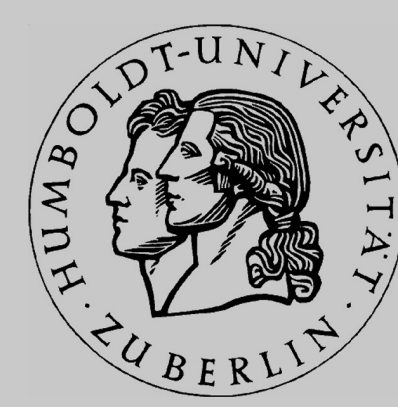


# How the Backchannel Hypothesis Solves the Adaptive Valley Problem of Cultural Group Selection



The Problem of Cooperation

How did cooperation evolve?

The high degree of prosocial behaviour in humans is seen as a puzzle from an evolutionary standpoint

	Agent 1		
Agent 2		Defect	Cooperate
Defect		1,1	3,0
Cooperate		0,3	2,2

Equilibrium Selection

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Stable and heritable variation:  
Mechanisms creating variation between groups (M) must far outweigh Intermixing (I)

(a)  $M < I$

(b)  $M > I$

(c)  $M \gg I$

Integrating

❖ Individual level selection

❖ Group level selection

Conditions:

❖ Variation

❖ Heritability

❖ Selection

The Backchannel

Prosocial Behaviour

Medium of Translation

Increased Reproductive Success

Attractor: females choosing males according to the contribution to the proliferation of the group.

Although an attractor defines the direction of the movement or development, it is not guaranteed that the attractor can ever be reached. Since, in the BCH, the development of the groups depends on the female choice criterion, the attractor of the system must be defined in terms of the optimal female choice criterion. The relevant dimension of the female choice criterion creating different equilibria in various groups concerns the capability of each equilibrium to influence the group's ability to proliferate.

The Adaptive Valley Problem of Cultural Group Selection

Cultural Group Selection proposes increasing speed of M in the form of cumulative culture to outpace I

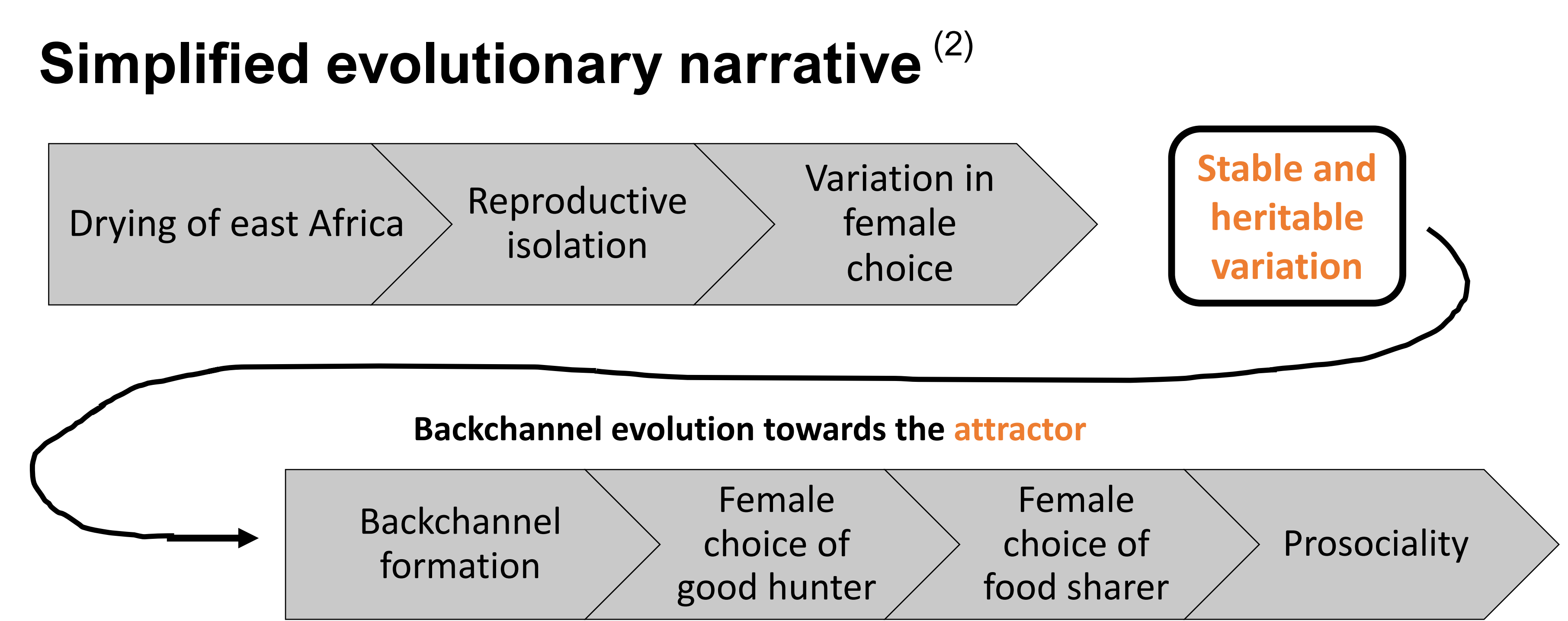
Problem: cumulative culture requires traits like language use, social learning and overimitation. These traits are not explained by the theory and thus need further explanations. This is what we take to be the adaptive valley problem

Comparison		
Theories	Cultural Group Selection <sup>(1)</sup>	Backchannel Hypothesis <sup>(2)</sup>
Categories		
Variation creation	cultural adaptation	social selection e.g. female choice
Heritability	cultural	genetic & cultural
Selection	Equilibrium	Equilibrium
Driving factor	Punishment	Reputation
Exogenous Assumptions	Language, social learning, overimitation	Traits of todays chimps
Time frame	ca. last 200,000 y	ca. last 6 My
Adaptive Valley problem <sup>(3)</sup>	Yes	No

The Backchannel Hypothesis

The Backchannel Hypothesis proposes reproductive isolation due to a changing environment to decrease I and social selection in the form of female choice (Fisherian sexual selection) as M

Problem solved: the Backchannel Hypothesis does not require cumulative culture and thus the traits required by Cultural Group Selection.



Results

The BCH is not only consistent with the core principle of CGS, it can solve the adaptive valley problem and extend to encompass roughly the last 6 million years of our ancestor's evolution. The Backchannel Hypothesis explains how given only the behavioural traits of chimpanzees (as a proxy for our common ancestor) as prerequisite, an evolutionary configuration can arise that puts selective pressure on prosocial behaviour through social selection in the form of female choice. The Backchannel allows group beneficial (=prosocial) behaviour of an individual to be translated into its reproductive success.

Sources

(1) Boyd, R., & Richerson, P. J. (2009). Culture and the evolution of human cooperation. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 364(1533), 3281-3288.

(2) von Heiseler, T. N. (2022). How Language and Human Altruism Evolved Hand in Hand—The Backchannel Hypothesis. *Frontiers in Psychology*, 13, 289.

(3) Boyd, R., & Richerson, P. J. (1996, January). Why culture is common, but cultural evolution is rare. In *Proceedings-British Academy* (Vol. 88, pp. 77-94). Oxford University Press Inc..