Supporting Information for ‘Human Behavioral Ecology: Current research and future prospects’

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This Supporting Information document gives more detail of the methodology used for the systematic review (section S1), and statistical analyses of the database of papers (section S2). The full list of the papers in the database can be found here (section S3), and is also available on request from the first author as an Endnote file.

S1. Methods for the systematic review

Search strategy
Many studies which seem to fit the HBE paradigm well do not include human behavioral ecology or any related term keywords or even full text, and so a systematic search strategy based on these terms and their variants would result in many misses. Instead, we adopted a two-part strategy. For a number of key journals which we knew from personal involvement in the literature were outlets for HBE research, we scanned all abstracts from papers published between 2000 and late 2011, and included studies in our sample based on their content, rather than whether their authors used the HBE terminology (see table S1 for journal list). Second, we identified a number of more general biological or multidisciplinary journals which might carry some HBE research. For these, we used the journals’ online portals, and carried out targeted searches with keywords such as ‘human*’ to identify human-related papers. After the initial searches, we re-examined all abstracts to adjudicate on questionable entries and ensure consistency. This resulted in a final sample of 369 papers.

Inclusion criteria

Papers were included if they met all of the following criteria:

(i) The research question is addressed within an adaptive evolutionary framework.
(ii) The paper presents quantitative empirical data on behavior.
(iii) Behavior is measured in its natural setting.
(iv) (a) Either the payoffs to different behaviors are measured in some currency relevant to fitness, or (b) relationships between ecological parameters and behavioral strategies are measured.

We recognize that the adoption of these criteria imposes particular and debatable restrictions on what our database includes. Criterion (i) excludes many social science studies which could be interpreted from a behavioral ecological point of view, but where the authors did not frame their work in this way. Although investigating how much of contemporary social science is potentially consilient with a behavioral ecological perspective would be interesting and worthwhile, relaxing criterion (i) would generate a vast set of papers, and end up including many studies whose authors do not share the adaptationist commitments which are central to BE. Criterion (ii) was motivated by our desire to examine the current status of empirical work in HBE, and thus excluded purely theoretical papers, as well as other reviews and discussions of ideas. It also excluded many evolutionary papers measuring selection on non-behavioral traits such as physical stature, and tended to exclude archaeological analyses, a difference between our review and SW. Criterion (iii) excluded a large number of more psychological studies where the outcomes measured were hypothetical preferences, behavior in artificial games, judgments or reaction times. Whilst much of this work is directly inspired by behavioral
ecological ideas, the objectives tend to be more on elucidating the psychological mechanisms underlying behavioral decisions, rather than BE’s traditional focus on behavior in real-world environments. Maintaining criterion (iii) also allowed our review to remain tractable in size. We did however accept that the measures of behavior could be proxies of various kinds, or self-reports of behavior, rather than requiring direct behavioral observation. Finally, criterion (iv) reflects the epistemic structure of BE. Whilst the overall goal of BE as a paradigm is to fulfill both clauses of criterion (iv), many individual studies fulfill either one or the other but not both, so criterion (iv) was an ‘or’ not an ‘and’ condition. Under (iv) (b), the measurement of ecological parameters could be obtained via self-report as long as the measures thus obtained were likely to covary with objectively measurable conditions.

Classification of papers

Having found our set of papers, we used the full text to code a number of key variables concerning the research. These included year of publication, journal, first author country of affiliation, and first author academic discipline. We also adopted Winterhalder and Smith’s (2000) rough tripartite distinction of topics into production (foraging and other productive activity), distribution (resource sharing, cooperation, social structure), and reproduction (mate choice decisions, sexual selection, life history decisions, parental and alloparental investment, etc.). Finally, we coded the presence of some key features we wished to examine in the light of our reading of the literature: the presence of any data from hunter-gatherer populations, the presence of any data from industrialized populations, the secondary use of datasets, and the use of comparative data from more than one population.

S2. Statistical analyses of the database

This section provides formal statistical analyses to support the assertions made in section 3 of the paper about how HBE research is changing over time. Table S1 tabulates the numbers of papers per year overall, and also belonging to key categories discussed below.

Number of papers over time

We performed linear regression of number of papers against publication year. Publication year significantly predicted number of papers found (t=4.57, p<0.05, r^2=0.68) with a positive coefficient (B=2.41, s.e.(B)=0.53). However, this could be due to a general secular increase in papers published in our target journals. We therefore computed the total number of Web of Science entries for our target journals in each study year, excluding three journals (Biology Letters, Evolutionary Psychology, Journal of Evolutionary Psychology) which were not listed on Web of Science for the whole study period. We then expressed the number of HBE papers per thousand papers published in the journals that year. The absolute number was low (mean=2.90), though this is understandable since the sample includes multidisciplinary journals such as Science, Nature and PNAS which carry large numbers of articles and news items from the whole of science. However, the regression on publication year was still significant (t=3.35, p<0.05, r^2=0.53) with a positive coefficient (B=0.16, s.e.(B)=0.05). As figure S1 shows, the time trend is very similar whether absolute number of HBE papers, or HBE papers per thousand papers published in the journals, is considered. In subsequent analyses, therefore, we present only analyses involving absolute numbers of papers.
Table S1. The number of papers found per year by the search, in total, and according to the affiliation of first author, the topic, the type of population, and whether secondary or comparative analysis was involved.

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Figure S1. The absolute number of HBE papers published per year in the target journals (left axis, solid line), and the number of HBE papers per year per thousand papers published in the journals overall (right axis, dashed line).
Changes over time in papers from anthropology and other disciplines

Publication year did not significantly predict number of papers from anthropology departments (regression: $t=1.47$, $p>0.05$, $r^2=0.18$, $B=0.69$, s.e.(B)=0.47), whereas it did positively predict number of papers from non-anthropology departments (regression: $t=7.02$, $p<0.05$, $r^2=0.83$, $B=1.72$, s.e.(B)=0.24). Thus, it was largely from non-anthropology authors that the growth in papers over time came.

Changes in study populations

The number of papers with data from hunter-gatherer populations was not significantly predicted by publication year ($t=1.95$, $p>0.05$, $r^2=0.28$, $B=0.36$, s.e.(B)=0.19), whereas number of papers with data from industrialized populations was significantly predicted by publication year ($t=4.81$, $p<0.05$, $r^2=0.70$), with a positive coefficient ($B=1.37$, s.e.(B)=0.29).

Study topics

Dividing the database into papers concerning production, concerning distribution, and concerning reproduction, the number of papers on production did not increase significantly over time (regression on year of publication: $t=0.07$, $p>0.05$, $r^2=0.00$, $B=0.01$, s.e.(B)=0.02). However, both papers on distribution (regression: $t=2.82$, $p<0.05$, $r^2=0.67$, $B=0.38$, s.e.(B)=0.14) and those on reproduction (regression: $t=5.35$, $p<0.05$, $r^2=0.74$, $B=1.98$, s.e.(B)=0.37) did so. Thus, the increase in the number of HBE papers of around 2.4 per year was made by around 2 more per year on reproduction, around 0.4 more per year on distribution, and no more per year on production.

Secondary and comparative analysis

Papers using secondary analysis increased significantly with publication year (regression: $t=7.67$, $p<0.05$, $r^2=0.86$, $B=1.82$, s.e.(B)=0.24), whereas those using only primary data did not (regression: $t=1.38$, $p>0.05$, $r^2=0.16$, $B=0.60$, s.e.(B)=0.43). The increase in papers using secondary analysis (1.82 extra papers per year) thus accounts for the bulk of the growth in paper numbers. Papers presenting comparative analyses increased with publication year (regression: $t=5.10$, $p<0.05$, $r^2=0.72$, $B=0.90$, s.e.(B)=0.18), as did those not presenting comparative analyses (regression: $t=2.93$, $p<0.05$, $r^2=0.46$, $B=1.51$, s.e.(B)=0.52). Thus, the overall increase in paper number was made up of a mixture of more comparative analyses (an extra 0.9 papers per year), and analyses within a single population (an extra 1.5 paper per year).
S3. References of papers in the database


89. Faurie, C., Pontier, D. & Raymond, M. Student athletes claim to have more sexual partners than other students. Evolution and Human Behavior 25, 1-8 (2004).


