

LANGUAGE AND THOUGHT

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- Source of knowledge

e.g., in Turkish, must specify if peanut eating was witnessed or just heresay

Do these quirks of language affect how speakers think about the world?

The Whorfian View

Strong version

Language determines your thoughts and actions.

Long since abandoned

Weak version

Language embodies a world view; it carves up the world into categories.

As a result, language critically shapes thoughts and actions.

a.k.a. linguistic relativity

also implied: languages differ in important ways from one another

Alternative to linguistic relativity

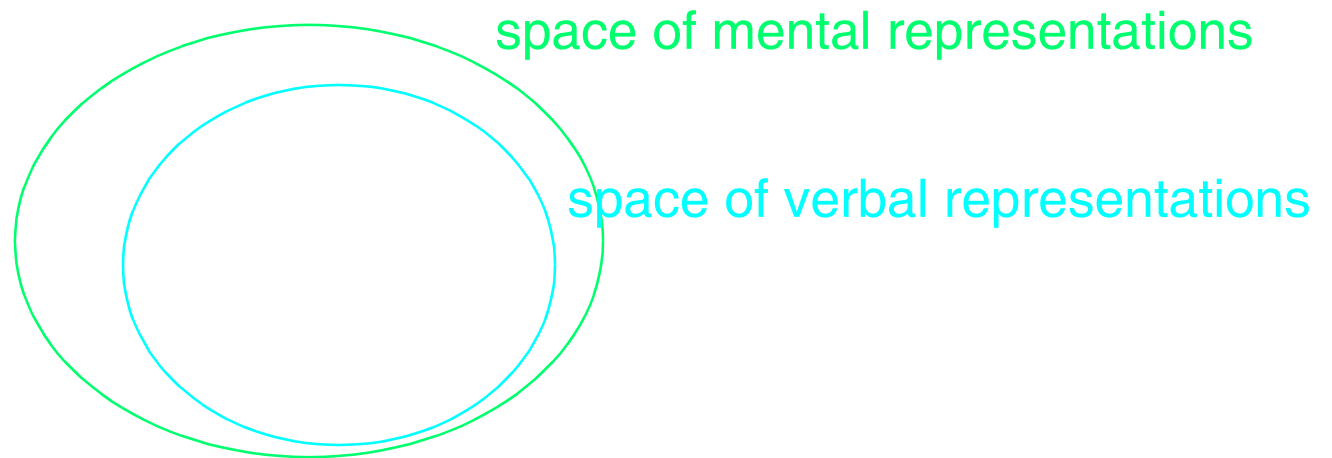
Brain operates without use of language.

Internal representations might be richer, more continuous.

Language is only an output system.

Language and Thought

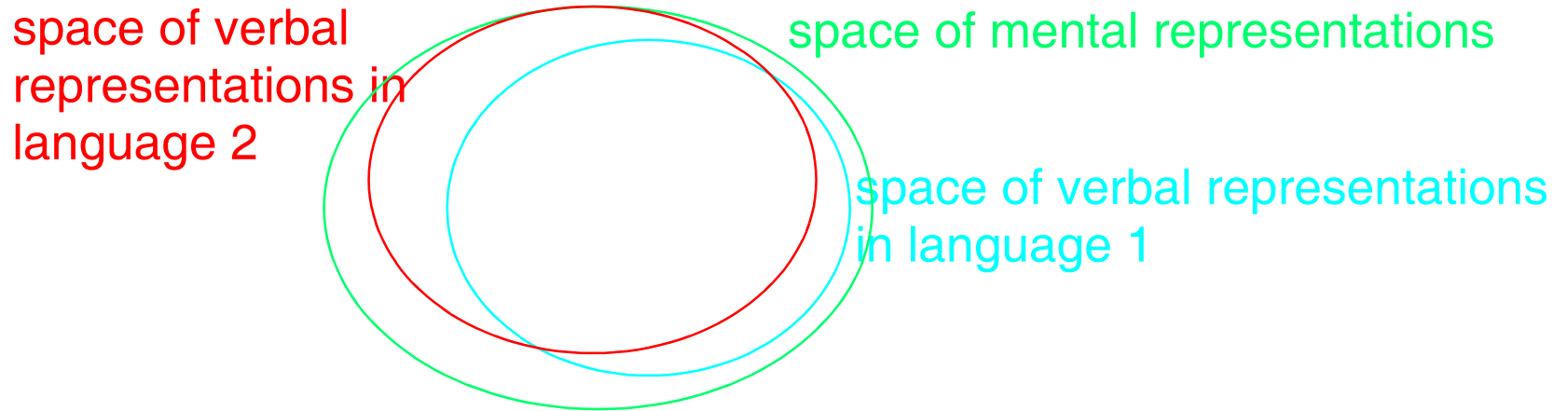
**Noncontroversial: We can think about things that we can't/
don't express in language.**



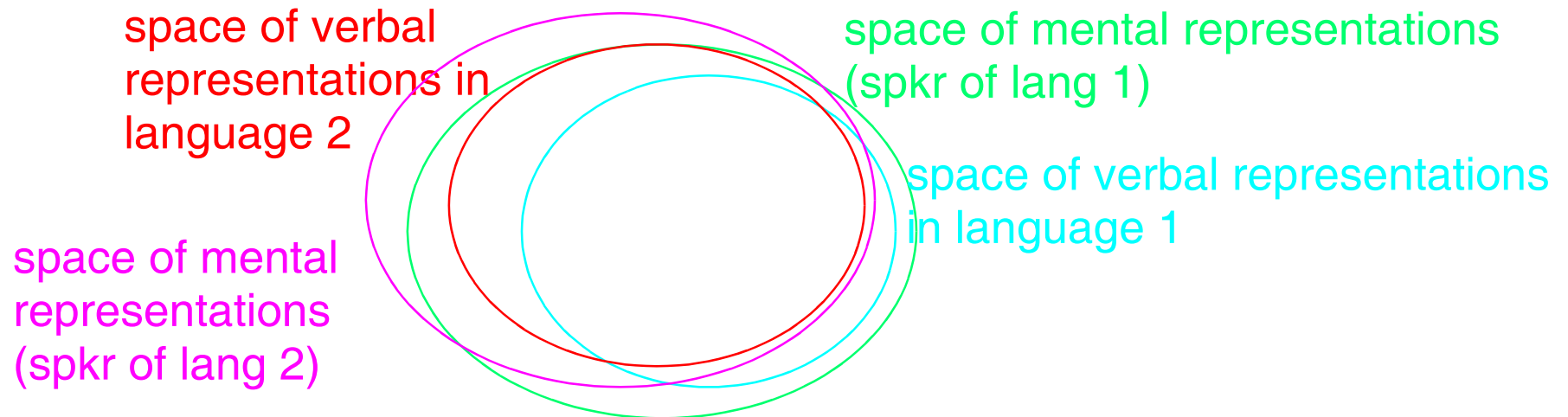
e.g., images, emotions, nonlinguistic propositions

Language and Thought

Language does not influence thought



Language does influence thought



Areas of Research in Linguistic Relativity

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Spatial relationships

Languages differ in the relations used to describe relative positions of objects (in, on, above, etc.).

e.g., put in: Korean has two words depending on whether outcome is tight fit or not (glove on hand vs. fruit in bowl)

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Shapes and substances

Languages differ in the extent to which they make grammatical distinctions between object that have shape (e.g., cookies) and substances (e.g., mud).

e.g., English: some mud, a cookie, a cup of mud; Japanese: cup of cookies

Areas of Research in Linguistic Relativity (Cont.)

Motion

Languages differ in how they code the manner and path of motion.

e.g., in English, manner is typically coded in the verb (walk, crawl, slide); in Greek and Spanish, path information is typically coded (exit, enter)

Areas of Research in Linguistic Relativity (Cont.)

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Time

Languages differ in how they use metaphors for talking about time.

English: time is horizontal (“push deadline back”, “move meeting forward”)

Mandarin: time is vertical (up and down to refer to the order of events, weeks, months)

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Number

Prelinguistic infants and nonhuman primates can represent exact numerosities for small sets (≤ 3 objects) and approx. num. for larger sets.

Experimental studies examine the role of language for representation of exact numerosity of large sets.

Areas of Research in Linguistic Relativity (Cont.)

Objects

Languages differ in how names of objects are grouped into grammatical categories.

e.g., gender

Not only are feminine objects more likely to be seen as similar to females, but features used to describe them also depended on gender

key (German, masculine): hard, heavy, jagged, metal , serrated

key (Spanish, feminine): little, lovely, shiny, tiny

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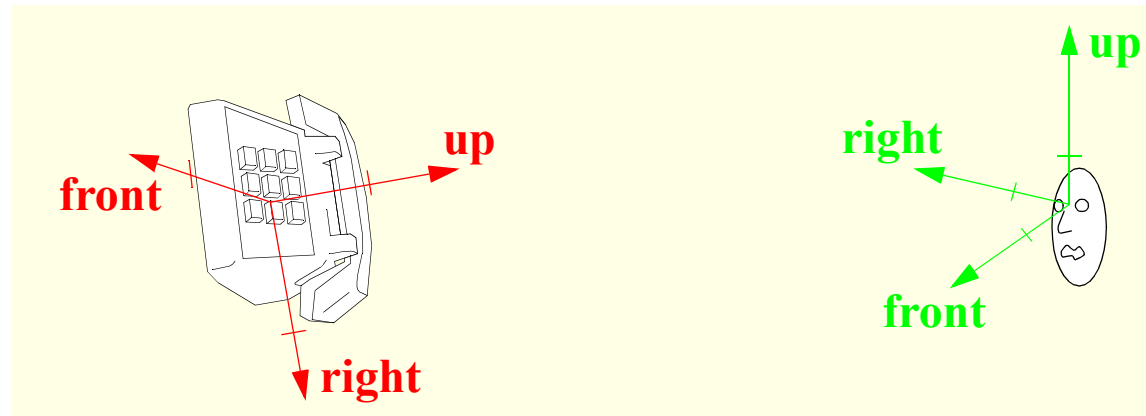
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Frames of reference

Frames of Reference

Coordinate systems used to compute the location of one object with respect to another.

Defined by (a) origin of coordinate system, (b) direction of principle axes, and (c) scale of principle axes



Reference frames can be prescribed by

- viewer (*“the window is to my left”*)
- objects (*“the handle is above the base”*)
- environment (*“the projector is at the west end of the room”*)

Terminology

Terms used in the article

relative FoR = viewer-based

intrinsic FoR = object-based

absolute FoR = environment based

FoRs used in language to specify spatial relationship between thing to be located and landmark.

For communication, relative FoR imposes listener burden.

Focus of article on 'table top space' vs. geographic space

Different representational systems may be at work depending on scale, and depending on whether objects are roughly reachable.

FoR and Languages/Cultures

Language	Country	Family	Linguistic frame of reference			Ecological zone or zones	Dwelling	Subsistence mode
			Intrinsic	Relative	Absolute			
Arernte	Australia	Pama Nyungan	x		X	D	R	H-G
Balinese	Indonesia	Austronesian	x	x	X	T	R	StA
Belhare	Nepal	Tibeto-Burman	x	x	X	H SubT, A	R	StA
Dutch	Netherlands	Indo-European	x	X	(x)	Temp	U	I
English	UK, USA, etc.	Indo-European	x	X	(x)	Temp	U	I
Ewe	Ghana	Niger-Congo	X	X	X	SubT	R	StA
Guugu								
Yimithirr	Australia	Pama Nyungan			X	TRF, TS	R	H-G
Ha!//om	Namibia	Khoisan	x	(x)	X	D	R	H-G
Jaminjung	Australia	Jaminjungan	X	(x)	(x)	S, T	R	H-G
Japanese	Japan	Isolate	x	X	(x)	Temp	U	I
Kgalagadi	Botswana	Bantu	X	X	X	T St	R	StA
Klivila	Papua New Guinea	Austronesian	X	X	X	deN	R	ShA
Longgu	Solomons	Austronesian	x	(x)	X	TRF	R	ShA
Mopan	Belize	Mayan	X		(x)	TRF	R	ShA
Tamil	India	Dravidian	x	X	X	S	U + R	StA
Tiriyó	Brazil	Cariban	X	X	X	TRF	R	H, StA
Totonac	Mexico	Totonacan	X		(x)	Temp	R	ShA
Tzeltal	Mexico	Mayan	x		X	SubT, A	R	ShA
Warwa	Australia	Nyulnyulan	x		X	D	R	H-G
Yukatek	Mexico	Mayan	X	X	x	TRF	R	ShA

Frame of reference: x indicates that the corresponding FoR is used by a language. (x) indicates that the FoR is only used in restricted circumstances, i.e. not in table-top space. X indicates the preferred FoR for describing spatial relationships between small-scale, manipulable objects (e.g. as in Figure 1). Ecological zone: A = alpine; D = desert; deN = denuded tropical rain forest; H = humid; S = savannah; SubT = subtropical; St = steppe; T = tropical; TRF = tropical rain forest; Temp = temperate. Dwelling: R = rural; U = urban; Subsistence mode: H = hunting; H-G = hunter-gatherer; ShA = shifting agriculture; StA = stable agriculture; I = industrial.

Data sources: Refs [13,20] and Levinson, S.C. and Wilkins, D. *Grammars of Space* (unpublished).

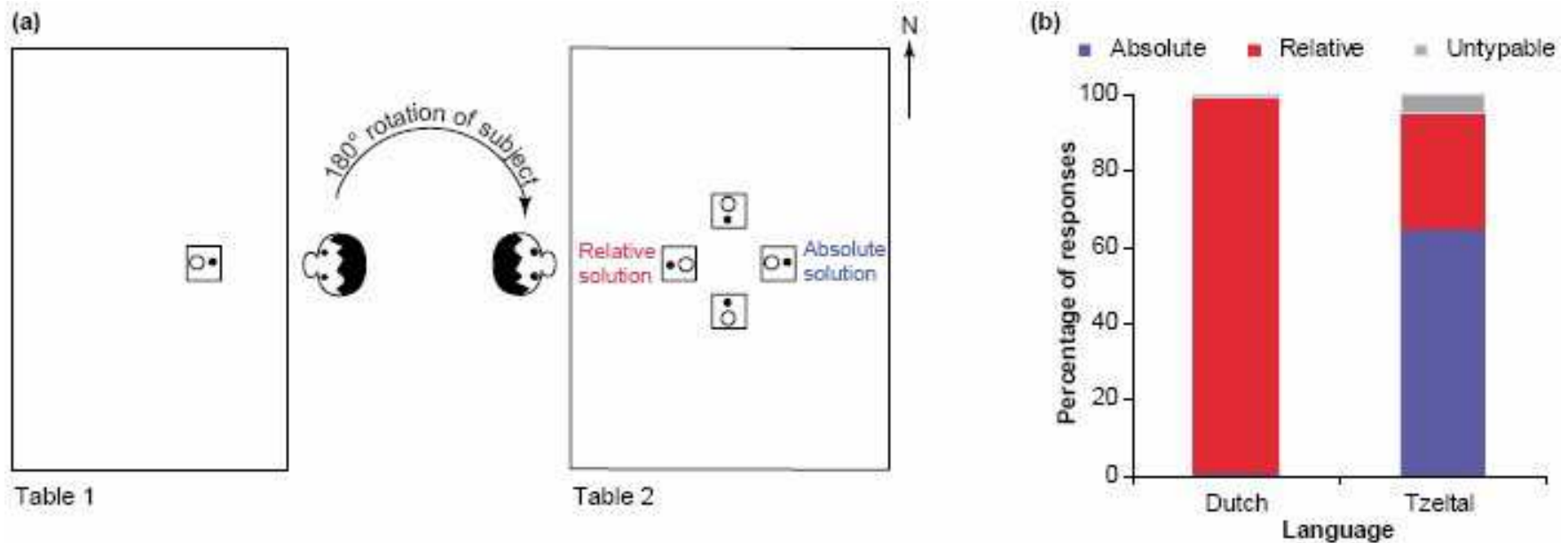
Experiments

Dutch and Tzeltal speakers

Subjects shown a spatial relation on table, then rotated 180 degrees and asked to solve a spatial task.

Rotation teases apart relative and absolute FoRs.

Memory for a spatial configuration:



Memory for motion and path direction:

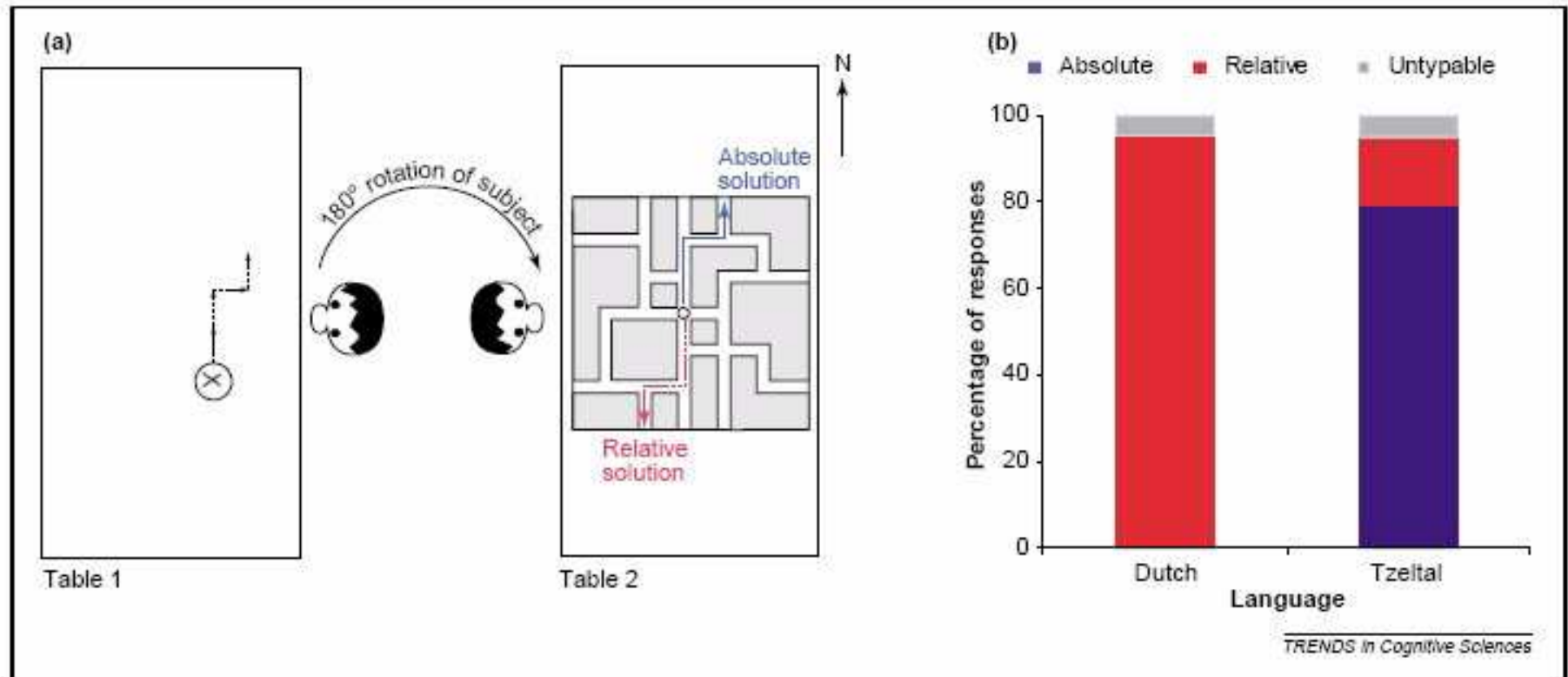


Figure 3. Memory for motion and path-direction: 'Eric's maze'. (a) The experimenter moved a toy man along a path on Table 1. After a delay, the participant was rotated through 180° and led to Table 2, where there was a maze. The maze had several possible paths, and the participant was asked to choose the path that the toy man had followed. Each participant had five trials. For each target path the toy man had travelled along on Table 1, there were two corresponding paths on the maze on Table 2: one that preserved Relative coordinates (shown in red), and one that preserved Absolute coordinates (shown in blue). (b) The results for Dutch and Tzeltal. As in Figure 2, we see that the Relative/Absolute trend matches the preferred linguistic FoR: Dutch participants gave Relative responses whereas Tzeltal participants gave predominantly Absolute responses [Adapted from [13], pp. 160–162, by permission of Cambridge University Press].

Transitive inference

Relative FoR: A left-of B, B left-of C → A left-of C

Absolute FoR: A south-of B, C way south-of B

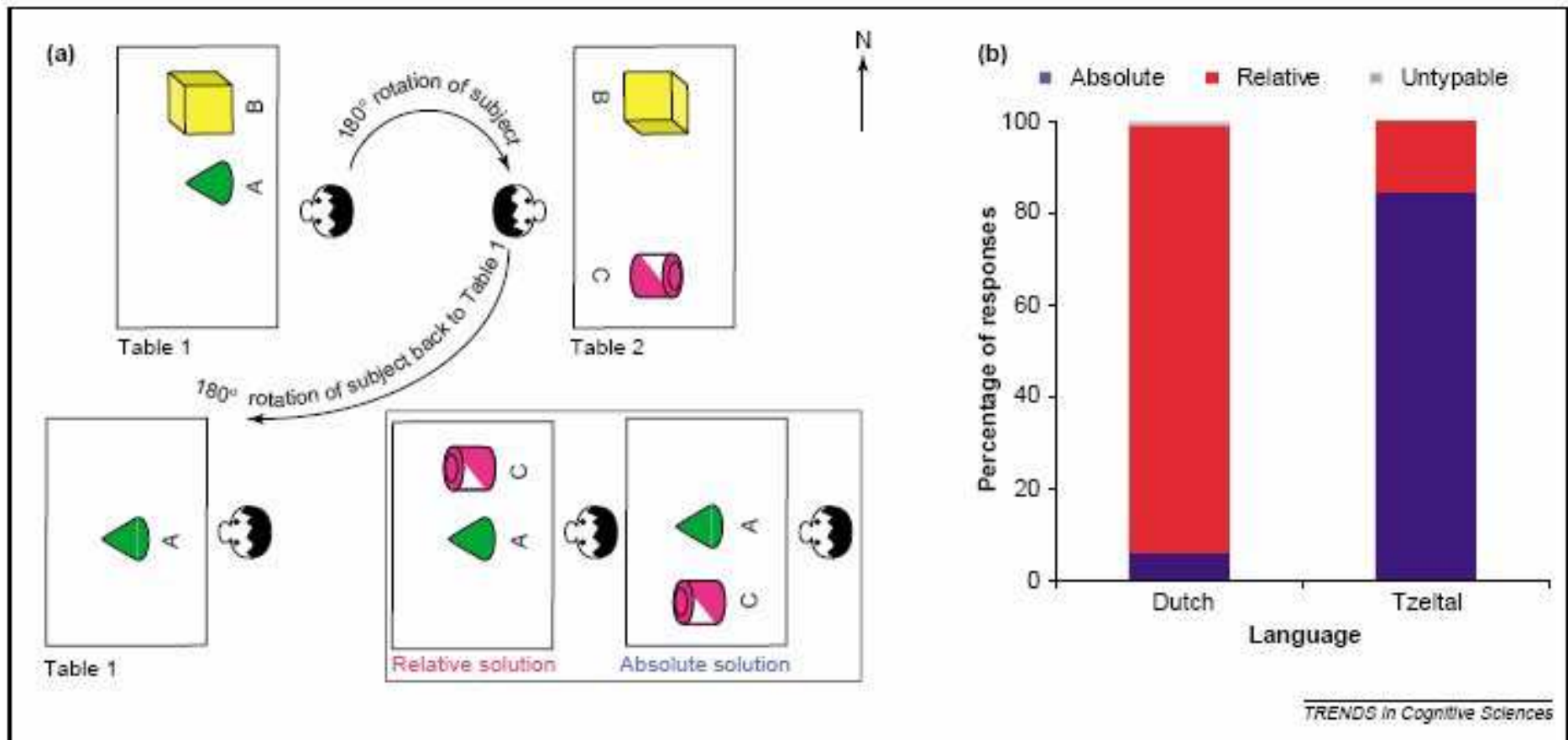


Figure 4. Spatial reasoning: making a transitive inference. (a) Transitive inferences (e.g. if A is bigger than B, and B is bigger than C, then A is bigger than C) can be drawn on the basis of non-linguistic arrays. In this experiment, participants saw a cube and a cone arranged in a particular configuration on Table 1, and were then rotated through 180° to Table 2 where they saw a cube and a cylinder. Finally they were rotated back to Table 1, where the cone was standing alone. Their task was to place the cylinder next to the cone, keeping the location consistent with what they had seen before. There were five trials using the transverse axis. There are two ways to perform this task: one using Relative coding (the cube is to the right of the cone, and the cylinder is to the right of the cube, therefore the cylinder is to the right of the cone), and the other using Absolute coding (the cube is to the south of the cone, and the cylinder is further south of the cube, therefore the cylinder is to the south of the cone). (b) Once again, the results for Dutch and Tzeltal show that the Relative/Absolute trend matches the preferred linguistic FoR: Dutch participants gave Relative responses whereas Tzeltal participants gave Absolute responses (Adapted from [13], pp. 162–167, by permission of Cambridge University Press).

Concerns Addressed by Experimenters

Claim that testing conditions controlled across populations.

Claim that there are no environmental or cultural confounds.

Have obtained similar results with a wide variety of languages that cut across environmental and cultural factors.

Absolute/relative FoR confounded with rural/urban environment. Could effects be due to environment?

Some rural communities use relative FoR in both linguistic and spatial reasoning.

Could effects be due to literacy (which is correlated with rural/urban environment)?

Within populations, no correlation between literacy and preferred FoR on cognitive tasks.

FoR and Development

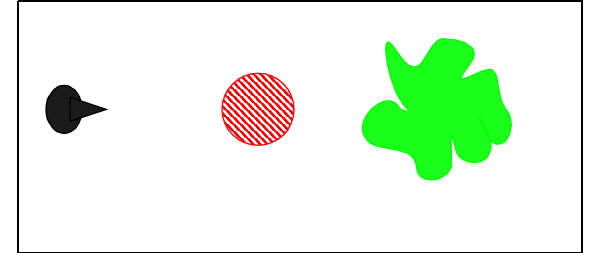
Order of development of relative vs. intrinsic FoR

Use of relative front/back doesn't appear until around 5.

e.g., ball is in front of the tree

Use of intrinsic FoR doesn't appear until around 4.

e.g., the ball is in front of the man



Order of development of expressions in relative vs. absolute languages

Relative expressions in relative languages learned at same age as absolute expressions in absolute languages

Both results seem surprising considering neuroscientific data suggests that spatial cognition is fundamentally egocentric (relative FoR).

Language and Representation

Language is a means by which we can represent our world.

Any representation makes some information explicit, some information implicit, and some information inaccessible.

e.g., “Robert Rupert”

e.g., (5’10” 170# 35 303)

e.g., FCQ scores: A-, A, A- B+, A

e.g.,



Information implicit in a representation requires more computation to make explicit.

Language, Representation, and Awareness

Hypothesis

We can be aware only of that which is represented explicitly.

To the extent that language represents information only implicitly, language makes it more difficult to become aware of the information.

e.g., tenseless languages

Hypothesis

Language contributes to flexibility of behavior.

Language provides symbols/categories from which we can reason (i.e., apply simple rules)

To the extent that language makes it easier to respond in arbitrary ways to stimuli, language contributes to awareness.