

The Prevalence of Mind–Body Dualism in Early China

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Abstract

We present the first large-scale, quantitative examination of mind and body concepts in a set of historical sources by measuring the predictions of folk mind–body dualism against the surviving textual corpus of pre-Qin (pre-221 BCE) China. Our textual analysis found clear patterns in the historically evolving reference of the word *xin* (heart/heart–mind): It alone of the bodily organs was regularly contrasted with the physical body, and during the Warring-States period became ever less associated with emotions and increasingly portrayed as the unique locus of “higher” cognitive abilities. We interpret this as a semantic shift toward a shared cognitive bias in response to a vast and rapid expansion of literacy. Our study helps test the proposed universality of folk dualism, adds a new quantitative approach to the methods used in the humanities, and opens up a new and valuable data source for cognitive scientists: The record of dead minds. **1**

Keywords: Mind–body dualism; Folk cognition; Comparative psychology; Chinese thought; Textual analysis

1. Introduction

The idea that mind–body dualism is a folk cognitive universal is widespread in the cognitive sciences. This position is perhaps best exemplified by Paul Bloom’s argument that the apparent early onset on mind–body dualism in infant development, its automaticity, and its apparent cross-cultural universality suggests that we are “natural Cartesians” (Bloom, 2004: xii).

Bloom’s claim for a universal folk Cartesianism might be characterized as “strong folk dualism” (SFD), in that it involves a scalpel-sharp, clear divide between a physical, mechanistic body and a disembodied, ontologically distinct mind encompassing abstract

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1 cognition, intentions, emotions, and personal identity—the “ghost in the machine.” Strong
2 dualism has been challenged by recent work suggesting that “weak folk dualism” (WFD),
3 whereby mind-stuff and body-stuff overlap and interact, is our cognitive default (Hodge,
4 2008). When reasoning about topics such as spirit possession or the afterlife, study partici-
5 pants have intuitions about which capacities clearly go with “the mind” (abstract thoughts
6 and personal identity); which clearly go with “the body” (physiological functions); and
7 which are intermediate capacities, such as appetites and habits, that straddle body and mind
8 (Cohen, 2007; Cohen & Barrett, 2008). Historical data also supports WFD: Many, if not
9 most, philosophical and religious traditions throughout history have postulated multi-partite
10 models of the self’s capacities that only roughly coordinate with Cartesian mind–body
11 dualism.¹ WFD predicts that, while it is not characterized by a perfectly consistent and
12 mutually exclusive divide between mind and body, human cognition will tend to cluster per-
13 son-concepts around these attractors, with only a rare minority of concepts conflating the
14 two in special cultural or pragmatic contexts. According to WFD, Descartes’ austere
15 mind–body substance dualism represents an intellectually rigorous, albeit ultimately
16 counter-intuitive, working out of this folk intuition.

17 Both SFD and WFD predict that a universal cognitive distinction between body and mind
18 will shape and constrain the evolution of language and culture, producing a clear, cross-
19 cultural trend toward contrasting mind–body concepts. The absence of such a trend, while it
20 would not indisputably falsify either form of folk dualism, would constitute a challenge for
21 both. SFD additionally predicts that all aspects of cognition—including emotions, desires,
22 and habits—should move in lockstep with higher cognitive abilities (abstract thought, deci-
23 sion-making) and be sharply contrasted with the body, whereas WFD allows for intermedi-
24 ate capacities with varying links to the body.

25 A third position, mind–body holism (MBH), rejects both WFD and SFD, arguing that
26 mind–body dualism in any form is characteristic only of European-descended cultures, and
27 therefore does not reflect an innate cognitive universal. For instance, Wierzbicka, 2006
28 argues against an exact equivalent to the English word *mind* in other cultures/languages:
29

30 The other main part of the person...is conceived of differently in different cultures.
31 Roughly speaking, the (contemporary) English word *mind* presents this part as primarily
32 an organ of thinking and knowing, whereas the Russian word *dusa*, the Japanese word
33 *kokoro*² and the Korean word *maum* link it in various ways with feeling, wanting, and
34 choosing between what is “good” and what is “bad” (165)
35

36 In addition at least one language, classical Chinese, lacks a single word corresponding to
37 the English *body*, which could alternately be rendered as *shen* 身, *ti* 體, or *xing* 形. Though
38 both forms of dualism accommodate the possibility that languages will not necessarily
39 divide up this semantic range the same way as do the English words *mind* and *body*, the
40 claim that dualism is a cognitive universal suggests that all languages will contain semantic
41 divisions that ultimately boil down to the mental and the physical. While many critiques of
42 innate mind–body dualism assume that this is not the case, the issue has not been rigorously
43 empirically explored.

1 This study responds to this gap by presenting the first large-scale, quantitative exami-
 2 nation of concepts of mind and body in a set of historical sources, measuring the predic-
 3 tions of folk dualism against the surviving textual corpus of pre-Qin (pre-221 BCE)
 4 China. This study both pioneers a quantitative approach to the analysis of historical texts
 5 and allows cognitive science to tap into a valuable and hitherto underutilized source of
 6 data.

7 Pre-Qin China represents a particularly important test-case for folk dualism because of
 8 longstanding and widespread claims that mind–body dualism is entirely foreign to
 9 China—or “the East” more generally (Granet, 1934; Jullien, 2007; Lévy-Bruhl, 1922;
 10 Rosemont & Ames, 2009). Moreover, the relative historical continuity and remarkable
 11 geographical scope of the Chinese cultural sphere, which was fundamentally shaped during
 12 the pre-Qin period, makes it an important data point for any claims concerning human cog-
 13 nitive universals. Finally, the pre-Qin period we examined represent a unique stage in the
 14 evolution of Chinese written communication where literacy began to spread from the
 15 specialized, exclusive needs of a small priestly class to a far larger and more diverse literate
 16 population (Lewis, 1999). If this broader population did share cognitive biases, this is
 17 precisely the period when we would expect the semantic scope of Chinese characters to
 18 evolve to reflect those biases.

19 Supporters of MBH in early China (Geaney, 2002; Jullien, 2007; Yu, 2007) claim that
 20 *xin* 心, the term in classical Chinese typically translated as *mind*, also denotes a physical
 21 organ (the graph 心, in its original form, clearly depicts the heart), and that, in addition to
 22 the cognitive capacities associated with *mind*, *xin* also serves as the locus of emotions,
 23 desires, and imaginative capacities. Though moderate versions of this claim are consistent
 24 with *weak* dualism, proponents of MBH typically make the stronger claim that there exists
 25 no qualitative distinction at all between anything we could call *mind* and the physical body
 26 or other organs of the body. For instance, Yu (2007) (citing approvingly several contempo-
 27 rary scholars of Chinese thought) claims that “the heart’ and in their Western senses, are
 28 conceptualized in ancient Chinese philosophy as being one, the *xin* ‘heart,’ which houses
 29 thoughts and feelings, ideas and emotions”; Jullien (2007) similarly declares that, because
 30 the Chinese saw what we would call body, soul, and mind as nothing more than points
 31 along a continuous, constantly transforming spectrum of energy, “no dualism is
 32 possible.”

33 In order to test these sorts of claims, we drew a large ($n = 620$) random sample of
 34 passages containing the word *xin* in both received and archeological texts from pre-Qin
 35 China. These texts can be roughly classified into three periods: Pre Warring States (c. 1500
 36 to c. 475 BCE), Early Warring States (late fifth to mid-fourth century BCE), and Late War-
 37 rring States (mid-fourth century BCE-221 BCE). We aimed to determine:

- 38 • whether these passages explicitly contrasted *xin* with the physical body and its other
 39 physical organs [contrary to MBH and consistent with both SFD and WFD];
- 40 • the relative frequency of *xin* referring to a (a) physical organ, (b) a locus of lower
 41 cognition (feelings, emotions), and (c) a locus of higher cognition (thought, reasoning,
 42 decision-making) [approximately equal frequencies would be most consistent with
 43

1 MBH; predominant but equal reference to (b) and (c) would favor SFD; predominant
 2 reference to both (b) and (c) with significantly more (c), would favor WFD];

- 3 • whether these patterns changed over time.

6 2. Methods

8 We extracted passages containing *xin* from an on-line database of the entire received
 9 pre-Qin corpus,³ as well as a database of a cache of recently discovered pre-Qin archeological
 10 texts.⁴ The result was 1,321 passages, automatically chunked into standard textual units by
 11 the search engine. The first author and three hypothesis-blind coders randomly sampled 60
 12 passages and inductively developed a set of 29 dichotomous codes to classify its usage (see
 13 Table S1). Of these, two main categories of codes bear directly on the analysis reported here:
 14 (a) whether or not *xin* was contrasted with the body; and (b) whether it was used to refer to a
 15 bodily organ, locus of feelings and emotions (lower cognitive concepts), or a locus of deliber-
 16 ate, reflective cognition (higher cognitive concepts). Next, 620 randomly sampled passages
 17 (179 from the Pre, 35 from the Early, and 406 from the Late Warring States period) were each
 18 subjected to these 29 dichotomous coding decisions. First, each passage (presented in a ran-
 19 dom order) was independently coded by two of three coders; that is, the passages were split
 20 among the three possible pairs. Cohen's Kappa reliability levels for these three pairs were .71,
 21 .56 and .47. Passages for which both coders' decisions agreed on all 29 codes were considered
 22 finalized at this point (310 passages); for the remaining passages coders disagreed on at least
 23 one (mean = 1.87, *SD* = 1.11) coding decision. To resolve these disagreements, a third coder
 24 (i.e., the one not in the pair who initially coded that passage) independently coded these pas-
 25 sages, and where their 29 decisions corresponded exactly to one of the first two coders, these
 26 passages were again considered finalized (159 passages). The disagreements on the remaining
 27 (151) passages were arbitrated and finalized by the first author, an expert on pre-Qin Chinese
 28 texts with full access to the original coders' decisions and notes.⁵

29 To provide a baseline for testing the frequency with which *xin* was explicitly contrasted
 30 with the body,⁶ we also coded this contrast for four other commonly-mentioned organs, two
 31 external (*mu* 目 "eye" and *er* 耳 "ear") and two internal (*gan* 肝 "liver" and *fu* 腹 "stom-
 32 ach"). Of the 864 passages containing occurrences of these terms in the pre-Qin textual
 33 database, only 337 also contained one of the predominant "body" terms (*xing* 形, *shen* 身,
 34 *ti* 體) and thus were likely candidates for a contrast. These 337 passages were coded by two
 35 coders working independently on mutually exclusive subsets. Only one contrast—a single
 36 passage where the stomach is contrasted with the body—was found.

38 3. Results

39 3.1. Do early Chinese authors explicitly contrast *xin* with the body?

40 Table 1 shows the frequency of passages that contrast *xin* with the body in each of the three
 41 periods. Since any deviation from zero is statistically significant under a binomial test of the
 42
 43

Table 1
Frequency in the pre-, early- and late-Warring States periods of three trends

	Pre	Early	Late	All Periods
Contrast with body ^a				
Xin-body contrasts	$\frac{7}{179} = 0.04$	$\frac{3}{35} = 0.09$	$\frac{42}{406} = 0.10$	$\frac{52}{620} = 0.08$
Semantic reference ^b				
Bodily organ	$\frac{8}{179} = 0.04$	$\frac{0}{35} = 0.00$	$\frac{9}{406} = 0.02$	$\frac{17}{620} = 0.03$
Locus of emotion	$\frac{72}{179} = 0.40$	$\frac{4}{35} = 0.11$	$\frac{53}{406} = 0.13$	$\frac{129}{620} = 0.21$
Locus of cognition	$\frac{90}{179} = 0.50$	$\frac{28}{35} = 0.80$	$\frac{324}{406} = 0.80$	$\frac{129}{620} = 0.71$
Rates of semantic reference compared ^c				
Emotions > Organ	**	$p = .12$	**	**
Cognition > Organ	**	**	**	**
Cognition > Emotions	$p = .07$	**	**	**

^aFrequency of contrasts between *xin* and the body.

^bFrequency of usage of *xin* to refer to a bodily organ, the locus of emotions or the locus of cognition.

^cResults of χ^2 significance tests of differences in these frequencies. Note that a conservative Bonferoni-Sidak adjusted alpha level for this many tests is approximately .004.

** $p < .004$.

hypothesis $p = 0$, a stronger test of this hypothesis is to compare these rates to the frequency with which other organs are contrasted with the body. A simple logistic regression on the 1/864 non-*xin* passages and 52/620 *xin* passages that contrast an organ with the body shows that the odds of *xin* being contrasted with the body were about 77 times greater than the other organs we examined ($p < .001$).

3.2. Did the frequency of such contrasts increase with time?

We used logistic regression to model the dichotomous outcome of whether *xin* was contrasted with the body in each passage, predicted by the period in which the passage was written.⁷ The frequency of contrasts did increase with time: The odds of *xin*-body contrasts were approximately 2.3 times ($p = .24$) higher in the Early than Pre period, 2.8 times ($p = .01$) higher in the Late than Pre period and 1.2 times ($p = .74$) higher in the Late than Early period.

3.3 Does *xin* 心 refer to a physical organ, locus of higher cognition⁸ or locus of emotion? Does its reference change with time?

To compare the frequency with which *xin* referred to each of primary content codes,⁹ we again fit our dichotomous data to a logistic regression model. The relative rates of occurrence of these three references are presented in Table 1. The frequency with which *xin* referred to body did not differ significantly between the three periods ($\chi^2 = 2.24$, $p = .33$), but the rates of reference to *xin* as locus of higher cognition ($\chi^2 = 51.07$, $p < .01$) and

emotion ($\chi^2 = 52.69, p < .01$) did. Locus of higher cognition was referred to significantly more in the Early (odds-ratio = 3.96, $p < .01$) and Late (odds-ratio = 3.91, $p < .01$) periods than in the Pre period, but did not significantly differ between the Early and Late periods ($p = .98$). Meanwhile, *xin* as locus of emotion showed the reverse pattern: It was referred to significantly less in the Early (odds-ratio = 0.19, $p < .01$) and Late (odds-ratio = 0.22, $p < .01$) periods than the Pre period, while also not significantly differing between the Early and Late period ($p = .78$).

A perhaps simpler way to analyze this trend is to approximate temporal periods linearly (i.e., Pre = 0, Early = 1, Late = 2), which shows that the rate of *xin*'s reference to the locus of cognition increased with time ($\beta = 0.67, p < .01$) and its reference to the locus of emotion decreased with time ($\beta = -0.75, p < .01$), while the linear change in rate of reference to a bodily organ did not differ significantly from chance ($\beta = -0.36, p = .17$) despite our considerable sample size. The interaction terms describing the differences between these rates were highly significant for contrasts between cognition versus emotion, as well as cognition versus bodily organ ($p < .01$), while the changes in rates of reference to emotion versus bodily organ did not differ significantly from chance ($p = .18$).

To test whether the rates of reference within each period differed more than expected by random sampling alone, we conducted χ^2 tests of the difference between these proportions given binomial expectations.¹⁰ Even given conservative Bonferonni-Sidak adjusted alpha levels, all but two of these proportions were significantly different (confidence interval overlaps in Fig. 1 make this visually apparent), the exceptions being *xin* referring to a locus of

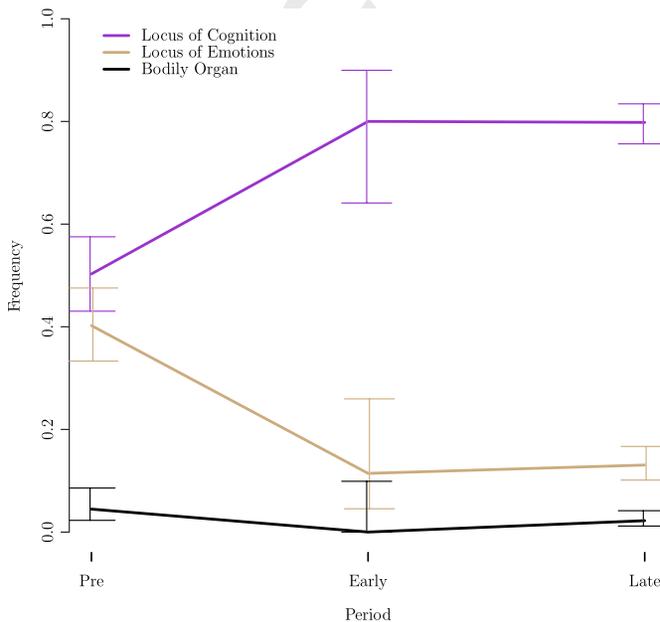


Fig. 1. Temporal trends in the rate at which *xin* refers to a bodily organ, the locus of emotions or the locus of cognition, in the pre-, early- and late-Warring States periods, with 95% confidence intervals.

both emotions and cognition at similar rates in the Pre period ($p = .07$) and to a physical organ and locus of emotions at similar rates in the Early period ($p = .1$); see Table 1.

The general pattern of these findings is illustrated in Fig. 1. Throughout all three periods *xin* referred to a physical body organ at a consistently low rate (about 3%). During the Pre Warring States period, it referred about equally often to a locus of emotion (approx. 40%) or cognition (approx. 50%). By the Early period it was being used to refer to the locus of cognition far more frequently (approx. 80%) than emotions (approx. 10%), and this pattern persisted into the Late period. This change also corresponded to a rise in the frequency of explicit contrasts of *xin* with the physical body.

4. Discussion

Our large-scale quantitative textual analysis found a clear pattern in the historical use and reference of the Chinese word *xin* (heart/heart-mind). Though it refers to a physical organ in the body (the heart) at a consistently low rate ($17/620 \approx 3\%$) throughout the time periods analyzed, it was explicitly *contrasted* with the body at a higher ($52/620 \approx 8\%$), statistically greater ($p < .01$) rate. Moreover, it alone of the all the organs is regularly contrasted with the common terms that refer to the physical body (*xing* 形, *shen* 身, *ti* 體). In addition, although *xin* is often portrayed as the locus of emotion as well as other cognitive abilities in the Pre Warring States period, by the end of the Warring States there is a strikingly clear trend whereby *xin* is less and less associated with emotions and becomes increasingly portrayed as the unique locus of “higher” cognitive abilities (which follows from WFD, but not SFD). The fact that this conception of *xin* then fixates for the remaining 2000 years of Chinese history argues against seeing this shift as the sort of random variation consistent with either MBH or cultural constructivist accounts.

What is so interesting about the early Chinese case is that linguistic resources seem to militate against mind-body dualism: The term that came to refer to mind concepts was represented by a graph denoting the physical heart, a concrete organ embedded in the body and the locus of desires and emotions. Nonetheless, over a several hundred year period, semantic distinctions in this culture became increasingly split along lines that strikingly mirror modern Western folk conceptions of *body* and *mind*, and that remain the default picture for the rest of its history.¹¹

Although likely predated by short inscriptions on divinatory bones and ceremonial bronze vessels, the pre-Warring States materials surveyed constitute the first significant writing from China, and date from a period of relative social, political, and religious stability, with literacy confined to an extremely small class of specialists. The Warring States period—especially its latter half—represents a significant rupture with the past, with the central polity fragmenting into a variety of independent states, all vying for supremacy. The chaos of the Warring States—also known as the period of “The Hundred Schools”—was accompanied by a dramatic expansion in literacy and a profusion of opposing schools of thought, each peddling its own particular model of self-cultivation and politico-religious

1 thought to rulers and advisors desperate for ideas that would give them a competitive advan-
2 tage. We speculate that the concept of *xin* that we see in pre-Warring States materials repre-
3 sents a relatively undeveloped, and therefore undifferentiated, concept that was suddenly
4 and rapidly elaborated over the course of the Warring States Period. Discussion of the
5 causes of this semantic shift is necessarily speculative. The possibility that we find most
6 plausible and directly consistent with our evidence is that the evolution of *xin* was guided
7 by the universal cognitive division proposed by WFD—that is, the referent of this particular
8 written character was attracted to a shared cognitive default in response to its use by a
9 rapidly growing literate community.

10 One alternative hypothesis is a cultural evolutionary one: That is, that Pre Warring States
11 Chinese *were* holists, but learned and subsequently culturally transmitted the useful cogni-
12 tive trick of dualism. Our corpus analysis techniques cannot distinguish between this
13 hypothesis and our favored cognitive default hypothesis, but the latter is much more consis-
14 tent with contemporary experimental evidence suggesting that mind–body dualism arises
15 quite early in childhood development (reviewed in Bloom, 2004). Another alternative is the
16 genre hypothesis: Approximately 38% of the Pre Warring States material is lyric poetry—a
17 genre more or less absent from Early and Late material—which might be expected to
18 include a disproportionate number of references to emotions. Rigorous analysis of post-
19 Warring States material remains to be done, but preliminary examination suggests that the
20 reemergence of lyric poetry in the later corpus is not accompanied by a reversion in the con-
21 ception of *xin* to the Pre Warring States pattern. The relative invariance of the conception of
22 *xin* in post-Warring States times also argues against an audience-effect hypothesis, whereby
23 the shift in *xin*'s referent is a response to the particular rhetorical needs of Early and
24 Late Warring States thinkers, in which case one would expect further shifts in reference
25 over time.

26 A complete test of dualism would require extensive comparison of many historical and
27 contemporary cultures; we hope that the methodologies pioneered in this study might serve
28 as a template for work that will expand the scope of historical cross-cultural work on con-
29 cepts important to cognitive scientists. Nonetheless, our analysis of pre-Qin China repre-
30 sents an important contribution to this puzzle. Predating the long-range, large-scale
31 exchange of goods and ideas along the Silk Road that began in the early Common Era,
32 pre-Qin China represents a culture, tied together by a common writing system, that devel-
33 oped in conceptual isolation from other literate world cultures. As such, it represents a
34 unique and influential data point in human cultural phylogeny, which can be of great value
35 in disentangling cultural, ecological, and evolutionary influences on the modern cognitive
36 differences being catalogued by cultural psychologists (e.g., Heine & Hamamura, 2007;
37 Nisbett, 2003).

38 Moreover, pre-Qin China—a time of great intellectual foment, and the formative period
39 of Chinese religious thought—has left to us a rich and well-documented archeological heri-
40 tage, as well as massive and fascinating corpus of received texts in a variety of genres. This
41 received corpus is now being supplemented with an increasingly large collection of archeo-
42 logical texts that represent a direct transmission from pre-Qin China to the present, eliminat-
43 ing concerns about later scribal errors or editorial changes. For scholars interested in human

1 cognitive universals, evidence from pre-Qin China should be viewed as an ideal, and
2 essential, data point.

3 Besides its implications for universalist claims concerning folk dualism, our study also
4 serves as an example of how techniques from the sciences—large-scale, team-based
5 analysis, random sampling, statistical analysis—can be put to good use in the humanities.
6 We believe that the approach developed in this study can be easily adapted for use in access-
7 ing other historical materials in order to address, in a rigorous and quantifiable manner, a
8 wide variety of questions that interest cognitive scientists. Acquiring “data from dead
9 minds”¹² in this fashion has its limits: We cannot perform controlled experiments on our
10 ancient Chinese subjects, and it is uncertain how directly written materials produced by a
11 small, literate elite are related to either everyday implicit cognition or popular conceptions.
12 On the other hand, such data do tell us *something* about human cognition in cultures far
13 removed in time, and therefore helps to expand the scope of cognitive science research
14 beyond its standard—and likely rather unrepresentative—Western undergraduate subject
15 pool (Henrich, Heine, & Norenzayan, 2010).

18 Notes

- 20 1. See, for instance, Brashier, 1996 on multipartite views of the soul in early China,
21 as well as work by Richert and Harris that has challenged Bloom by arguing that
22 a tripartite (body–mind–soul) model of the self is more characteristic of folk
23 thinking than simple mind–body dualism (Richert & Harris, 2008). This apparent
24 refutation of Bloom is converted into a corrective when one observes that nothing
25 that does not have a mind can possess a soul, which suggests that soul
26 concepts—unitary or multipartite—are simply subdivisions of the more basic
27 category of mind.
- 28 2. *Kokoro* is the Japanese pronunciation of the character *xin* 心 that is the focus of the
29 study reported below.
- 30 3. An on-line database maintained by the National Palace Museum in Taipei, Taiwan
31 (<http://210.69.170.100/s25/index.htm>).
- 32 4. An on-line database of the Guodian corpus of bamboo texts (interred roughly 300
33 BCE and discovered in 1993), maintained by the Chinese University of Hong Kong
34 (<http://bamboo.lib.cuhk.edu.hk/>).
- 35 5. In order to control for the possibility of bias having been introduced in the final round
36 of coding, we repeated the analyses reported below using only those passages final-
37 ized in the first two rounds by agreement between at least two independent coders.
38 We found a qualitatively identical pattern of results, specifically: All significance
39 levels remained on the same side of conventional thresholds (i.e., .05, .01 and .001),
40 all effects retained their directions, and their magnitudes remained close to those
41 reported.
- 42 6. Instances of *xing* 形, *shen* 身, *ti* 體, *li* 力 (physical strength) and *qi* 氣 (when used in
43 the sense of physiological energy) were all taken as references to the “body.”

7. Note that this statistical procedure examines differences in the odds of a contrast, not the absolute number of contrasts.
8. Note that, for the purposes of the final analysis, content codes 3–5 (all referring to various aspects of what one might term “higher cognition”) were collapsed into one code.
9. For examples from the texts examined, see the on-line Supporting Information, which also includes our entire coded data set.
10. Hypothesis tests were based on simple asymptotic assumptions, implemented by the `prop.test()` function of the R statistical computing environment (version 2.11.1). Confidence intervals in Fig. 1 were computed using Wilson’s score method, which has better coverage (Newcombe, 1998).
11. Qualitative analysis suggests that, once Buddhism is introduced to China in the beginning of the Common Era, the conception of *xin* becomes, if anything, even more disengaged from the body (e.g., Radich, unpublished data).
12. The title of a session organized by Roger Beck and Luther Martin at the International Association for the History of Religion XXth Quinquennial World Congress, Toronto, ON, August 2010.

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Supporting Information

Additional Supporting Information may be found in the online version of this article on Wiley Online Library:

Table S1. Dichotomous criteria used to code passages containing *xin*. The first two main sets of codes (labeled contrasts and content) were used directly in the analyses reported here; the remaining codes are relevant for interrogating other research questions and for understanding the coding procedure and reliability measures.

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