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## Ritual Behavior and Trust in the Tyva Republic

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### CA+ Online-Only Material: Supplement A

Many anthropologists of Inner Asia have examined the use of ritual cairns that pepper the landscape of the region. These cairns are devoted to a variety of spirits and are typically placed on territorial borders. Cairn rites devoted to these spirits can be both collective and individualized affairs, and some anthropologists have suggested that collective cairn rites may facilitate a stronger sense of in-group solidarity, which, in turn, must be predicated on a heightened sense of trustworthiness signaled by ritual participants. The present work investigates whether or not people in the Tyva Republic find others who regularly participate in cairn practices as more trustworthy than those who do not engage in such rituals. Indeed, ethnic Tyvans who regularly participate in these rites are perceived as more trustworthy than ethnic Tyvans, Christian Tyvans, and Christian Russians who do not. These findings strongly suggest that cairn practices ritualistically display commitment to others and thus help explain why the tradition persists throughout Inner Asia.

Ritual cairns are a central feature of the various religious traditions throughout pastoralist Inner Asia (Bawden 1958; Djakonova 1977, 2001; Halemba 2006:168–170; Kuzhuget 2002, 2003, 2006:85–90; Vreeland 1953:175–180, 256–258). At these mounds of stones or tree branches (see CA+ online supplement, figs. A1–A4), people make offerings to local spirits by burning incense and leaving money, food, tobacco, or prayer ties. Some of the earliest known cairn complexes are among Mongolia's *khirigsuur* monuments (Allard and Erdenebaatar 2005:548; Fitzhugh 2009a, 2009b), some of which have been dated to the third through first millennium BCE nomads of the Early Iron Age (Wright 2006, 2007). Ritual cairn customs are still observed among many Inner Asian groups, and ethnographers continue to try to understand them fully (Birtalan 1998; Humphrey 1995; Purzycki 2010, 2012).

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Throughout Inner Asia, cairns (*obo*, *oboo*, *ovoo*, *ovaa* are regional variants of the term) often indicate the presence of resident groups. As Humphrey (1995) notes, cairns are “occupation-marks, in the sense of ‘We are here’” (146). Markov (1976) observed that the pasture boundaries of each campsite in the Tyva Republic were marked, and newly formed territories entailed the erection of new mounds. As such, cairns are undoubtedly bound up in notions of territory and identity—associations also found in the etymology of the term. Sneath (2007) details how the Manchus “imposed on common subjects” (3) “administrative and tax units [which were also] used by both Russian and Iranian states” (146). These units were called *oba* (also *ova*, *obog*, *obúg*, *ovog*). Interestingly, among the Turkic Iranian Yomut,

the smallest residence group was a group known in Turkmen as an *oba*. This consisted of a group of households which together shared a joint estate with reference to a defined stretch of territory known as the territory of the *oba*. All members of the *oba* had a right to camp and pasture their livestock anywhere on the *oba*'s territory. Outsiders could do these things only after obtaining permission from the residents. (Irons 1974:640)

Since the term has referred to both residence groups and cairns placed on their borders, an important question emerges: why are cairns imbued with religious significance? The answer lies in the nature of religious ritual.

While many anthropologists (e.g., Durkheim 2001 [1915]; Turner 1995) have observed that religion fosters social cohesion, Rappaport (1979, 1999) explains how this works by arguing that participation in religious ritual communicates two things: it conveys both acceptance of the community's traditions (e.g., moral codes, social obligations, institutions, etc.) as well as the acknowledgment that one can be held accountable if he or she breaches these expectations. He insightfully observed that whereas belief is a private, internal state, public rituals are the external expression of acceptance. This “*establishes an obligation* to abide by whatever conventions . . . that order represents” (1999:395).

Building on this, current approaches argue that religious rituals are actually communicative signals of solidarity to other people because their *costs* are reliable indicators of commitment and trustworthiness (see Alcorta and Sosis 2005; Atran and Norenzayan 2004; Bulbulia 2004, forthcoming; Bulbulia and Sosis 2011; Cronk 1994; Irons 2001; Sosis and Alcorta 2003). Superficially, these messages convey that one is devoted to the religious tradition and its spirits; however, they also convey that one is committed to the other individuals engaged in that tradition. Accordingly, ritual costs “tend to honestly index cooperative dispositions, enabling cooperative signallers and audiences who exchange such displays to reliably assort while avoiding defectors” of social obligations (Bulbulia and Sosis 2011:367). There is emerging evidence suggesting that religion evolved for this very purpose.

Table 1. Demographics per treatment

Treatment	Kezhik <sub>R</sub>	Kezhik <sub>NR</sub>	Kezhik <sub>X</sub>	Andrey	Total
Men	18	17	15	23	73
Women	20	20	17	20	77
Total	38	37	32	43	150
Age ( <i>M</i> )	34.71	33.57	30.41	30.79	32.39
Age ( <i>SD</i> )	12.37	11.45	9.38	7.33	10.32

Note. *M* = mean; *SD* = standard deviation.

For example, Ruffle and Sosis (n.d.) found that both religious and secular Israelis trust religionists more than the nonreligious. Elsewhere (Sosis and Ruffle 2003), they found that male religious kibbutzim who engaged in collective rituals took less money from a common pool than did religious females who do not participate in collective rituals and secular kibbutzim of either sex. In addition, Tan and Vogel (2008) found that among Germans, religiosity predicts trustworthiness and willingness to trust others in economic games, and Soler (2012) found similar effects among Afro-Brazilians. Sosis and Bressler (2003) demonstrated that religious communes last longer than their secular counterparts, suggesting that religious costs even *sustain* cooperative relations. Moreover, in places where warfare frequency is higher, and therefore having greater organizational need, Sosis, Kress, and Boster (2007) found that ritual costs are especially high. How, then, do these findings relate to Inner Asian ritual cairns?

Provided that cairn practices entail costs, we would expect to see stronger bonds between those who participate, and these bonds should be predicated on a sense of trust (Bacharach and Gambetta 2001; Sosis 2005). Indeed, ethnographers of Inner Asia have made such observations. Sneath (1992) notes that for Mongolians, “as a cultural means of expressing solidarity, unity and the position of a group with respect to other group [*sic*] the obo ceremony is an excellent method” (314; see also Humphrey 1995:146–147; Purzycki 2010). In other words, while cairns mark territory, collective rituals conducted at them express individuals’ solidarity with in-group members and conveys that solidarity to out-groups. If costly religious rituals “honestly index cooperative dispositions” (Bulbulia and Sosis 2011:367), then stopping at cairns to observe local customs should signal trustworthiness to all those observing. We addressed these concerns in the Tyva Republic (Tyva).

### Ritual in the Tyva Republic

Tucked away between the Sayan and Tangdy-Uula mountain ranges in southern Siberia, Tyvans maintain many of the elements of the religious traditions described above. In particular, Tyvans continue to pay homage to local spirits (*cher eezi*, literally “master of the place,” pl. *cher eeleri*) at cairns (*ovaa*, pl. *ovaalar*).<sup>1</sup> These spirits are often viewed as ancestor spirits

1. For the sake of consistency and clarity, we use Tyvan terms as group nouns (e.g., “*ovaa* are” and “*aal* are” rather than “*ovaalar* are” and “*aaldar* are”).

or creations of nature and perceived to own the region over which they lord (Purzycki 2010, 2012). Spirit-masters do not punish people for failing to perform rituals, but one’s luck can be affected negatively if one does not stop to make an offering during travels. Moreover, it is important to note that by and large these spirits are neither concerned with nor punish people for moral transgressions (Purzycki 2010, 2012, n.d.). Like other cases throughout pastoralist Inner Asia, one regularly finds Tyvan *ovaa* on regional borders, mountain passes, and mountaintops, often marking the territories and travel routes of families’ campsites (*aal*, *ail* in Mongolian).

Vainshtein (1980) notes that “it was normal for each *aal* to have its own more or less traditional migration routes which were followed year after year. Knowing this, Tuvian herdsmen . . . avoided grazing their cattle along the routes of other *aals*” (84). If engaging in ritual increases perceptions of trustworthiness, this may be useful for minimizing defensive measures against and strengthening bonds with resident out-group members; conveying one’s commitment to local spirits conveys one’s commitment to fellow travelers, local residents, and the resources they require to feed livestock (Purzycki 2010). In other words, stopping on a mountain pass or peak on territorial borders to make attractive offerings may convey not only one’s own local outgroup membership status but also that one has “altruistic intentions” (Bulbulia 2004).

In Tyva, there are two general forms of cairn rites (see also Halemba 2006:168–170). *Ovaa dagyyry* (*ovaa* sanctification) rites are collective, male-only, affairs conducted annually or seasonally (see fig. A4). Typically, competitive games such as wrestling, archery, and horse racing follow the ceremonies. Eldest males, shamans, and lamas often lead (Humphrey and Sneath 1999:123–127). Individualized *art dagyyry* (mountain pass sanctification) rites, on the other hand, typically take place in transit. During these rituals, people humble themselves and pray, circumnavigate the *ovaa* three times while thinking only good thoughts, and leave offerings. Does ritual participation at *ovaa* therefore elicit higher perceived trustworthiness? This is the central question of the present work.

Table 2. Results for individual planned contrasts (1–9) of mean attributed trustworthiness

Contrast	Prediction	<i>t</i>	<i>P</i>	<i>r</i>
1	$K_R > K_{NR} + K_X + A$	4.74***	.000	.37
2	$K_R + K_{NR} > K_X + A$	3.85***	.000	.30
3	$K_R + K_{NR} + K_X > A$	2.45***	.008	.20
4	$K_R > K_{NR}$	3.05***	.001	.24
5	$K_R > K_X$	4.04***	.000	.32
6	$K_R > A$	4.49***	.000	.35
7	$K_{NR} > K_X$	1.10	.138	.09
8	$K_{NR} > A$	1.32	.094	.11
9	$K_X > A$	.14	.446	.01

Note. *t* = *t*-statistic; *r* = Pearson’s *r*; *df* = 146.

\*\*\* *P* < .001; one-tailed *t*-tests.

Table 3. Descriptives and statistics for Kolmogorov-Smirnov tests of normality for each variable by treatment ( $P > .05$ )

	<i>N</i>	<i>M</i>	<i>SD</i>	<i>Mdn</i>	<i>D</i>	<i>df</i>
CHILD:						
Kezhik <sub>R</sub>	38	2.79	1.93	3	.23	38
Kezhik <sub>NR</sub>	37	1.57	1.76	1	.30	37
Kezhik <sub>X</sub>	32	1.53	1.61	1	.24	32
Andrey	43	1.56	1.62	1	.20	43
Total	150	1.87	1.80			
RETURN:						
Kezhik <sub>R</sub>	38	2.87	1.53	3	.27	38
Kezhik <sub>NR</sub>	37	1.97	1.67	3	.27	37
Kezhik <sub>X</sub>	32	1.97	1.73	2	.19	32
Andrey	43	2.16	1.90	2	.20	43
Total	150	2.25	1.74			
WILLING:						
Kezhik <sub>R</sub>	38	3.26	1.13	3	.30	38
Kezhik <sub>NR</sub>	37	2.43	1.41	3	.28	37
Kezhik <sub>X</sub>	32	1.91	1.42	2	.21	32
Andrey	43	2.12	1.79	2	.16	43
Total	150	2.44	1.54			
PURSE:						
Kezhik <sub>R</sub>	38	3.16	1.39	3	.27	38
Kezhik <sub>NR</sub>	37	2.46	1.56	3	.28	37
Kezhik <sub>X</sub>	32	2.28	1.35	3	.30	32
Andrey	43	1.95	1.63	2	.19	43
Total	150	2.45	1.55			
HONEST:						
Kezhik <sub>R</sub>	38	3.29	1.11	3	.29	38
Kezhik <sub>NR</sub>	37	2.86	1.36	3	.27	37
Kezhik <sub>X</sub>	32	2.5	1.46	3	.26	32
Andrey	43	1.84	1.56	2	.18	43
Total	150	2.6	1.48			
LEND:						
Kezhik <sub>R</sub>	38	3.76	1.24	4	.19	38
Kezhik <sub>NR</sub>	37	2.65	1.75	3	.23	37
Kezhik <sub>X</sub>	32	1.81	1.49	1	.24	32
Andrey	43	2.14	1.74	2	.17	43
Total	150	2.61	1.73			

Note. *N* = sample size; *M* = mean; *SD* = standard deviation; *Mdn* = median; *D* = test statistic for Kolmogorov-Smirnov test; *df* = degrees of freedom.

## Hypotheses

If religious rituals reliably convey trustworthiness, then we would expect that, all else being equal, Tyvans should trust other Tyvans who regularly conduct rituals at *ovaa* more than other Tyvans who do not. Alternatively, if cairn practices are merely conventions borne out by a pastoralist economy with no social effects, then participants should not be perceived as any more trustworthy than any other individual. Additionally, nonparticipating ethnic in-group members should be considered more trustworthy than ethnic Tyvans who reject traditional religious practices (i.e., Christian Tyvans) and nonparticipating ethnic out-groups (i.e., Russians). Observant Ty-

vans, therefore, should be also perceived as significantly more trustworthy than Christian Tyvans or Christian ethnic Russians. Additionally, a Christian ethnic Russian should be deemed more trustworthy than a Christian Tyvan insofar as the latter may be perceived as rejecting tradition. In sum, there should be a decreasing trend of attributed trustworthiness to participating Tyvans, nonparticipating Tyvans, Christian Tyvans, and ethnic Russians (see table 3 for outline of planned contrasts). The present work examines these predictions.

## Methods

We designed a between-subjects study with four treatments to determine whether or not ritual participation and identity play a role in trusting a hypothetical individual. Recent studies (see Jensen and Petersen 2011; Wilson and O'Gorman 2003) use fictional narratives showing significant effects on participants. Given the unpredictability of *art dagyryr* rites in Tyva, this methodological paradigm was optimal for testing our hypotheses.

Each treatment included the same basic demographic questions and an adapted eight-item scale measuring religiosity (Nicholas 2004; Nicholas and Durrheim 1995; Rohrbaugh and Jessor 1975). However, treatments differed slightly in their introduction to the focal questions concerning trust with decreasing similarity to the ethnic, religious ideal. In other words, these treatments decrease in similarity to participants' ethnic and religious identities (defining characteristics are in bold):

Treatment 1 (Kezhik<sub>R</sub>): Kezhik is from Kyzyl. He comes from a large family. He is a teacher. Sometimes, he drinks *araga*, but never too much. **When he passes by an *ovaa*, he always leaves an offering.** He has three children.

Treatment 2 (Kezhik<sub>NR</sub>): Kezhik is from Kyzyl. He comes from a large family. He is a teacher. Sometimes, he drinks *araga*, but never too much. **When he passes by an *ovaa*, he never leaves an offering.** He has three children.

Treatment 3 (Kezhik<sub>X</sub>): Kezhik is from Kyzyl. He comes from a large family. He is a teacher. Sometimes, he drinks *araga*, but never too much. **He is a Christian. When he passes by an *ovaa*, he never leaves an offering.** He has three children.

Treatment 4 (Andrey): **Andrey** is from Kyzyl. He comes from a large family. He is a teacher. Sometimes, he drinks **beer**, but never too much. **He is a Russian Christian.** He has three children.

In sum, there are four treatments: the religiously observant (Kezhik<sub>R</sub>), the nonreligious condition (Kezhik<sub>NR</sub>), the Christian Kezhik (Kezhik<sub>X</sub>) treatment, and the treatment with an ethnic Russian Christian (Andrey). Kezhik is a fairly common Tyvan name. While Tyvans do often name their children with Russian names, it is extremely unlikely that a Russian would

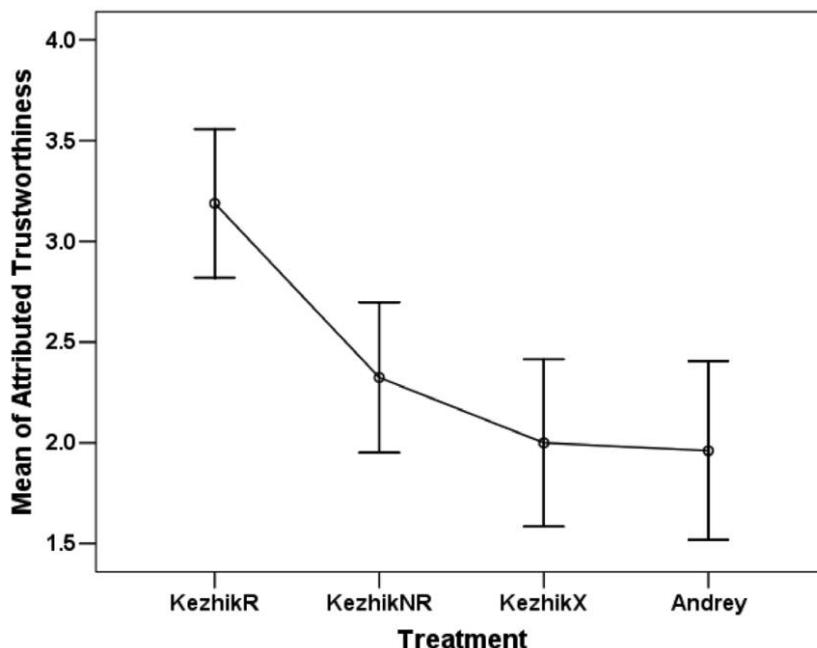


Figure 1. Confidence intervals ( $\alpha = .05$ ) for mean attributed trustworthiness across four treatments.

name his or her child with a Tyvan name. As it is also extremely uncommon for ethnic Russians to perform cairn rituals, it was necessary to avoid any awkward confounds in the design by including such a condition.

After reading the introduction, participants completed a paper and pencil task, including the demographic questions and religiosity scale, and answered six items that aimed to measure trustworthiness. Six questions were administered on Likert scales anchored at 0 and 5. We designed these questions to measure attributed trustworthiness in a number of ways. Two questions elicit subjective characterizations of the hypothetical individual (HONEST, WILLING): (1) How honest do you think Kezhik/Andrey is? and (2) How would you rate your willingness to trust others like Kezhik/Andrey? Three questions were about potentially risky behaviors (CHILD, RETURN, LEND): (3) How much would you trust Kezhik/Andrey to watch your children? (4) How likely do you think that Kezhik/Andrey would return money to you that you lent to him? (5) Andrey/Kezhik needs 1,000 rubles [about US\$30], and he asks you to borrow this money.<sup>2</sup> He promises to return it to you in 1 week. If you had this money and you could lend it, how likely would you give him the money?

One question was about the likelihood that the hypothetical individual would return a lost belonging (modified from Ruffle and Sosis, n.d.). As it would have been awkward to frame the scenario as meeting a Christian Tyvan or Russian at an

2. According to the Department of Federal State Statistics Service, the average salary in Tyva (March 2012) was 16,913 rubles per month (Territorialnyi Organ Federalnoi Sluzhby Gosudarstvennoi Statistiki Respubliki Tyva). <http://www.tuvastat.ru/digital/region12/2007/10.3.htm>.

*ovaa dagyryy* who might never participate in *art dagyryy* rituals, we used a wedding scenario. Weddings are collective affairs shrouded in religious significance with various costs. Most importantly, weddings often have both ethnic groups in attendance. Therefore, in order to ensure a consistent context, the following variants were used for PURSE:

Treatments Kezhik<sub>R</sub> and Kezhik<sub>NR</sub>: **You met Kezhik at an *ovaa dagyryy*.** He has your phone number. You accidentally left your purse/wallet at the *ovaa*, which is by his place. How likely do you think he would return it to you?

Treatments Kezhik<sub>X</sub> and Andrey: You met **Kezhik/Andrey at a wedding.** He has your phone number. You accidentally left your purse/wallet at the reception, and he sees it. How likely do you think he would return it to you?

Treatment protocols were translated into Tyvan, back-translated into English, and revised for consistency.

### Participants

Participants were approached in various locations (e.g., schools, educational institutions, clinics, etc.) around the capital city of Kyzyl and asked to fill out one of the four randomly assigned treatments. Only adult, ethnic Tyvans who could speak and read Tyvan well participated. All individuals were paid 100 rubles (about US\$3.33) for their participation. Analyses include only Tyvans who identified themselves as Buddhist or Shamanist. Table 1 shows the breakdown of demographic variables of each treatment.

A one-way ANOVA demonstrates that there were no sig-

nificant differences between age across treatments ( $F(3, 146) = 1.56, P = .20$ ). In order to test for effects of participants' religiosity, we used a modified eight-item scale (Nicholas 2004; Nicholas and Durrheim 1995; Rohrbaugh and Jessor 1975). A factor analysis using Varimax rotation failed to replicate a single factor for this scale. Therefore, the five items that loaded high on the first factor were selected for use as the religiosity scale (55.18% variance explained, Cronbach's  $\alpha = .78$ ), and individuals' scores on the first factor of this reduced scale were used as an index of religiosity. Neither religiosity ( $F(1, 144) = 0.15, P = .70$ ), sex ( $F(1, 148) = 2.65, P = .11$ ), nor age ( $F(1, 148) = 1.07, P = .30$ ) had significant effects on mean attributed trust. Therefore, all tests were conducted without such controls.

Results

Reponses to the trust questions were highly intercorrelated (Cronbach's  $\alpha = .89$ ) and yielded a single factor in an unrotated factor analysis (64.59% variance explained) with an eigenvalue (3.88) over three times greater than the following factor (0.69). A test-items analysis showed that removing any individual variable from the scale would only decrease the alpha. Therefore, the mean scores of the items were used for initial analyses. The distribution of each treatment's mean attributed trustworthiness was not significantly different from normal ( $P > .05$ ): Kezhik<sub>R</sub> ( $M = 3.19; SD = 1.12, D(38) = 0.12$ ); Kezhik<sub>NR</sub> ( $M = 2.32; SD = 1.12, D(37) = 0.09$ ); Kezhik<sub>X</sub> ( $M = 2.00; SD = 1.15, D(32) = 0.11$ ); Andrey ( $M$

$= 1.96; SD = 1.44, D(43) = 0.10$ ). Also, the variances were equal across groups ( $F(3, 146) = 2.22, P > .05$ ).

Overall Attributed Trustworthiness

A one-way ANOVA demonstrates that mean evaluations of trustworthiness were different across treatments ( $F(3, 146) = 8.22, P < .001, \omega = 0.36$ ), and, as predicted, there were significant linear trends ( $K_R > K_{NR} > K_X > A$ ) of decreasing attributed trust ( $F(1, 146) = 21.14, P < .001, \omega = 0.34$ ; fig. 1). Results from the planned contrasts are detailed in table 2. Contrast 1 tests the prediction that the amount of Kezhik<sub>R</sub> will be more trustworthy than the pooled individuals in all other treatments. Contrast 2 tests the prediction that the combined trustworthiness of Kezhik<sub>R</sub> and Kezhik<sub>NR</sub> will be higher than Kezhik<sub>X</sub> and Andrey, the two obvious religious out-group members. The latter two treatments consist of individuals who explicitly do not participate in *ovaa* practices because they are in a different religious group, whereas Kezhik<sub>NR</sub> simply does not stop at cairns. Contrast 3 predicts that all ethnic Tyvans will be rated as more trustworthy than the ethnic Russian. Contrasts 4–9 test the differences between the individual treatments.

Of the four treatments, it is immediately clear that Kezhik<sub>R</sub> is considered to be the more trustworthy. However, contrary to predictions 7–9, all individuals who do not make offerings at *ovaa* showed no significant differences between each other in attributions of trust, though Kezhik<sub>NR</sub> was nearly significantly more trustworthy than Andrey, suggesting that ethnicity plays a minor role in judgments of trustworthiness. In summary, above all other cases, Tyvans who regularly engage in cairn rites are thought to be significantly more likely to live up to social obligations and reliably cooperate in an honest fashion.

Individual Items

Using Kolmogorov-Smirnov tests of normality, all variables for all treatments were significantly nonnormal at the .05 level (table 3). Levene's tests demonstrated that variances were equal ( $P > .05$ ) across treatments for CHILD ( $F(3, 146) = 1.25$ ), RETURN ( $F(3, 146) = 1.78$ ), and PURSE ( $F(3, 146) = 1.60$ ). However, the variances of the other variables were significantly different across treatments: WILLING ( $F(3, 146) = 5.77, P = .001$ ), HONEST ( $F(3, 146) = 3.13, P < .05$ ), and LEND ( $F(3, 146) = 4.23, P = .001$ ). Therefore, Welch's *F*-tests are included for these latter variables.

With the exception of RETURN, which bordered on significance, one-way ANOVAs were consistent with the omnibus analyses (table 4). Planned contrasts were also conducted for each individual variable as well (table 5). These were also largely consistent with the omnibus tests showing strong effects for cairn participation on mean trustworthiness. There were, however, some notable differences. In the case of the HONEST variable, Kezhik<sub>NR</sub> was rated significantly higher than Andrey but no different from Kezhik<sub>R</sub>. Moreover, the Kezhik<sub>X</sub> was rated as significantly more HONEST than An-

Table 4. Results for one-way ANOVAS for individual variables

	<i>df</i>	<i>F</i>	<i>P</i>	$\omega$
CHILD:				
Between groups	3(149)	4.80***	.003	.27
Linear trend	1(149)	9.15***	.003	.22
RETURN:				
Between groups	3(149)	2.28	.082	.16
Linear trend	1(149)	3.01	.085	.11
WILLING:				
Between groups	3(149)	6.07***	.001	.30
Linear trend	1(149)	14.43***	.000	.29
Welch's test	3(79.30)	7.97***	.000	.35 <sup>a</sup>
PURSE:				
Between groups	3(149)	4.55***	.004	.26
Linear trend	1(149)	12.74***	.000	.27
HONEST:				
Between groups	3(149)	8.00***	.000	.35
Linear trend	1(149)	23.05***	.000	.36
Welch's test	3(78.98)	8.16***	.000	.35 <sup>a</sup>
LEND:				
Between groups	3(149)	10.78***	.000	.40
Linear trend	1(149)	25.95***	.000	.37
Welch's test	3(79.20)	14.23***	.000	.46 <sup>a</sup>

Note. *df* = degrees of freedom; *F* = *F*-ratio.

<sup>a</sup> Adj.  $\omega$ .

\*\*\*  $P < .001$ .

Table 5. Results for planned contrasts for individual variables

	Prediction	<i>t</i>	<i>df</i>	<i>P</i>	<i>r</i>
CHILD:					
1	$K_R > K_{NR} + K_X + A$	3.79***	146	.000	.30
2	$K_R + K_{NR} > K_X + A$	2.22**	146	.014	.18
3	$K_R + K_{NR} + K_X > A$	1.29	146	.100	.11
4	$K_R > K_{NR}$	3.05***	146	.001	.24
5	$K_R > K_X$	3.02***	146	.001	.24
6	$K_R > A$	3.19***	146	.001	.26
7	$K_{NR} > K_X$	.09	146	.466	.01
8	$K_{NR} > A$	.02	146	.490	.00
9	$K_X > A$	-.07	146	.474	.01
RETURN:					
1	$K_R > K_{NR} + K_X + A$	2.58**	146	.005	.21
2	$K_R + K_{NR} > K_X + A$	1.26	146	.105	.10
3	$K_R + K_{NR} + K_X > A$	.34	146	.365	.03
4	$K_R > K_{NR}$	2.25**	146	.013	.18
5	$K_R > K_X$	2.18*	146	.015	.18
6	$K_R > A$	1.84*	146	.034	.15
7	$K_{NR} > K_X$	.01	146	.496	.00
8	$K_{NR} > A$	-.49	146	.312	.04
9	$K_X > A$	-.48	146	.315	.04
WILLING: <sup>a</sup>					
1	$K_R > K_{NR} + K_X + A$	4.74***	86.47	.000	.45
2	$K_R + K_{NR} > K_X + A$	3.53***	136.24	.000	.29
3	$K_R + K_{NR} + K_X > A$	1.38	61.58	.086	.17
4	$K_R > K_{NR}$	2.82***	69.03	.003	.32
5	$K_R > K_X$	4.36***	58.84	.000	.49
6	$K_R > A$	3.49***	71.90	.000	.38
7	$K_{NR} > K_X$	1.54	65.33	.064	.17
8	$K_{NR} > A$	.88	77.40	.190	.10
9	$K_X > A$	-.57	72.64	.287	.07
PURSE:					
1	$K_R > K_{NR} + K_X + A$	3.29***	146	.001	.26
2	$K_R + K_{NR} > K_X + A$	2.81***	146	.003	.23
3	$K_R + K_{NR} + K_X > A$	2.51**	146	.007	.20
4	$K_R > K_{NR}$	2.02*	146	.023	.16
5	$K_R > K_X$	2.44**	146	.008	.20
6	$K_R > A$	3.62***	146	.000	.29
7	$K_{NR} > K_X$	.49	146	.311	.04
8	$K_{NR} > A$	1.51	146	.067	.12
9	$K_X > A$	.94	146	.175	.08
HONEST: <sup>a</sup>					
1	$K_R > K_{NR} + K_X + A$	3.91***	83.14	.000	.39
2	$K_R + K_{NR} > K_X + A$	4.01***	133.35	.000	.33
3	$K_R + K_{NR} + K_X > A$	3.88***	67.61	.000	.43
4	$K_R > K_{NR}$	1.48	69.55	.072	.17
5	$K_R > K_X$	2.51**	57.29	.008	.31
6	$K_R > A$	4.87***	75.82	.000	.49
7	$K_{NR} > K_X$	1.07	63.93	.144	.13
8	$K_{NR} > A$	3.15***	77.98	.001	.34
9	$K_X > A$	1.89*	69.16	.031	.22
LEND: <sup>a</sup>					
1	$K_R > K_{NR} + K_X + A$	6.12***	85.10	.000	.55
2	$K_R + K_{NR} > K_X + A$	4.79***	136.18	.000	.38
3	$K_R + K_{NR} + K_X > A$	1.99*	68.64	.026	.23
4	$K_R > K_{NR}$	3.17***	64.71	.001	.37
5	$K_R > K_X$	5.88***	60.45	.000	.60
6	$K_R > A$	4.88***	75.74	.000	.49
7	$K_{NR} > K_X$	2.14*	66.99	.018	.25
8	$K_{NR} > A$	1.30	76.08	.099	.15
9	$K_X > A$	-.87	71.49	.192	.10

Note. *t* = *t*-statistic; *df* = degrees of freedom; *r* = Pearson's *r*. One-tailed test.

<sup>a</sup> Equal variances not assumed.

\* *P* ≤ .05.

\*\* *P* ≤ .01.

\*\*\* *P* ≤ .001.

drey. Participants were also more likely to LEND money to Kezhik<sub>NR</sub> than to Kezhik<sub>X</sub>.

## Discussion

As demonstrated in the present work, economic transactions with spirit-masters signals trustworthiness to people observing such behaviors. These results provide an important answer to the question of why Inner Asian groups make offerings at cairns. Notably, this occurs in a context where spirits are acutely concerned with ritual behavior and resource maintenance (Purzycki 2010, 2011) rather than Abrahamic moral virtues. In fact, Tyvans moralize *cher eezi* significantly less than Christians moralize the Abrahamic god (Purzycki 2012, n.d.). In the present case, ritualistically signaling trustworthiness occurs in a context where supernatural agents are not explicitly concerned with moral virtues such as honesty or living up to interpersonal prosocial obligations. These results are consistent with the research detailed in the introduction and shed light on what appears to be an intrinsic property of the dynamic relationship between ritual participation and participants' bonds.

One major question requiring further investigation is how such a tradition evolved. The relationship between ritual cairns and pastoralism appears to be significant worldwide (Purzycki 2012; Sierksma 1963). If cairns serve as strategically located beacons to convey trustworthiness and this helps people traveling through others' land to convey to others that they pose no threat, this system may actually solve socioecological problems of resource negotiation rather than merely being an artifact of the pastoralist economy. Moreover, if conveying trustworthiness is a consistent feature of costly rituals, then signal effectiveness may face different challenges across socioecological contexts. It is as crucial as ever to conduct cross-cultural studies of this kind to further aid in our understanding of ritual and religious expression. The present study takes an important step toward this endeavor.

Future studies should consider using behavioral measures of trust, but such research is challenging to conduct cross-culturally, particularly in contexts such as Inner Asia where religious practices at cairns are distributed over vast stretches of land. The present study nevertheless contributes to understanding by filling an important piece to the puzzle of religious ritual. Collective rites at *ovaa* may increase bonds between participants, but how these translate to increased levels of cooperation has yet to be systematically addressed. The results also suggest that the trustworthiness signaled by rituals is of a domain-general sort; the fact that the anonymous observant Tyvan is trusted more with watching participants' children, for instance, is fairly remarkable, as there is no immediately apparent relationship between ritual participation, spirit-masters' concerns, and the risk involved in having an anonymous individual take care of one's progeny. However, the individual variable items' differences suggest the

necessity for future studies to tease apart the complex relationships between ethnicity, ritual participation, and trust.

Another question concerns the relationship between cost of ritual and trustworthiness (see Alcorta and Sosis 2005; Bulbulia 2004, forthcoming; Sosis and Alcorta 2003). For instance, since tying a silk scarf is more expensive than placing a few kopeks on a cairn, are perceptions of trustworthiness mediated by the actual cost of the offering? There should be a positive correlation with cost of rite and the amount of trustworthiness conveyed, but this should also be weighed with the number of participants present. Future research will do well to consider this.

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## References Cited

- Alcorta, Candace S., and Richard Sosis. 2005. Ritual, emotion, and sacred symbols: the evolution of religion as an adaptive complex. *Human Nature* 16(4):323–359.
- Allard, Francis, and Diimaajav Erdenebaatar. 2005. Khirigsuurs, ritual and mobility in the Bronze Age of Mongolia. *Antiquity* 79(305):547–563.
- Atran, Scott, and Ara Norenzayan. 2004. Religion's evolutionary landscape: counterintuition, commitment, compassion, communion. *Behavioral and Brain Sciences* 27:713–770.
- Bacharach, Michael, and Diego Gambetta. 2001. Trust in signs. In *Trust and society*. Karen S. Cook, ed. Pp. 149–184. New York: Russell Sage Foundation.
- Bawden, C. R. 1958. Two Mongol texts concerning obo-worship. *Oriens Extremus* 5(1):23–41.
- Birtalan, Ágnes. 1998. Typology of stone cairn obos preliminary report, based on Mongolian fieldwork material collected in 1991–1995. In *Tibetan mountain deities, their cults and representations*. Anne-Marie Blondeau, ed. Pp. 199–210. Vienna: Verlag der Österreichischen Akademie der Wissenschaften.
- Bulbulia, Joseph. 2004. Religious costs as adaptations that signal altruistic intention. *Evolution and Cognition* 10(1):19–38.
- . Forthcoming. Why “costly-signalling” models of religion require cognitive psychology. In *Origins of religion, cognition, and culture*. A. Geertz and J. Jensen, eds. London: Equinox.
- Bulbulia, Joseph, and Richard Sosis. 2011. Signaling theory and the evolution of religions. *Religion* 41(3):363–388.
- Cronk, Lee. 1994. Evolutionary theories of morality and the manipulative use of signals. *Zygon* 29(1):81–101.
- Djakonova, V. P. 1977. L'obo, monument du culte de la nature chez les peuples du Saïan Altaï [The obo, cult monument of nature of the people of the Sayan Altai]. *L'ethnographie* 68(74–75):93–99.
- . 2001. Lamaism and its influence on the worldview and religious cults of the Tuvans. *Anthropology and Archeology of Eurasia* 39(4):52–57.
- Durkheim, Émile. 2001 (1915). *The elementary forms of religious life*. New York: Oxford University Press.
- Fitzhugh, William W. 2009a. Pre-Scythian ceremonialism, deer stone art, and cultural intensification in northern Mongolia. In *Social complexity in pre-historic Eurasia: monuments, metals and mobility*. B. Hanks and K. Linduff, eds. Pp. 378–411. Cambridge: Cambridge University Press.
- . 2009b. Stone shamans and flying deer of northern Mongolia: deer goddess of Siberia or chimera of the steppe? *Arctic Anthropology* 46(1–2): 72–88.
- Halemba, Agnieszka. 2006. *The Telengits of Southern Siberia: landscape, religion and knowledge in motion*. New York: Routledge.
- Humphrey, Caroline. 1995. Chiefly and shamanist landscapes in Mongolia. In *The anthropology of landscape: perspectives on place and space*. Eric Hirsch and Michael O'Hanlon, eds. Pp. 135–162. Oxford: Clarendon.
- Humphrey, Caroline, and David Sneath. 1999. *The end of nomadism? society, state and the environment in Inner Asia*. Durham, NC: Duke University Press.
- Irons, William. 1974. Nomadism as a political adaptation: the case of the Yomut Turkmen. *American Ethnologist* 1(4):635–658.
- . 2001. Religion as a hard-to-fake sign of commitment. In *Evolution and the capacity for commitment*. R. Nesse, ed. Pp. 292–309. New York: Russell Sage Foundation.
- Jensen, Niels Holm, and Michael Bang Petersen. 2011. To defer or to stand up? how offender formidability affects third party moral outrage. *Evolutionary Psychology* 9(1):118–136.
- Kuzhuget, A. K. 2002. *Tuvinskii letnij prazdnik ovaa dagyyry* [The Tuvan summer holiday Ovaa Dagyyry]. In *Uchenye Zapiski* [Scientific Notes], Vypusk XIX. Pp. 67–76. Kyzyl: Respublikanskaia Tipografiia.
- . 2003. *Traditsionnaia kul'tura Tuvintsev glazami inostrantsev: Konets XIX–Nachalo XX vv* [Traditional culture of the Tuvans through the eyes of foreigners: the end of the 19th century–beginning of the 20th century]. Kyzyl: Tuvinskoe Knizhnoe Izdatel'stvo.
- . 2006. *Dukhovnaia kul'tura Tuvintsev: Struktura i transformatsiia* [Spiritual culture of the Tuvans: structure and transformation]. Kemerovo: KemGUKI.
- Markov, G. E. 1976. *Kochevnikii Azii: Struktura khoziaistva obschestvennoi organizatsii* [Nomads of Asia: structure of household and collective organizations]. Moscow: Izdatelstvo Moskovskogo Gosudarstvennogo Universiteta.
- Nicholas, L. J. 2004. The association between religiosity, sexual fantasy, participation in sexual acts, sexual enjoyment, exposure, and reaction to sexual materials among Black South Africans. *Journal of Sex and Marital Therapy* 30:37–42.
- Nicholas, L. J., and K. Durrheim. 1995. Religiosity, AIDS, and sexuality knowledge, attitudes, beliefs, and practices of Black South-African first-year university students. *Psychological Reports* 77:1328–1330.
- Purzycki, Benjamin Grant. 2010. Spirit masters, ritual cairns, and the adaptive religious system in Tyva. *Sibirica* 9(2):21–47.
- . 2011. Tyvan *cher eezi* and the ecological constraints of what supernatural agents know. *Religion, Brain, and Behavior* 1(1):31–45.
- . 2012. Finding minds in the natural world: dynamics of the religious system in the Tyva Republic. PhD dissertation, Department of Anthropology, University of Connecticut, Storrs.
- . n.d. The minds of gods: a comparative study of supernatural minds. Unpublished manuscript.
- Rappaport, Roy A. 1979. *Ecology, meaning, and religion*. Berkeley: North Atlantic Books.
- . 1999. *Ritual and religion in the making of humanity*. Cambridge: Cambridge University Press.
- Rohrbaugh, John, and Richard Jessor. 1975. Religiosity in youth: a personal control against deviant behavior. *Journal of Personality* 43(1):136–155.
- Ruffle, Bradley J., and Richard H. Sosis. n.d. Do religious contexts elicit more trust and altruism? An experiment on Facebook. <http://ssrn.com/abstract=1566123>.
- Sierksma, F. 1963. Sacred cairns in pastoral cultures. *History of Religions* 2(2): 227–241.
- Sneath, David. 1992. The obo ceremony in Inner Mongolia: cultural meaning and social practice. In *Altai religious beliefs and practices*. Géza Bethlenfalvy, Ágnes Birtalan, Alice Sárközi, and Judit Vinkovics, eds. Pp. 309–318. Budapest: Research Group for Altaic Studies.
- . 2007. *The headless state: aristocratic orders, kinship society, and misrepresentations of nomadic Inner Asia*. New York: Columbia University Press.
- Soler, Montserrat. 2012. Costly signaling, ritual and cooperation: evidence

- from Candomblé, an Afro-Brazilian religion. *Evolution and Human Behavior* 33(4):346–356.
- Sosis, Richard. 2005. Does religion promote trust? the role of signaling, reputation, and punishment. *Interdisciplinary Journal of Research on Religion* 1(7):1–30.
- Sosis, Richard, and Candace Alcorta. 2003. Signaling, solidarity, and the sacred: the evolution of religious behavior. *Evolutionary Anthropology* 12:264–274.
- Sosis, Richard, and Eric R. Bressler. 2003. Cooperation and commune longevity: a test of the costly signaling theory of religion. *Cross-Cultural Research* 37(2):211–239.
- Sosis, Richard, Howard C. Kress, and James S. Boster. 2007. Scars for war: evaluating alternative signaling explanations for cross cultural variance in ritual costs. *Evolution and Human Behavior* 28:234–247.
- Sosis, Richard, and Bradley Ruffle. 2003. Religious ritual and cooperation: testing for a relationship on Israeli religious and secular kibbutzim. *Current Anthropology* 44:713–722.
- Tan, Jonathan H. W., and Claudia Vogel. 2008. Religion and trust: an experimental study. *Journal of Economic Psychology* 29(6):832–848.
- Turner, Victor. 1995. *The ritual process: structure and anti-structure*. Hawthorne: Aldine.
- Vainshtein, Sevyan. 1980. *Nomads of south Siberia: the pastoral economies of Tuva*. Cambridge: Cambridge University Press.
- Vreeland, Herbert Harold. 1953. *Mongol community and kinship structure*. New Haven, CT: Human Relations Area Files.
- Wilson, David, and Rick O’Gorman. 2003. Emotions and actions associated with norm-breaking events. *Human Nature* 14(3):277–304.
- Wright, J. S. C. 2006. The adoption of pastoralism in northeast Asia: monumental transformation in the Egiin Gol Valley, Mongolia. Unpublished PhD dissertation, Department of Anthropology, Harvard University, Cambridge, MA.
- . 2007. Organizational principles of Khirigsuur monuments in the Lower Egiin Gol Valley, Mongolia. *Journal of Anthropological Archaeology* 26(3):350–365.