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# Water sharing is a distressing form of reciprocity: Shame, upset, anger, and conflict over water in twenty cross-cultural sites

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## Abstract

Anthropological theories of reciprocity suggest it enhances prestige, social solidarity, and material security. Yet, some ethnographic cases suggest that water sharing—a form of reciprocity newly gaining scholarly attention—might work in the opposite way, increasing conflict and emotional distress. Using cross-cultural survey data from twenty global sites (n = 4,267), we test how household water reciprocity (giving and receiving) is associated with negative emotional and social outcomes. Participation in water sharing as both givers and receivers is consistently associated with greater odds of reporting shame, upset, and conflict over water. Water sharing experiences in a large, diverse sample confirm a lack of alignment with predictions of classic reciprocity theories. Recent ethnographic research on reciprocity in contexts of deepening contemporary poverty will allow development of ethnographically informed theories to better explain negative experiences tied to water reciprocity.

KEYWORDS
mental health, reciprocity, water borrowing, water loaning, water insecurity

## Resumen

Teorías antropológicas de reciprocidad sugieren que ésta mejora el prestigio, la solidaridad social y la seguridad material. Sin embargo, algunos casos etnográficos sugieren que compartir el agua –una forma de reciprocidad que esta ganando atención académica recientemente– puede funcionar de forma opuesta, incrementando el conflicto y la angustia emocional. Utilizando información de una encuesta intercultural de veinte sitios globales (n = 4,267), evaluamos cómo la reciprocidad de agua en hogares (dar y recibir) esta asociada con resultados emocionales y sociales negativos. La participación en el compartir de agua como dadores y recibidores esta asociada consistentemente con mayores probabilidades de reportar culpa, malestar y conflicto sobre el agua. Las experiencias de compartir agua en una muestra amplia y diversa confirman una falta de alineación con las predicciones de las teorías clásicas de reciprocidad. Investigación etnográfica reciente sobre reciprocidad en contextos de profundización de la pobreza contemporánea permitirá el desarrollo de teorías informadas

  

etnográficamente para explicar mejor las experiencias negativas ligadas a la reciprocidad del agua. [*reciprocidad*, *prestar agua*, *pedir prestada agua*, *inseguridad de agua*, *salud mental*]

## INTRODUCTION

In Cochabamba, Bolivia, in the early 2000s, one of us first ethnographically observed households giving each other buckets of water in the city's water-insecure informal settlements. This appeared to be a form of reciprocity, but people were initially hesitant to discuss it. Slowly, over the years, we were offered more details. Stories depicted this water sharing as both distressing and shameful (Wutich 2011; Wutich and Ragsdale 2008), like with Doña Paloma, a middle-aged wife and mother, who described the humiliation of begging her neighbors for water after vending trucks refused to stop for small-scale clients. As relationships with her neighbors became increasingly strained, Doña Paloma's mental health deteriorated. Eventually, her family moved away (Wutich et al. 2015).

Spurred by such narratives, we reviewed historical ethnographies and found only limited cases documenting household water sharing (Wutich and Brewis 2014). Water-sharing norms have been described, for example, in !Kung San (Wiessner 1986, 1996) and Navajo (Diné) (Roberts 1951) communities. Here, we are not referring to community institutions that govern common-pool or open-access water. Rather, we mean evidence of reciprocal norms that govern how people give water, which is stored in or accessed by their own households, to others (Brewis et al. 2019; Pickles 2020). The ethnographic literature is largely silent on such practices (Wutich et al. 2018). This could suggest that water-insecure households no longer share water, that anthropologists observed water sharing but deemed it uninteresting, or that water sharing happens but is minimized or hidden by those doing it. Lack of sharing seemed unlikely given our own ethnographic observations, the growing "manufactured scarcity" of water (Johnston 2011; Mehta 2005; Whiteford and Whiteford 2005), and other ongoing drivers of water insecurity, such as poverty, disasters, displacement, and climate change (Roque et al. 2021; Stoler et al. 2019).

Following those initial observations in Bolivia and the theoretical assumption that water sharing is likely happening, members of our Household Water Insecurity Experiences (HWISE) Research Coordination Network have now ethnographically identified cases of household water sharing in water-insecure communities (Brewis et al. [2019] in Democratic Republic of the Congo, Ghana, Kenya, Malawi, Nigeria, Ethiopia, and Uganda; Brewis et al. [2021] in Ethiopia; Cole [2017] in Indonesia; Eichelberger [2010] in Alaska; Pearson, Mayer, and Bradley [2015] in Uganda; see also Schnegg and Linke [2015] in Namibia; Zug and O'Graefe [2014] in Sudan). Mostly called "water sharing" in the recent literature (Brewis et al. 2021; Harris et al. 2020; Roque et al. 2021; Stoler et al. 2019; Wutich et al. 2018), the phenomenon is not yet comprehensively documented and has also been described as "water borrowing" (Rosinger et al. 2020), "water transfers" (Brewis et al. 2019; Zug 2014b), "water gifts" (Zug 2014a; Zug and Graefe 2014), and "reciprocal water exchanges" (Wutich 2011; Wutich and Ragsdale 2008). One collective suggestion embedded in the totality of these cases is that both givers and receivers are often uncomfortable or even distressed while sharing water (Wutich et al. 2018)—just like Doña Paloma.

Such distress is, however, unexpected in the context of what anthropologists know generally about givers and receivers in reciprocal systems. Historically, prestige and social solidarity have been theorized to underlie most reciprocal systems (Blau 1963; Gluckman 1964; Homans 1958; Mauss [1924] 1954; Schneider 1974). *Giving*—of things such as food or gifts—usually increases the giver's prestige and forms affective ties of mutual support (to mobilize later, when needed); giving, therefore, should be associated with positive emotion (Bollig 1998; Cashdan 1985; Wiessner 1982). This prestige and social solidarity effect is documented in cultures as varied as African pastoralist societies (Bollig 1998; Colson 1974; Ensminger 1996; Guyer 1993; Schnegg 2015), Melanesian "Big Men" societies (Malinowski [1922] 2014; Sahlins 1963), Indigenous potlatch ceremonies in North America (Piddocke 1965), Chinese *guanxi* (Smart 1993), Andean *ayni* (Faas 2017; Isbell 1996; Orlove 1977), Siberian cooperative networks (Gerkey 2013), and European charitable giving (Hanson 2015).

However, reciprocal giving can be associated with negative emotions. Those who evade giving—especially when they have resources to give—often experience shame (Bollig 1998; Schnegg 2015; Wiessner 1982). Shame, therefore, may be an emotional signal, deeply linked to reciprocal norms, that alerts people to the danger of prestige loss and social devaluation (Sznycer et al. 2016). Shame can escalate into anger and conflict, as status loss may narrow the ways people can engage in social negotiations (Bollig 1998; Sznycer et al. 2016). Thus, people who refuse demands to give, are unable to give, or give too little may experience increased shame, anger, and conflict (Berman 2020; Bollig 1998; Desmond 2012; Schnegg 2015; Wiessner 1982).

While the anthropological literature indicates that giving should be linked to positive emotion, it provides a more nuanced picture of the extent to which *receiving* might be linked to shame or status loss (Mauss [1924] 1954). In equitable reciprocal networks, receiving *should not* provoke any shame or status loss (Cashdan 1985; Wiessner 1982). Rather, *exclusion* from such sharing networks evokes emotional distress (Bollig 1998; Mauss [1924] 1954; Wiessner 1982). Reciprocal economies in hunter-gatherer and pastoralist societies, for example, allow members to draw heavily on group resources during certain life phases, such as childhood or early parenthood or during environmental crises like droughts (Bollig 1998; Hawkes, O'Connell, and Blurton-Jones 1997; Kaplan et al. 1985). In contexts of extreme poverty or marginality, affective ties formed in long-standing reciprocal

relationships minimize shame or status loss for receivers of help and favors (Beresford 2021; Lomnitz 1977; Sangaramoorthy 2018; Stack 1970). Here, too, people are expected to be heavy receivers during certain crises or life phases—and they are expected to give more at other times. In such circumstances, being bound in the give-and-take of reciprocal ties shields people from shame and anger and the need to engage in conflicts to obtain resources (Sznycer et al. 2016).

Here, we use data that we collected systematically from twenty global sites to integrate, extend, and generalize available ethnographic observations on water sharing and distress. We examine if water sharing is associated with negative emotions (shame, upset, and anger) and extra-household conflict using multilevel models. Guided by the theoretical literature discussed above, we hypothesized that people from households participating either as givers or receivers of water would report less-negative water-related distress (shame, upset, anger) and conflict than people who did not report sharing water. As such, this analysis is also an opportunity to test how water sharing might—or might not—fit with broader anthropological theories of reciprocity.

## METHODS

### HWISE network: Equitable global collaborative scholarship

The Household Water Insecurity Experiences Research Coordination Network (HWISE RCN, hwise-rcn.org) is a global research collaboration. The network is designed to advance theories and methods for understanding water insecurity. HWISE has a strong commitment to equity in scholarly practices, including coauthorship equity (e.g., Liboiron et al. 2017), as an underlying ethical tenet in our international collaborations.

### Site selection, sampling, and surveys

For this study, HWISE implemented cross-sectional surveys in twenty-seven communities in Africa, the Americas, the Middle East, and Asia in 2017–2018 (Young et al. 2019a, 2019b). We selected sites to maximize variability around water problems, water infrastructure, urbanicity, and region. The survey explored cultural aspects of living with water insecurity, including water sharing. Data collection was led by scholars with long-term contextual and ethnographic familiarity with each research site (Wutich and Brewis 2019). In each site, we targeted 250 households using random and purposive sampling from geographically defined areas. Interviews were conducted face-to-face with adults knowledgeable about their household's water situation. Interviewers sought verbal or written informed consent in local languages, following local IRB agreements. Study activities were reviewed and approved by all relevant ethical review boards.

Questions on water borrowing and community conflicts were asked at all sites, and questions related to water loaning, upset, anger, and shame were asked for a subset (Supplemental Table 1). For these analyses, we selected only HWISE sites that employed random sampling to maximize possible comparability and generalizability of findings and households with complete data on all covariates. This resulted in data from twenty water-insecure fieldsites (Figure 1) representing 4,267 households (Table 1).

### Key variables

#### Participation in water sharing

Giving water and receiving water in the prior four weeks were the two key predictor variables. When asking these two questions, we used the terms "loaning" and "borrowing" because survey piloting and earlier work found these terms best signaled generalized water reciprocity to respondents (Wutich 2011). Questions on borrowing were asked in all twenty sites, while questions on loaning water were asked in fifteen sites. We dichotomized households as participating in giving or receiving water based on their reporting any event of loaning or borrowing water in the prior four weeks. We treated these as two separate variables and further combined them into a four-level categorical variable for those households who had information on both. We categorized people as follows: (1) those who never gave or received, (2) those who only gave, (3) those who only received, and (4) those who both gave and received water.

#### Shame, upset, anger, and conflict around water

Water-related shame, upset, anger, or conflict in the prior four weeks were the key outcome variables. To capture shame, we asked: "In the last 4 weeks, how frequently have problems with water caused you or anyone in your household to feel ashamed/excluded/stigmatized?" This question was asked in nine sites (four where questions about water loaning were asked). Given that distress associated with anger can be difficult to translate and elicit, we collected data using two different terms: "upset" (eleven sites) and "anger" (nine sites). These we analyzed separately. To capture conflict, we asked if anyone in the household had water-related "difficulties with neighbors or others in the community" (eleven sites). In nine sites, we modified the question to elicit "difficulties with neighbors, water providers, or others." We judged these items to be equivalent and combined responses for analysis. For the primary analyses, responses were dichotomized as never versus sometimes/often/always; they were treated as an ordinal variable in sensitivity analyses.

#### Household water situation

We created a variable to describe households' unmet water needs over the prior four weeks based on reported frequency (never/rarely/sometimes/often/always), where higher scores indicate more unmet need, following Brewis et al. (2019). The variable used six questions:

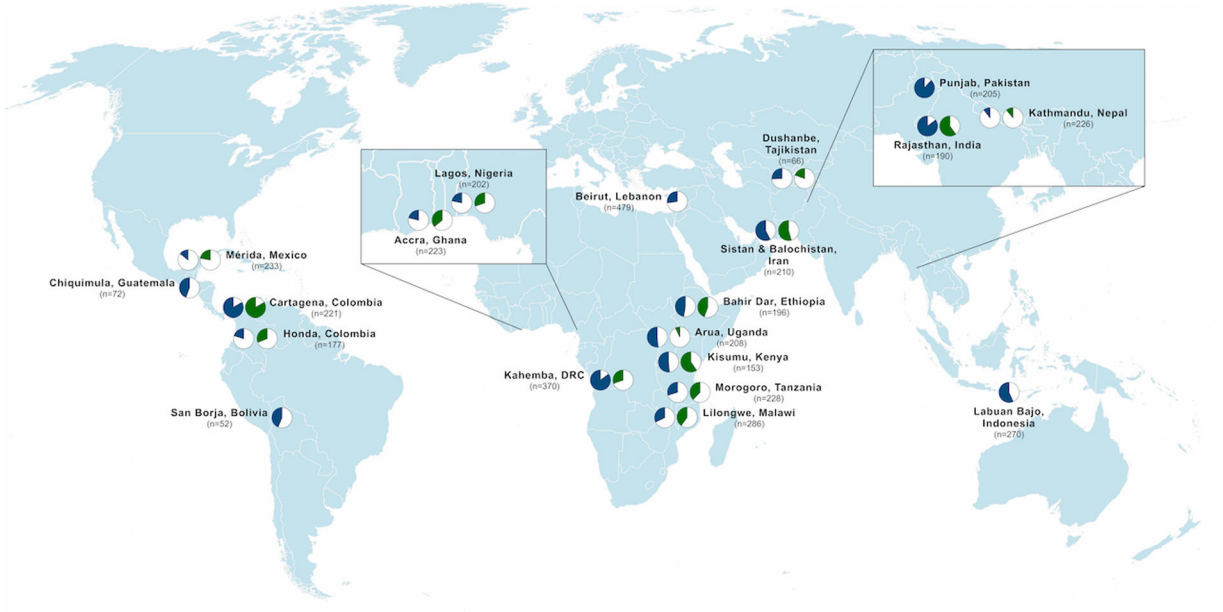


**FIGURE 1** Map of twenty HWISE sites in nineteen countries, including sample size and proportion of households borrowing and loaning water; blue = proportion of households that borrowed water; green = proportion of households that loaned water [This figure appears in color in the online issue]

**TABLE 1** Descriptive characteristics of samples used to model negative emotions and conflict associated with loaning and borrowing water, HWISE

| | Borrowing | | | | Loaning | | | |
|---|---|---|---|---|---|---|---|---|
| Variable | Shame Mean | Upset Mean | Anger Mean | Conflict Mean | Shame Mean | Upset Mean | Anger Mean | Conflict Mean |
| Sample size | 1,928 | 2,362 | 1,940 | 4,267 | 861 | 2,371 | 869 | 3,217 |
| Sites (n) | 9 | 11 | 9 | 20 | 4 | 11 | 4 | 15 |
| Age, mean (SD) | 39.7 (14.0) | 39.5 (14.7) | 39.6 (14.0) | 39.5 (14.4) | 38.9 (14.3) | 39.5 (14.7) | 38.9 (14.2) | 39.3 (14.6) |
| Sex (% female) | 63.2% | 75.7% | 63.1% | 69.9% | 68.6% | 75.7% | 68.7% | 73.7% |
| Outcome (shame, etc.) of column (%) | 38.5% | 49.4% | 67.5% | 25.6% | 43.9% | 49.6% | 67.5% | 23.0% |
| Borrowed water | 55.3% | 37.9% | 55.4% | 45.8% | – | – | – | – |
| Loaned water | – | – | – | – | 58.1% | 30.0% | 58.0% | 37.6% |
| Perceived Stress High (yes) (%) | 17.4% | 15.2% | 17.4% | 16.2% | 18.8% | 15.4% | 18.9% | 16.4% |
| Self responsible for water (Yes) (%) | 45.0% | 59.3% | 45% | 52.9% | 43.9% | 59.3% | 44.1% | 55.1% |
| HH unmet water needs: | | | | | | | | |
| Low | 40.8% | 50.3% | 40.7% | 45.9% | 43.0% | 50.2% | 42.7% | 48.1% |
| Medium | 25.7% | 16.6% | 25.7% | 20.8% | 25.2% | 16.7% | 25.2% | 19.1% |
| High | 33.5% | 33.1% | 33.6% | 33.3% | 31.8% | 33.1% | 32.1% | 32.8% |
| Rural (%) | 27.9% | 22.7% | 27.8% | 25.1% | 33.6% | 22.9% | 33.4% | 25.8% |
| Water time high >7 hrs week (%) | 15.9% | 30.0% | 15.9% | 23.7% | 14.1% | 30.2% | 14.0% | 26.0% |
| Season: | | | | | | | | |
| Rainy | 36.8% | 45.8% | 36.6% | 62.3% | 28.9% | 45.8% | 28.8% | 40.8% |
| Dry | 49.2% | 35.6% | 49.5% | 21.1% | 71.1% | 35.8% | 71.2% | 45.6% |
| Neither rainy or dry | 14.0% | 18.5% | 13.9% | 16.6% | – | 18.4% | – | 13.6% |

how frequently households, due to lack of water, (1) changed what was eaten, (2) went without washing their hands following "dirty" activities, (3) went without washing their body, (4) drank less water than they would like, (5) went to sleep thirsty, or (6) had no usable or drinkable water whatsoever. We created a single measure of unmet household water need by collapsing these six variables using principal components analysis. The first factor explained 58.5 percent of the variation in these variables and was applied as the measure.

### Other covariates

Prior research suggests those responsible for household water exhibit more emotional distress related to shortages (Wutich 2009). We therefore created a dichotomous variable that reflected if the respondent identified themselves as the person primarily responsible for ensuring sufficient water in the household. If they shared responsibility, they were classified as not primarily responsible. Greater time spent collecting water is also positively associated with anger and conflict (Sultana 2011), so we controlled for a dichotomous variable that identified whether or not a household spent seven or more hours fetching water each week (Rosinger et al. 2020). We included site rurality (rural or not) and season of data collection (dry, rainy, or neither), though results do not enable us to conclusively determine whether dry season and distress are associated (since we do not have longitudinal observations across sites). We also included respondent's age and gender. Women tend to bear the burden of water insecurity (Geere and Cortobius 2017) and water-related emotional distress (Ennis-McMillan 2001; Stevenson et al. 2012; Wutich, Brewis, and Tsai 2020). To account for generalized stresses, we included scores from the four-item perceived stress scale (Cohen, Kamarck, and Mermelstein 1983), with higher scores indicating greater perceived stress.

## Data analysis

We estimated multilevel models that tested the relationship between independent variables—(1) household water giving (in Table 2) and (2) household water receiving (in Table 3)—and four dependent variables (shame, upset, anger, and conflict) using a two-level mixed-effects logistic regression (melogit) of households nested within sites. We then reestimated the mixed-effects logistic regression models presented in Tables 2 and 3, replacing the primary independent variable with the four-level categorical variable describing one's participation in both giving and receiving, adjusting for the same covariates (in Table 4). This last analysis was restricted to sites where information on both giving and receiving were collected.

We applied random intercepts for each site and used robust standard errors to account for clustering within sites. We considered statistical significance at 0.05 but relied also on odds ratios of each negative outcome as the measure of magnitude of effect for practical significance. We considered the outcome variables (shame, anger, upset, conflict) as an ordinal variable (never/rarely/sometimes/often/always) using mixed-effects ordered probit models to further understand if level of borrowing or receiving water was associated with higher probabilities of the reported distress and conflict. In post hoc sensitivity analyses, we reestimated our regression models with the additional covariate of perceived socioeconomic standing, as measured by the MacArthur ladder, to investigate whether socioeconomic status was an omitted variable, which could help explain the associations between water sharing and our outcomes. As results of these additional analyses were widely consistent but resulted in additional households being dropped due to missing data, we only present the main analyses.

## Results

### Water sharing: Frequent and widespread

Water-sharing practices occurred in all the surveyed sites, as previously documented (Rosinger et al. 2020). The proportion of households that reported giving water in the prior four weeks (Figure 1) ranged from 7.2 percent in Arua, Uganda, to 83.2 percent in Cartagena, Colombia. The proportion of households that reported receiving water ranged from 10.6 percent in Kathmandu, Nepal, to 88.3 percent in Punjab, Pakistan. In a separate analysis, we demonstrated that having data collected during the dry season was associated with higher levels of water borrowing compared to the rainy season (Rosinger et al. 2020).

### Giving water: More distress and conflict

Households that gave water in the last four weeks had higher odds of reporting shame (Odds ratio [OR] = 1.55; 95 percent confidence intervals [CI]: 1.07–2.27), upset (OR = 2.21, 95 percent CI: 1.50–3.26), and conflict (OR = 2.40, 95 percent CI: 1.68–3.44) than households that did not give water, adjusted for covariates (Table 2). Anger in the prior four weeks, however, did not meaningfully differ by having given water. Households reporting high- and middle-level unmet water need had higher odds of reporting shame, upset, anger, and conflict over water. Respondents who were solely responsible for water were less likely to report anger, upset, and conflict when adjusting for other covariates (including respondent gender). Those surveyed during the dry season were more likely to report shame. Rural respondents were less likely to report shame, but more likely to report anger. Perceived stress was associated with reports of shame over water, but not upset, anger, or conflict. Sensitivity analyses were consistent with the primary analyses (Supplemental Table 2).

### Receiving water: More distress and conflict

Compared to the results (point estimates) for giving water, receiving water was more strongly positively associated with reports of

**TABLE 2** Mixed-effect logistic regression models of the associations between loaning/giving water and shame, upset, anger, and conflict, across HWISE sites

| | Shame | Upset | Anger | Conflict |
|---|---|---|---|---|
| **Predictors** | **OR (95% CI)** | **OR (95% CI)** | **OR (95% CI)** | **OR (95% CI)** |
| Loaned/Gave Water (yes) | 1.55** | 2.21*** | 1.27 | 2.40*** |
| | (1.07–2.27) | (1.50–3.26) | (0.52–3.10) | (1.68–3.44) |
| Perceived stress (High) | 1.89*** | 1.29 | 1.04 | 1.27 |
| | (1.29–2.79) | (0.93–1.78) | (0.82–1.31) | (0.76–2.14) |
| Responsible for water (yes) | 0.90 | 0.58*** | 0.48*** | 0.73** |
| | (0.48–1.66) | (0.39–0.86) | (0.33–0.71) | (0.54–0.98) |
| Low unmet water need (Reference) | 1 | 1 | 1 | 1 |
| Middle unmet water need tercile | 4.27*** | 4.67*** | 2.50* | 2.35*** |
| | (1.99–9.16) | (2.87–7.59) | (0.99–6.31) | (1.31–4.20) |
| High unmet water need tercile | 8.37*** | 7.28*** | 6.74*** | 3.54*** |
| | (1.81–38.67) | (4.45–11.92) | (3.07–14.79) | (1.74–7.22) |
| Rural (yes) | 0.61*** | 0.77 | 1.58*** | 1.32 |
| | (0.47–0.77) | (0.50–1.19) | (1.41–1.79) | (0.93–1.88) |
| Time to collect water (High) | 1.16 | 1.48 | 0.75 | 1.03 |
| | (0.49–2.77) | (0.89–2.47) | (0.40–1.42) | (0.67–1.60) |
| Rainy season (Reference) | 1 | 1 | 1 | 1 |
| Dry season | 38.45*** | 1.02 | 1.77 | 1.26 |
| | (19.47–75.93) | (0.19–5.42) | (0.24–13.27) | (0.33–4.76) |
| Not rainy or dry season | – (No sites) | 2.17 | – (No sites) | 1.62 |
| | | (0.39–12.21) | | (0.82–3.21) |
| Age, years | 0.99 | 1.00 | 1.00 | 1.00 |
| | (0.98–1.01) | (1.00–1.01) | (0.98–1.02) | (0.99–1.01) |
| Gender, female | 1.21 | 1.08 | 1.32* | 1.09 |
| | (0.90–1.64) | (0.76–1.55) | (0.99–1.77) | (0.72–1.67) |
| Observations | 861 | 2,371 | 869 | 3,217 |
| Number of groups | 4 | 11 | 4 | 15 |

OR: Odds ratio; Robust 95% confidence intervals (CI) in parentheses.
***$p$ <0 .01, **$p$ < 0.05, *$p$ < 0.1.

shame (OR = 2.45, 95 percent CI: 1.66–3.60) and anger (OR = 1.43, 95 percent CI: 1.04–1.95) and similarly strongly associated with increased reports of being upset (OR = 2.16, 95 percent CI: 1.26–3.69), as well as slightly lower odds of conflict (OR = 2.05, 95 percent CI: 1.45–2.90) (Table 3). There were similar associations here with other covariates. Unmet water need was consistently associated with greater odds of reporting shame, upset, anger, and conflict. Respondents interviewed in the dry season were significantly more likely to report shame, and those responsible for water were significantly less likely to report upset. People with high perceived stress were significantly more likely to report shame and anger. People outside of rural areas were somewhat more likely to report upset (but not shame, anger, or conflict). Again, sensitivity analyses examining levels of water borrowing were consistent with the primary analyses (Supplemental Table 3).

## Neither giving nor receiving water: Less distress and conflict

The final analysis (Table 4) is largely consistent with the results presented in Tables 2 and 3, but provides additional insights. We find that 44.4 percent (n = 1,405) of households neither gave nor received water in the prior four weeks; 11.2 percent (n = 353) reported only giving water, not receiving; 18.0 percent (n = 570) reported only receiving water, not giving; and 26.4 percent (n = 836) reported both giving and receiving water. The regression results demonstrate that, compared to those households that neither gave nor received water from others, those that both gave and received water had higher odds of reporting shame (OR = 2.35, 95 percent CI: 1.39–3.95), upset (OR = 3.70, 95 percent CI: 2.29–6.00), and conflict (OR = 3.36, 95 percent CI: 2.05–5.53). In the conflict model, compared to those that neither gave nor received

**TABLE 3** Mixed effect logistic regression models of the associations between receiving/borrowing water and shame, upset, anger, and conflict, across HWISE sites

| | Shame | Upset | Anger | Conflict |
|---|---|---|---|---|
| **Predictors** | **OR (95% CI)** | **OR (95% CI)** | **OR (95% CI)** | **OR (95% CI)** |
| Received/borrowed water (yes) | 2.45*** | 2.16*** | 1.43** | 2.05*** |
| | (1.66–3.60) | (1.26–3.69) | (1.04–1.95) | (1.45–2.90) |
| Perceived stress (High) | 1.46*** | 1.30 | 1.42* | 1.07 |
| | (1.13–1.88) | (0.92–1.84) | (0.96–2.12) | (0.71–1.61) |
| Responsible for water (yes) | 1.13 | 0.57*** | 0.91 | 0.87 |
| | (0.81–1.56) | (0.38–0.84) | (0.52–1.59) | (0.64–1.18) |
| Low unmet water need (Reference) | 1 | 1 | 1 | 1 |
| Middle unmet water need tercile | 3.17*** | 4.52*** | 2.98*** | 2.30*** |
| | (1.79–5.60) | (2.88–7.11) | (1.61–5.53) | (1.46–3.62) |
| High unmet water need tercile | 6.58*** | 6.45*** | 6.40*** | 3.57*** |
| | (2.93–14.79) | (3.99–10.44) | (4.43–9.26) | (1.96–6.51) |
| Rural (yes) | 0.57 | 0.70* | 1.00 | 1.20* |
| | (0.27–1.21) | (0.46–1.06) | (0.43–2.34) | (0.97–1.48) |
| Time to collect water (High) | 1.38 | 1.42 | 1.05 | 1.11 |
| | (0.89–2.11) | (0.86–2.33) | (0.62–1.78) | (0.77–1.62) |
| Rainy season (Reference) | 1 | 1 | 1 | 1 |
| Dry season | 11.60*** | 0.92 | 2.26 | 1.64 |
| | (2.35–57.30) | (0.21–4.09) | (0.46–11.01) | (0.54–5.02) |
| Not rainy or dry season | 1.39 | 2.53 | 2.91*** | 1.70** |
| | (0.36–5.37) | (0.42–15.35) | (1.76–4.82) | (1.08–2.68) |
| Age, years | 0.99 | 1.01* | 1.00 | 1.00 |
| | (0.98–1.00) | (1.00–1.01) | (0.99–1.00) | (0.99–1.00) |
| Gender, female | 0.94 | 1.08 | 0.90 | 0.96 |
| | (0.54–1.65) | (0.77–1.51) | (0.71–1.13) | (0.68–1.37) |
| Observations | 1,928 | 2,362 | 1,940 | 4,267 |
| Number of Sites | 9 | 11 | 9 | 20 |

OR: Odds ratio; Robust 95% confidence intervals (CI) in parentheses.
***$p < .01$, **$p < .05$, *$p < .1$.

water from others, the three other categories (only giving, only receiving, gave and received) all had higher odds of conflict. Of note, those that only gave water (but did not receive it) had 2.7 times the odds (95 percent CI: 1.49–4.90) of reporting conflict than households that neither gave nor received water. Finally, compared to those that neither gave nor received water, those that only received water had twice the odds (OR = 2.02, 95 percent CI: 0.99–4.28) of anger. Again, the associations among covariates and the outcomes were similar to prior regression models.

## DISCUSSION AND CONCLUSIONS

We tested how household water giving ("loaning") and receiving ("borrowing") were associated with reports of shame, upset, anger, and conflict in a large cross-cultural sample. Across global sites, participation in water sharing—as givers and receivers—was associated with greater odds of reporting shame, upset, and conflict. Strikingly, people reporting that their household received water had 2.5 times the odds of reporting feeling water-related shame. Unexpectedly, households that gave water were estimated to have 1.5 times the odds of reporting shame compared to those that did not give water. Further, receiving (but not giving) water was associated with greater odds of reporting anger.

Importantly, these results suggest that water-sharing experiences in a large, diverse sample do not align well with classic reciprocity theories. One reason for this divergence could be that "water sharing" needs to be better theorized, with clarification on how water might align (or not) with the literature on food reciprocity and exchanges (Schnegg 2015, 2016), including sharing (Woodburn 1998) and demand

**TABLE 4** Mixed-effect nested logistic regression models of the associations between water-sharing categories and shame, upset, anger, and conflict

| | Shame | Upset | Anger | Conflict |
|---|---|---|---|---|
| **Predictors** | **OR (95% CI)** | **OR (95% CI)** | **OR (95% CI)** | **OR (95% CI)** |
| Neither loaned/gave nor received/borrowed water (Ref) | 1 | 1 | 1 | 1 |
| Only loaned/gave water | 0.89 | 1.30 | 1.01 | 2.70*** |
| | (0.31–2.55) | (0.89–1.90) | (0.60–1.69) | (1.49–4.90) |
| Only received/borrowed water | 1.62 | 1.25 | 2.02* | 1.85** |
| | (0.88–2.98) | (0.72–2.18) | (0.95–4.28) | (1.12–3.08) |
| Both loaned/gave and received/borrowed water | 2.35*** | 3.70*** | 1.60 | 3.36*** |
| | (1.39–3.95) | (2.29–6.00) | (0.73–3.50) | (2.05–5.53) |
| Perceived stress (High) | 1.66** | 1.33 | 1.06 | 1.23 |
| | (1.03–2.69) | (0.94–1.88) | (0.92–1.22) | (0.73–2.07) |
| Responsible for water (yes) | 1.00 | 0.57*** | 0.50*** | 0.75* |
| | (0.53–1.88) | (0.38–0.84) | (0.30–0.81) | (0.55–1.01) |
| Low unmet water need (Ref) | 1 | 1 | 1 | 1 |
| Middle unmet water need tercile | 4.18*** | 4.31*** | 2.28 | 2.22*** |
| | (1.75–10.02) | (2.62–7.07) | (0.82–6.35) | (1.26–3.91) |
| High unmet water need tercile | 7.54** | 6.59*** | 6.12*** | 3.16*** |
| | (1.47–38.68) | (4.06–10.69) | (3.21–11.65) | (1.53–6.53) |
| Rural (yes) | 0.61*** | 0.74 | 1.63*** | 1.25 |
| | (0.44–0.86) | (0.49–1.12) | (1.42–1.86) | (0.92–1.69) |
| Time to collect water (High) | 1.24 | 1.39 | 0.74 | 1.00 |
| | (0.45–3.47) | (0.85–2.29) | (0.40–1.38) | (0.66–1.51) |
| Rainy season (Ref) | 1 | 1 | 1 | 1 |
| Dry season | 32.96*** | 1.01 | 1.60 | 1.17 |
| | (17.88–60.74) | (0.19–5.34) | (0.26–9.91) | (0.33–4.16) |
| Not rainy or dry season | No sites | 2.33 | No sites | 1.59 |
| | | (0.39–13.79) | | (0.85–2.98) |
| Age | 0.99 | 1.01** | 1.00 | 1.00 |
| | (0.98–1.01) | (1.00–1.01) | (0.98–1.02) | (0.99–1.00) |
| Participant gender = 1, Female | 1.29** | 1.07 | 1.16 | 1.08 |
| | (1.04–1.61) | (0.75–1.53) | (0.81–1.67) | (0.71–1.64) |
| Observations | 829 | 2,348 | 837 | 3,164 |
| Number of groups | 4 | 11 | 4 | 15 |

Robust 95% confidence intervals in parentheses.
***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

sharing (Peterson 1993). That said, our findings do reflect trends documented in recent ethnographic research and suggest future directions for research on how water, reciprocity, and distress are linked.

First, "free riding"—when people request goods but reciprocate insufficiently—might explain distress and conflicts reported by givers and receivers and should be explored. Free riders are resented, punished, and expelled from reciprocal networks (Berman 2020; Bollig 1998; Ensminger 1996). Such actions can produce status loss and shame, which can culminate in anger and conflict (Berman 2020; Bollig 1998; Schnegg 2015). In our study, 70.5 percent of water borrowers did not plan repayment of any kind (Rosinger et al. 2020), but we cannot determine if this nonreciprocation was perceived as free riding. Furthermore, extant research does not explain why free riding might provoke distress and conflict around water sharing, specifically.

The literature on contemporary poverty may also help explain our findings. Deepening poverty, spurred by the withdrawal of state-backed social support in the 1970s–1990s, eroded once-strong sharing networks (González de la Rocha 2001; Moser 1997). When entire communities are impoverished and water-insecure, even active reciprocal economies cannot safeguard individual well-being through

risk-sharing and self-insurance (Wutich 2011). Instead, people are forced to rely on transfers secured through fleeting, weak, and disposable ties (Bähre 2007; Desmond 2012; Spiegel 2018). Such disposable ties may be formed hastily, used to gain resources, quickly broken, and characterized by anger, conflict, and shame.

Recent findings from water research support this. In urban Brazil, Jepson et al. (2021) found that water-insecure households were more likely to engage in infrequent water borrowing and suggest that households lacking active, long-standing sharing relationships had to resort to stressful water borrowing during a drought. In Ethiopia, Brewis et al. (2021) found that infrequent water sharing was associated with more depression/anxiety symptoms, while frequent water sharing was associated with better mental health outcomes. This recent work suggests that future research should examine more closely the nature of water-sharing relationships—including their duration, the frequency of sharing, the full range of resources exchanged, and the nature of reciprocity—to understand their association with distress and conflict.

It is particularly difficult to explain why people who *give* water are not more shielded—through increased prestige or social status—from distress and conflict. Recent research on sharing avoidance may provide insight. Berman (2020) explains that sharing avoidance is a cooperatively constructed act that makes refusing to give socially acceptable. In contexts of deepening poverty and widespread free riding, few opportunities may be available for people to construct socially acceptable refusals—resulting in pressure to give too much water, water of a low quality, or water to too many people. If so, givers who feel forced to share may be particularly vulnerable to distress and conflict. While this aligns with our findings—that more conflict is reported by givers who do not receive water—and Wutich's (2011; see also Jewell and Wutich 2011) findings in Bolivia, more research is needed to explore this phenomenon in a global context.

Finally, the value placed on a resource likely matters for understanding how sharing, conflict, and distress are linked. In food sharing, for example, shame is felt when someone shares a culturally devalued food (Hadley et al. 2012; Scheper-Hughes 1992). Cultural values placed on shared water are different from those placed on other resources (Beresford 2020; Wilson et al. 2019; Wutich and Beresford 2019). Unlike other commonly shared household resources (e.g., labor, food), water scarcity can quickly create life-threatening thirst and dehydration (Wutich and Brewis 2014). The cross-cultural belief that "water is life" (Hellum, Kameri-Mbote, and van Koppen 2015) suggests that water may be perceived as a *uniquely* precious resource (Beresford 2020). If so, water's unique value may make the stakes of water sharing higher than other forms of resource sharing—and may help explain its widespread association with distress and conflict.

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## SUPPORTING INFORMATION

Additional supporting information may be found in the online version of the article at the publisher's website.

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## APPENDIX

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