, B., Kugelmass, S., & Winter, A. (1991). Cross-cultural and developmental trends in graphic productions. Cognitive Psychology, 23, 515–557. doi:10.1016/0010-0285(91)90005-9

Tversky, B. (2011). Visualizing Thought. Topics in Cognitive Science, 3(3), 499-535. doi:10.1111/j.1756-8765.2010.01113.x

Marsh, E., & White, M. (2006). Content analysis: A flexible methodology. Library trends, 55(1), 22-45. doi:10.1353/lib.2006.0053

Hayes, A. F., & Krippendorff, K. (2007). Answering the Call for a Standard Reliability Measure for Coding Data. Communication Methods and Measures, 1(1),

