The social symbolism of water-conserving landscaping

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ABSTRACT

Three studies examined the symbolic and self-presentational meaning of low-water-use residential landscaping in a desert city in the southwestern United States. We hypothesized that owners' water-intensive or water-conserving landscape choices would be seen to convey very different characteristics. Data indicated that these two types of residential landscapes led to substantially different attributions about homeowners and also that potential homeowners could use landscapes to convey an array of characteristics to a social audience. In general, water-intensive landscapes led to more positive attributions than did water-conserving landscapes. The results support the idea that landscaping choice may be guided by self-presentational considerations, and that such considerations might influence the adoption of high- or low-water-use landscapes.

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1. Introduction

Each year worldwide demand for fresh water increases, while the sources of fresh water remain relatively constant (Gleick, 2002, 2010; Jackson et al., 2001; Oki & Kanae, 2006; Vörösmarty, Green, Salisbury, & Lammers, 2000). Conservation has been advocated as a method for both limiting the demand for water resources and avoiding the negative environmental consequences of excess consumption. Water conservation, for example, reduces the need for the development of new dams, reservoirs, and canals with attendant construction costs and destructive impacts on local ecosystems.

Some conservation efforts have focused on reducing residential water consumption. Because most residential water consumption occurs outside the home (Mayer & DeOreo, 1999, cited in Gober & Kirkwood, 2010), outdoor water use for landscaping is an important factor in water-reduction efforts. In the desert southwest of the United States, in particular, landscaping accounts for a significant amount of residential water use, and may be a crucial component of long-term plans for water-use reduction (Gober & Kirkwood, 2010; Wentz & Gober, 2007). An obstacle to conservation efforts, however, is that residents often prefer high-water-use landscaping to more water-conserving landscaping (e.g., Larsen & Harlan, 2006; Yabiku, Casagrande, & Farley-Metzger, 2008).

Our research explores the social significance of high- and low-water-use residential landscapes. In two initial studies we investigate the self-presentational consequences of landscape choice and explore whether landscape choice conveys the homeowner's status, personality, and demographic characteristics. In a third study participants were given specific self-presentational goals and were asked to choose between high-water-use and low-water-use landscapes.

1.1. Symbolism, self-presentation and conservation behavior

Despite landscaping's importance in the context of water conservation, little is known about the social symbolism or self-presentational value associated with residential landscaping. Symbolic interactionist theory (Blumer, 1969; Mead, 1934) suggests that people will act toward landscapes based on their interpretation of the meaning of landscape elements. Self-presentational theory (Baumeister, 1982; Goffman, 1959) emphasizes the importance of symbols as mediators of self-definition in relation to a social audience. Both symbolic interactionist and self-presentational theories assume that a person's possessions, territory, and residential environment can be thought of as symbols chosen to convey information about identity or character (c.f. Sadalla, Vershure, & Burroughs, 1987).

Although research on self-presentation has a rich history within psychology, a recent review concludes that self-presentation as it occurs in everyday contexts has been under-studied (Leary, Allen, & Terry, 2011). Research indicates that people

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express their personality through different areas of their personal space (e.g., office, bedroom), and others perceive personality based on cues evident in the space (Gosling, Craik, Martin, & Pryor, 2005; Gosling, Ko, Mannarelli, & Morris, 2002). Likewise, both theory and previous research indicate that self-presentation is an important determinant of the choices people make regarding design of home exteriors. People infer characteristics of others based on a home's interior and exterior appearance (Sadalla et al., 1987) and the materials used in construction (Ridoutt, Sueyoshi, Ball, Miyazaki, & Morikawa, 2005; Sadalla & Sheets, 1993). Several researchers have posited that one's front yard is an important and visible self-presentational symbol (Goffman, 1959; Larsen & Harlan, 2006), yet no research of which we are aware has specifically explored the self-presentational consequences of residential landscaping.

We examine the kind of information that landscapes communicate about homeowners with a focus on the consequences of choosing water-intensive versus water-conserving residential landscapes. One possibility is that compared to water-intensive landscaping, water-conserving residential landscaping will be seen to convey more positive and high status characteristics because this choice poses the opportunity to "conspicuously conserve" — that is, to make resource-conserving choices because they benefit others and thus convey altruism (Griskevicius, Tybur, & Van den Bergh, 2010). If this were the case, then people would view a homeowner choosing water-conserving landscaping more positively.

However, as Griskevicius et al. (2010) note, resource-conserving behaviors are not universally seen as opportunities to convey high status. For example, Sadalla and Krull (1995) found that some resource-conserving behaviors (e.g., using a clothesline, taking the bus, and recycling) communicated a host of undesirable personal traits including lowered status and lowered sexual attractiveness. Thus, water-conserving landscaping may be seen to convey *less* positive characteristics, particularly if it is not seen to provide an opportunity to display wealth or status.

Water-conserving landscaping may thus exact self-presentational costs including lowered status and the perception of undesirable personal traits. Economic modeling based on actual property records supports this possibility, as Phoenix, Arizona residents are willing to pay $17 more per month for a residence that has "green" (i.e., grass and trees, as opposed to desert) landscaping within a particular neighborhood, and will pay $116 more per month to live in a neighborhood that has this landscaping (Klaiber & Smith, 2011). Given this apparent preference, what does such high-water-use landscaping mean to residents of the desert southwest of the United States?

1.2. Project overview and hypotheses

We conducted three studies to examine the self-presentational value of low-water-use, xeric (i.e., desert-adapted plants and trees) and high-water-use, mesic (i.e, grass and non-native shrubs and trees) residential landscaping in a desert city in the United States. In the first two studies we evaluated the hypothesis that participants would infer differences in the status, personality, and demographic characteristics of a homeowner based on the homeowner's landscaping choice. In a third study participants were given a specific self-presentational goal and were asked to select a landscape type that would convey that impression to a social audience. Drawing from literature reviewed above, which demonstrates that resource-conserving behaviors are often perceived more negatively than resource-consuming behaviors, we hypothesized that low-water-use (xeric) landscaping would convey lower status and less positive attributions than high-water-use (mesic) landscaping.

Table 1
Measures of perceived decision maker characteristics.

Environmentalism	α = .89
tend(s) to save water/tend(s) to waste water	
environmentalist/non-environmentalist	
tend(s) to save energy/tend(s) to waste energy	
recycles/does (do) not recycle	
General positive evaluation	α = .87
good/bad	
pleasant/unpleasant	
likeable/unlikeable	
good neighbors/bad neighbors	
warm/cold	
Status/achievement orientation	α = .79
wealthy/poor	
educated/not educated	
high status/low status	
intelligent/unintelligent	
cultured/uncultured*	
Sexual attractiveness	α = .84
sexy/not sexy	
romantic/not romantic	
attractive/not attractive	
Masculinity	
masculine/feminine	
Family orientation	α = .78
have (has) children/don't (doesn't) have children	
like (likes) children/do not like (does not like) children	
family oriented/not family oriented	
Prosociality	α = .84
generous/stingy	
helpful/unhelpful	
kind/unkind	
volunteers/does not volunteer	
donates to charity/does not donate to charity	
Agreeableness	α = .46
critical/accepting	
quarrelsome/agreeable	
sympathetic/unsympathetic	
Creativity/openness	α = .81
artistic/non-artistic	
creative/uncreative	
open to new experience/closed to new experience	
prefers new things/prefers familiar things	
conventional/unconventional*	
complex/simple*	
Extraversion	α = .62
extraverted/reserved	
enthusiastic/unenthusiastic	
prefers to be alone/prefers to be with other people*	
Emotional Stability	α = .72
anxious/calm	
easily upset/emotionally stable	
moody/even-tempered	
Conscientiousness	α = .40
dependable/unreliable	
self-disciplined/un-self-disciplined	
disorganized/organized	
careless/deliberate	

Note: * Did not correlate well with other items, so not included in scale. The low reliabilities for agreeableness and conscientiousness are consistent with reliabilities for other, validated short measures of these constructs (e.g., Gosling et al., 2003).

2. Study 1

Study 1 examined perceptions of homeowners who choose different landscaping options. The study examined the perceived characteristics of a man, a woman, or a married couple who chose xeric or mesic landscaping.

2.1. Method

2.1.1. Participants
One hundred seventy-one students from a large university in the southwestern U.S. (110 men, 58 women, three did not indicate;

61% White, 15% non-White Hispanic, 7% Black, 5% Asian, 12% other race; $M_{age} = 19$, age range: 17–30 years) participated in exchange for course credit. Participants had lived an average of 8.1 years in the local environment (SD = 7.9 years, range: 0–28 years).

2.1.2. Design and procedure

The study had a 3 (Decision Maker: man, woman, married couple) × 2 (Landscaping: xeric, mesic) between-subjects design. Participants read the following description of the decision maker:

A [man, woman, married couple] moved into a neighborhood in the greater Phoenix area. In this neighborhood, the houses were all quite similar, but differed in their front yard landscaping. Half of the homes had typical desert landscaping with cacti and other desert plants, and half had typical grass landscaping with trees and shrubs. After thinking over [his, her, their] options, [he, she, they] realized [he, she, they] had a strong preference for [desert, grass] landscaping, so [he, she, they] bought a house with [desert, grass] landscaping in front.

Participants then rated decision makers on a variety of qualities (see Tables 1 and 2).

2.1.3. Measures

Participants rated decision makers on a variety of characteristics (Table 1) and on demographic measures (Table 2). The first set of measures was drawn from previous studies of environment and self-presentation (Sadalla & Krull, 1995; Sadalla & Sheets, 1993) with additional items adapted from a short measure of Big Five personality factors (Gosling, Rentfrow, & Swann, 2003). Personality psychologists have identified these five factors – Extraversion, Conscientiousness, Neuroticism/Emotional Stability, Agreeableness, and Creativity/Openness – as universal and basic dimensions of both personality and social perception (see John & Srivastava, 2001; Srivastava, 2010). We also measured perceived demographic characteristics including the decision maker's political orientation, religiosity, age, and race. Together, these measures represent a broad range of consequential dimensions of human social judgment.

2.2. Results

2.2.1. Perceived decision maker characteristics

Landscapes were found to convey a variety of homeowner characteristics. Substantial differences in attributions regarding status and personality traits strongly supported our initial hypothesis (Table 3). When the decision maker chose a high-water-use landscaping they were seen as higher in status, sexual attractiveness, family orientation, prosociality, and they received higher ratings on a general evaluation factor. Landscaping choice also significantly influenced ratings on four of the Big Five personality factors, with decision makers who chose mesic landscaping rated higher on Agreeableness, Creativity/Openness, Extraversion, and Conscientiousness.

Table 2
Measures of perceived decision maker demographics.

Political orientation (1 = *liberal*, 7 = *conservative*)
Religiosity (1 = *religious*, 7 = *not religious*)
Youth (1 = *young*, 7 = *old*)
Age (*under 20s, 20s, 30s, 40s, 50s, 60s, 70s, 80s or older*)
Race (*Caucasian/White, Hispanic or Latino, Black or African–American, Asian or Asian–American, American Indian or Alaska Native, Native-Hawaiian or Other Pacific Islander, Middle-Eastern, Multi-Racial, Other, Decline to Answer*)

Table 3
Study 1 ratings of decision maker characteristics based on landscaping choice.

Decision maker characteristic	M (SD)		F(1,169)	p	η_p^2
	Xeric	Mesic			
Environmentalism	**5.14 (1.18)**	4.24 (1.46)	19.65	<.001	.10
General positive evaluation	4.59 (.98)	**5.11 (.95)**	12.81	<.001	.07
Status	4.55 (.98)	**5.18 (.88)**	19.31	<.001	.10
Sexual attractiveness	3.94 (1.05)	**4.81 (1.04)**	29.37	<.001	.15
Masculinity[a]	**4.48 (1.41)**	3.91 (1.68)	5.71	.018	.03
Family orientation	3.82 (1.07)	**5.11 (1.11)**	59.49	<.001	.26
Prosociality	4.27 (.87)	**4.86 (.92)**	18.77	<.001	.10
Agreeableness	4.02 (.78)	**4.36 (.94)**	6.55	.011	.04
Creativity/openness	4.13 (1.05)	**4.60 (1.19)**	7.38	.007	.04
Extraversion	4.24 (1.18)	**4.84 (1.02)**	13.07	<.001	.07
Emotional stability	3.92 (.89)	4.14 (1.11)	2.13	.147	.01
Conscientiousness	4.42 (.72)	**4.67 (.77)**	4.75	.031	.03

Note: Bolded text indicates the significantly higher mean based on landscaping choice. Ratings were on a 7 point scale with higher numbers indicating higher levels of the trait.
[a] A significant interaction of decision maker and landscaping choice emerged for masculinity. See text for discussion.

To examine whether the patterns of ratings differed between the Landscaping and Decision Maker conditions, we conducted a MANOVA with Landscaping (xeric, mesic) and Decision Maker (man, woman, couple) as between-subjects factors. The analysis revealed a significant main effect of Landscaping, Roy's Largest Root $F(12,154) = 8.18$, $p < .001$, $\eta_p^2 = .39$, indicating that the patterns of ratings differed between the Landscaping conditions. There was also a main effect of Decision Maker, Roy's Largest Root $F(12,155) = 3.78$, $p < .001$, $\eta_p^2 = .23$, indicating that the patterns of ratings also differed among Decision Maker conditions. These main effects were qualified by a significant interaction between Landscaping and Decision Maker, Roy's Largest Root $F(12,155) = 4.53$, $p < .001$, $\eta_p^2 = .26$, which indicates that the effect of Landscaping on the pattern of person characteristics differed depending on the Decision Maker.

To understand the results of the MANOVA and examine the source of the difference in patterns between conditions, we separately examined each characteristic with a 2 (Landscaping: xeric, mesic) × 3 (Decision Maker: man, woman, couple) between-subjects ANOVA. This analysis allowed us to pinpoint which characteristics were differently affected by Landscaping, Decision Maker,[1] and the interaction of Landscaping × Decision Maker. The only trait with a significant interaction between Landscaping choice and Decision Maker was masculinity, $F(2,165) = 17.41$, $p < .001$, $\eta_p^2 = .17$. Pair-wise comparisons of Landscaping choice (mesic, xeric) within each type of Decision Maker (man, woman, couple) indicated that both couples and women were seen as more masculine when choosing desert landscaping (couple xeric: M = 4.35, SD = .88; mesic M = 3.06, SD = 1.64, $F(1,165) = 12.21$, $p = .001$, $\eta_p^2 = .07$; woman xeric M = 5.29, SD = 1.15; mesic M = 3.94, SD = , $F(1,165) = 14.16$, $p < .001$, $\eta_p^2 = .08$), but men were perceived as less masculine when choosing desert landscaping (xeric M = 3.88, SD = 1.60; mesic M = 5.29, SD = $F(1,165) = 13.14$, $p < .001$, $\eta_p^2 = .08$).

Because there were no significant interactions between Landscaping and Decision Maker for any of the other traits, and because

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[1] We found few main effects of Decision Maker across the studies. These are: In Study 1, creativity, $F(2,165) = 3.26$, $p = .04$, $\eta_p^2 = .04$; and extraversion, $F(2,165) = 4.31$, $p = .015$, $\eta_p^2 = .05$; and masculinity, $F(2,165) = 7.81$, $p = .001$, $\eta_p^2 = .09$; the pattern of means showed that the couple was perceived as more creative and extraverted, and less masculine, than either the man or woman. In Study 2, the only effect of Decision Maker was on perceived masculinity, $F(1,361) = 126.23$, $p < .001$, $\eta_p^2 = .26$, with the man perceived as more masculine than the woman.

main effects of Landscaping were our primary concern, we collapsed across Decision Makers for analyses of all other characteristics. All these traits were rated higher (more positively) for choosing a mesic landscape over a xeric landscape except for environmentalism, for which xeric landscaping was rated higher ($M = 5.14$, SD $= 1.18$) than mesic landscaping ($M = 4.24$, SD $= 1.46$), $F(1,165) = 22.64$, $p < .001$, $\eta_p^2 = .12$, and emotional stability, for which no significant difference emerged by Landscaping choice (See Table 3).

2.2.2. Perceived demographic characteristics of decision makers

For each of the demographic-variable judgments of the decision maker, we conducted separate ANOVAs to examine the effects of Landscaping and Decision Maker. For perceived political orientation, a significant interaction of Landscaping and Decision Maker emerged, $F(2,165) = 3.47$, $p = .034$, $\eta_p^2 = .04$. The interaction was driven by a significant difference within the male Decision Maker condition; men who chose mesic landscaping were seen as significantly less liberal ($M = 3.24$, SD $= 1.89$) than men who chose xeric ($M = 4.50$, SD $= 1.58$), $F(1,165) = 9.09$, $p = .003$, $\eta_p^2 = .05$. There were no significant differences for women or for couples.

There was a main effect of Landscaping choice on perceived religiosity, $F(1,165) = 15.53$, $p < .001$, $\eta_p^2 = .09$, with mesic landscaping conveying greater religiosity ($M = 4.74$, SD $= 1.24$) than xeric ($M = 4.04$, SD $= 1.29$). Most participants perceived the decision makers to be White (72%), and perceived race was not affected by Landscaping condition. Participants thus perceived decision makers who chose mesic landscaping to be significantly more religious, and, if the decision maker was male, less liberal than those who chose xeric landscaping.

2.3. Discussion

The results of Study 1 indicate that study participants make inferences about a homeowner's qualities based on landscaping choice. Importantly, choice of high-water-use landscapes generally conferred more positive ratings of homeowners, including perceptions of higher status.

The results of Study 1 naturally lead to questions concerning the psychological mechanisms involved. As discussed, one possible explanation of the pattern of results involves an association between status and general positivity, with higher status homeowners being perceived more positively. Indeed, high-water-use landscapes are more expensive to maintain and convey a higher home value than do low-water-use landscapes, perhaps signaling that such homeowners are higher in socioeconomic status (SES). Empirical studies have found that more affluent households use more water (Harlan, Yabiku, Larsen, & Brazel, 2009).

If status differences were equalized, the results may have differed, with other self-presentational consequences of landscaping disappearing. For example, Welte and Anastasio (2010) ran a modified replication of Sadalla and Krull (1995), in which they showed that two recycling behaviors (recycling and composting) conveyed no differences in status, or in other dimensions measured. They argue that these data suggest that conservation behavior may no longer convey lower status in the United States, given the current "green" zeitgeist. However, the behaviors they chose were both a) pretested to convey no income information, and b) were relatively private behaviors. In this sense, recycling and composting have little status communication value, either negatively or positively.

Other research has shown that landscaping can convey cultural and class information (Duncan, 1973), and that people make judgments of a community's status based on the exterior

appearance of those neighborhoods (O'Brien & Wilson, 2011). In Study 2 we explore the possibility that the pattern of results observed in the first study were the results of a halo effect of status.

3. Study 2

The procedures employed in this study are similar to those used in Study 1 except that we manipulated the status of the decision maker. We explored the null hypothesis that no differences between landscaping conditions will occur when status differences are equalized.

3.1. Method

3.1.1. Participants

Three hundred seventy-three students at a large university in the southwestern U.S. (210 women, 163 men, nine did not indicate; 65% White, 15% non-White Hispanic, 6% Black, 11% Asian, 3% other race; $M_{age} = 19.5$, age range: 18–29) participated in exchange for course credit. Participants had lived an average of 9.7 years in the local environment (SD $= 8$ years, range: 0–26 years).

3.1.2. Design and procedure

Study 2 had a 2 (Decision Maker: man, woman) × 2 (Landscaping: xeric, mesic) × 3 (Neighborhood SES: working class, middle class, upper class) between-subjects design. The method for Study 2 followed exactly that of Study 1, with a change in the scenario designed to specify the socioeconomic status of the decision maker.

> A [man, woman] decided to purchase a home in a [working, middle, upper] class neighborhood with [small, average-sized, large] houses in the greater Phoenix area. In this neighborhood, the houses were all quite similar, but differed in their front yard landscaping. Half of the homes had typical desert landscaping with cacti and other desert plants, and half had typical grass landscaping with trees and shrubs. After thinking over [his, her] options, [he, she] realized [he, she] had a strong preference for [desert, grass] landscaping, so [he, she] bought a house with [desert, grass] landscaping in front.

3.2. Results

3.2.1. Manipulation check

To assess the effectiveness of the status manipulation we compared rated status across the three status conditions. The means of the rated status for working class ($M = 4.59$, SD $= .88$), middle class ($M = 4.78$, SD $= .78$), and upper class ($M = 5.16$, SD $= .88$) were significantly different from one another, $F(2,374) = 14.61$, $p < .001$, $\eta_p^2 = .07$. Pairwise comparisons showed that upper class was rated as conveying significantly higher status than either working or middle class ($ps < .001$), but that middle class did not convey significantly higher status than working class ($p = .26$). Perhaps the fact that the decision maker was able to buy a home created a floor effect for the perceived status of the decision maker.

3.2.2. Perceived decision maker characteristics

A MANOVA revealed a main effect of Landscaping, which was qualified by a significant interaction between Landscaping and Neighborhood SES, Roy's Largest Root $F(12,351) = 2.11$, $p = .016$, $\eta_p^2 = .07$. To understand the interaction, we separately examined each characteristic with a 2 (Landscaping) × 3 (Neighborhood SES) between-subjects ANOVA. The only trait for which a significant

interaction emerged was Creativity/Openness, $F(2,367) = 3.59$, $p = .03$, $\eta_p^2 = .02$. Pairwise comparisons indicated that mesic landscaping conveyed greater Creativity/Openness than did xeric for working class neighborhoods (xeric M = 3.86, SD = 1.19; mesic M = 4.51, SD = 1.04, $F(1,367) = 9.71$, $p = .002$, $\eta_p^2 = .03$). No differences were found between Landscaping conditions for Creativity/Openness of homeowners in middle class neighborhoods (xeric: M = 3.89, SD = 1.14; mesic M = 4.24, SD = 1.07, $F(1,367) = 3.13$, $p = .08$, $\eta_p^2 = .01$) or upper class neighborhoods (xeric: M = 4.43, SD = 1.22; mesic: M = 4.29, SD = 1.17, $F < 1$).

For all other characteristics, the effects of desert versus grass landscapes did not depend on whether the neighborhood was working, middle, or upper class. Across the Neighborhood SES conditions, then, Landscaping choice produced consistent differences in homeowner ratings. Because the main effects of Landscaping were our primary concern, we collapsed across Neighborhood SES for analyses of all other characteristics. As in Study 1, the majority of traits were rated higher (more positively) when decision makers chose mesic landscaping over xeric landscaping. Decision makers who chose water-intensive landscapes were given higher ratings on the general evaluation dimensions, and were rated significantly higher on status, sexual attractiveness, family orientation, pro-sociality, Agreeableness, Creativity/Openness, and Extraversion. No differences between Landscaping conditions were found on the dimensions of Emotional Stability and Conscientiousness. Environmentalism was rated higher when decision makers chose xeric (M = 5.14, SD = 1.10) over mesic landscaping (M = 3.90, SD = 1.34), $F(1,367) = 93.43$, $p < .001$, $\eta_p^2 = .20$ (Table 4).

3.2.3. Perceived demographic characteristics of decision makers

As in Study 1, the type of residential landscaping chosen also influenced the perceived demographic characteristics of decision makers. We conducted a 2 (Landscaping) × 2 (Decision Maker) × 3 (Neighborhood SES) between-subjects ANOVA predicting each of the demographic variables. A main effect of Landscaping on perceived political orientation $F(1,359) = 10.37$, $p = .001$, $\eta_p^2 = .03$ emerged, with xeric landscaping conveying greater liberalism (M = 4.18, SD = 1.50) than mesic landscaping (M = 3.76, SD = 1.37). There were no significant effects of Decision Maker or Neighborhood SES on perceived liberalism – landscaping was thus seen as a more reliable cue of political orientation than was either the decision maker's sex or SES.

There was a significant interaction of Landscaping and Neighborhood SES, $F(1, 359) = 3.34$, $p = .036$, $\eta_p^2 = .02$, on perceived

Table 4
Study 2 ratings of decision maker characteristics based on landscaping choice.

Decision maker characteristic	M (SD)		F(1,371)	p	η_p^2
	Xeric	Mesic			
Environmentalism	**5.14 (1.10)**	3.90 (1.34)	93.44	<.001	.20
General positive evaluation	4.63 (.90)	**4.98 (.89)**	14.46	<.001	.04
Status	4.72 (.85)	**4.96 (.88)**	6.83	.009	.02
Sexual attractiveness	3.86 (.99)	**4.37 (.93)**	26.32	<.001	.07
Masculinity	**4.56 (1.41)**	4.01 (1.57)	12.57	<.001	.03
Family orientation	3.84 (1.19)	**4.92 (1.16)**	78.62	<.001	.18
Prosociality	4.28 (.84)	**4.58 (.74)**	13.57	<.001	.04
Agreeableness	4.08 (1.03)	4.27 (.85)	3.76	.053	.01
Creativity/openness[a]	4.03 (1.20)	**4.34 (1.10)**	6.86	.009	.02
Extraversion	3.91 (1.14)	**4.79 (.96)**	65.03	<.001	.15
Emotional stability	4.15 (.97)	4.20 (.95)	0.2	.65	.00
Conscientiousness	4.59 (.80)	4.73 (.87)	2.46	.12	.01

Note: Bolded indicates the significantly higher mean based on landscaping choice.
[a] A significant interaction of target SES and landscaping choice emerged for creativity. See text for discussion.

religiosity: When decision makers chose mesic landscaping, neighborhood status made no difference in perceived religiosity (working class M = 4.43, SD = 1.05, middle class M = 4.33, SD = 1.20, upper class M = 4.29, SD = 1.28, $F(2, 359) < 1$, $p = .85$, $\eta_p^2 = .001$), but for decision makers with xeric landscaping, Neighborhood SES did make a difference for perceived religiosity (working class M = 4.18, SD = 1.24, middle class M = 3.76, SD = 1.30, upper class M = 4.53, SD = 1.24, $F(2, 359) = 5.78$, $p = .003$, $\eta_p^2 = .03$). Most participants perceived the decision makers(s) to be White (69%) and perceived race was not affected by experimental condition. There was also a main effect of Landscaping choice on perceived decision maker youth, $F(1, 359) = 11.13$, $p = .016$, $\eta_p^2 = .02$, with xeric landscaping conveying a younger person (M = 3.75, SD = 1.44) than did mesic landscaping (M = 4.09, SD = 1.29). However, for numerical age, no main effects of Landscaping, or interaction of Landscaping and Decision Maker, emerged. Participants thus perceived that decision makers who chose xeric landscaping were younger, and depending on the Neighborhood SES, somewhat less religious than those who chose mesic landscaping.

3.3. Discussion

The results of Study 2 show that even when neighborhood status is equalized, differences between landscaping still emerge. Landscape type was again found to result in different inferences about the characteristics of the homeowner, no matter whether the home was in a working, middle, or upper SES neighborhood. The pattern of attributions was consistent with those found in Study 1. Interestingly, landscape type also led to inferences of status differences independent of neighborhood SES. Decision makers who chose mesic landscapes were rated as higher in status than were those who chose xeric landscapes.

4. Study 3

Studies 1 and 2 focused on the inferences that participants made about homeowners based on the homeowner's landscaping choices. Results were consistent with the hypothesis that people make inferences about others' personality, age, and political orientation based on their landscaping choice. Generally, xeric landscaping is seen to convey a less positive image than is grass landscaping. Given this, we predict that when people choose to convey particular impressions to others, they will favor the landscaping type that people infer to convey that image. In Study 3, we employed a more direct test of this prediction that landscaping can be used for self-presentational purposes. Participants were given an explicit self-presentational goal and were then asked to choose a landscape that would most effectively convey that characteristic to a social audience. This allowed us to directly test whether participants could consciously make a landscape choice to present themselves to others, and whether such choices would correspond to the attributions found in Studies 1 and 2.

4.1. Method

4.1.1. Participants

Participants completed a survey on Amazon Mturk (an online system for recruiting and paying participants; see Buhrmester, Kwang, & Gosling, 2011) and were paid from 35 to 50 cents. Only participants from the states of California, Utah, Nevada, Arizona, New Mexico, and Texas were included. There were 53 participants (17 men, 36 women; 70% White, 11% Hispanic, 8% African–

American, 11% other, multiple, or did not indicate race; $M_{age} = 33.3$, age range: 18—75).

4.1.2. Design and procedure

Participants completed a survey in which they indicated which landscaping option (mesic or xeric) they would choose if they were trying to convey a specified trait. Traits were presented in sets based on the scales used in Studies 1 and 2. For personality traits (Conscientiousness, Agreeableness, Openness, Extraversion, status, sexual attractiveness, prosociality, and general positivity) a category label plus three adjectives were presented as a set. For example, one item was "Which landscaping option would you choose if you wanted to convey conscientiousness (being dependable, self-disciplined, or organized)?" Other characteristics (environmentalism, family orientation, political conservatism, political liberalism, masculinity, femininity, religiousness, and youthfulness) were presented as items with single descriptors. The order of item presentation was counterbalanced. Landscaping choices were presented on a 7-point scale anchored at 1 ("Definitely desert landscaping with cacti and other desert plants") and 7 ("Definitely grass landscaping with trees and shrubs"). No labels were given for points 2 through 6. Participants also responded to several demographic measures.

4.2. Results

A response of 4, the midpoint on the scale, indicates that a person was no more likely to choose one landscaping option than the other to convey a specific characteristic. Values above 4 indicate a tendency to choose mesic landscaping, and below 4, a tendency to choose xeric landscaping. Our general analytic approach was to compare the landscaping choices people made to the midpoint of the scale, which represents no preference. We used one-sample t-tests to determine whether the mean of a given item differed significantly from 4.0.

4.2.1. Conveyed traits

In order to examine which landscaping choice a person would make if they were trying to convey a specified trait, we ran a series of one-sample t-tests comparing the mean of each trait to the midpoint of 4. Results are presented in Table 5.

Table 5
Study 3 landscaping choices to convey specific characteristics.

Decision maker characteristic	M	(SD)	t	df	
Environmentalism	**2.96**	(2.49)	−3.036	52	**
General positive evaluation	**4.63**	(1.82)	2.521	51	*
Status	**5.17**	(1.71)	4.99	52	***
Attractiveness	4.00	(1.65)	0	52	
Masculinity	**3.17**	(1.82)	−3.328	52	**
Femininity	**5.30**	(1.55)	6.109	52	***
Family orientation	**6.13**	(1.29)	12.064	52	***
Prosociality	**4.54**	(1.80)	2.159	51	*
Agreeableness	**4.75**	(1.66)	3.304	52	**
Openness	**3.32**	(2.16)	−2.294	52	**
Extraversion	**4.54**	(1.81)	2.146	51	**
Conscientiousness	4.28	(2.40)	0.86	52	
Political conservatism	**5.15**	(1.55)	5.409	52	***
Political liberalism	**3.13**	(1.47)	−4.248	51	***
Religiousness	**4.75**	(1.77)	3.096	52	**
Youthfulness	**4.62**	(2.02)	2.243	52	*

Note. Significant values are bolded and indicate a difference from the scale midpoint (4).
*p < .05.
**p < .01.
***p < .001.

The data indicate that participants were more likely to choose mesic landscaping if they were trying to convey family orientation, political conservatism, femininity, religiousness, youthfulness, Agreeableness, Extraversion, social status, prosociality, and a generally positive impression. Participants were more likely to choose xeric landscaping when they were trying to convey environmentalism, being politically liberal, masculinity, and Openness. Landscaping choices did not differ from the midpoint if participants were asked to convey Conscientiousness or sexual attractiveness.

4.3. Discussion

The results of Study 3 supported the hypothesis that residential landscapes can be used for self-presentational purposes. We found significant consensus among study participants regarding the landscapes that would be chosen to implement a broad range of self-presentational goals. Generally, the choices made in Study 3 conformed to the inferences and attributions found in the first two experiments. Consistent with Studies 1 and 2, in Study 3 high-water-use landscapes were selected to communicate higher social status, a more positive general impression, family orientation, political conservatism, femininity, religiousness, youthfulness, Agreeableness, Extraversion, and prosociality. Likewise, in Study 3 xeric landscaping was chosen to convey homeowner environmentalism. Although the results of Study 3 do not indicate that residential landscaping is, in fact, chosen for self-presentational purposes, they suggest that landscaping's symbolism would allow them to be used for such purposes.

5. General discussion

The three experiments described above suggest that the elements used in residential landscaping have broad symbolic and self-presentational significance. Our results indicate that high- and low-water-use landscapes differ in their social meaning and lead to different inferences about the homeowner's characteristics. Further, when asked to make a particular type of self-presentation, participants made choices that generally reflected the same inferences that others would make about their landscape choice. Taken together, the three studies indicate that when homeowners choose high- or low-water-use landscaping, their choices can have personal and social significance: Landscaping may be chosen not only for personal considerations such as function and aesthetics (e.g., Larson, Casagrande, Harlan, & Yabiku, 2009), but also for what it communicates about the homeowner.

In the studies described, high-water-use landscapes were consistently associated with more positive attributions than were low-water-use landscapes. A homeowner wishing to communicate higher status and positive qualities would tend to opt for landscapes consisting of grass, trees and other high water use plants. With the exception of environmentalism, low-water-use landscaping was associated with more negative homeowner characteristics. Self-presentational considerations may thus constitute a barrier to the adoption of low-water-use landscapes.

In addition to generally positive personal characteristics, our studies show that high-water-use landscapes are associated with a greater degree of family orientation. In a qualitative analyses of the study area (Phoenix, Arizona), Larson et al. (2009) report data that are consistent with this finding. In their study xeric landscaping was valued for its environmentally-friendly and ease-of-care qualities, while mesic was often preferred because it was seen as safer, and a better setting for families to play and interact. Such perceptions may also drive the consistent finding across our studies that mesic landscapes convey greater Extraversion.

People may not have direct access to the reasons they choose a particular landscaping type (e.g., Nolan, Schultz, Cialdini, Griskevicius, & Goldstein, 2008), and undoubtedly a number of factors influence their choice. Nonetheless, our results suggest that to the extent a person consciously or unconsciously wishes to convey status, family orientation, or a number of other positive attributes, they may be swayed toward choosing more water-intensive, mesic landscaping.

5.1. Sources of symbolic meaning

It should be noted that symbolic and self-presentational theories do not imply that the meaning of a given landscape, or landscape element, is invariant. The social meaning of residential landscaping should vary according to the individual, the house, the neighborhood, and the social context in which it is embedded.

Cultural approaches to the meaning of landscape elements emphasize that materials acquire different meanings in different historical, cultural, and economic contexts. Self-presentational and symbolic interactionist perspectives assume that the meaning of things is derived from, or arises out of, the social interaction that one has with others and the society (Blumer, 1969). These theories assert that social interaction involves the continuous interpretation of the activities of others. The symbolic meanings that become attached to objects, and which are used for interpreting the actions of others, are regarded as an arbitrary culturally-specific symbolic system. From this perspective, the self-presentational significance of landscape elements is arbitrary and can vary with changes in the culture. Such theories imply that public education campaigns, designed to change the symbolic meaning of mesic and xeric landscapes, could have substantial impacts on both self-presentation and the willingness to adopt water-conserving landscaping.

Evolutionary models, on the other hand, emphasize that there are inherited emotional and esthetic reactions to landscape elements that derive from functional considerations. These models suggest a non-arbitrary basis for symbolism that is tied to the biological requirements and perceptual capacities of the human species. Humans, for example, function best in environments where there is available fresh water and protection from the elements (refuge). Such considerations imply an innate esthetic preference for mesic landscapes. Empirical studies have supported biological models in finding that lush landscapes with water are judged to be more attractive than those that do not (e.g., Hartmann & Apaolaza-Ibanez, 2010).

Sadalla and Sheets (1993) found that building materials used in the construction of a home are commonly perceived to have characteristics that are used in self-presentation. Their studies support both evolutionary and cultural models of the process by which material acquires meaning. They found for example that wood (as a building material) was rated as warmer, more emotional, weaker, more tender, and more delicate than were brick or concrete block. Such descriptions are semantically related to a host of personality and self-presentational descriptors that were ascribed to homeowners who choose wood building materials. In a similar vein, xeric landscaping elements such as cacti or stone have different perceptual qualities (e.g., hard, prickly, uncomfortable) than do grass and shade trees (e.g., soft, inviting, protective), and these perceptual qualities may in turn be generalized to homeowners.

5.2. Landscaping, self-presentation, and actual water use

We designed the present research to clarify some of the psychological factors involved in residential landscaping with the ultimate goal of developing interventions that that might be used to promote water conservation. There are several caveats that should be considered with regard to the effect of mesic and xeric landscaping on water use. Martin (2008) found substantial variability in water use within both mesic and xeric types of landscaping. Simply promoting xeric landscaping may not be sufficient to curtail excessive water use because it is common for homeowners with low-water-intensive plants to overwater. In many cases technological improvements in irrigation systems may pay the greatest dividends for both types of landscaping (see also Endter-Wada, Kurtzman, Keenan, Kjelgren, & Neale, 2008). Nonetheless, both of these studies found that mesic landscaping consumed significantly more water, on average, than did xeric landscaping, suggesting that, coupled with technological improvements, choosing desert landscaping may save significant amounts of water for area residents. However, given the self-presentational costs of desert landscaping, it may be easier (in addition to more effective in terms of water conservation) to implement improvements in irrigation methods and technology, which are relatively invisible, than to hope to convert all landscaping to desert.

A second caveat is that large scale conversion to xeric landscaping may have unintended consequences. It has been pointed out that mesic landscaping provides the added benefit of reducing the urban heat island effect (Gober et al., 2010), suggesting yet another reason residents and policymakers may wish to focus on improving irrigation methods in addition to reducing the number of the most water-intensive plants.

5.3. Summary

Across three studies, mesic and xeric residential landscapes were found to be associated with different attributions about the personalities and demographic characteristics of homeowners. In general, water-intensive mesic landscapes lead to more consistently positive attributions than low-water-use xeric landscapes, although xeric landscaping conveys a greater environmental orientation. Our results support the idea that landscaping choice can communicate socially important impressions of the homeowner, and such considerations may be relevant to a homeowner's willingness to employ low-water-use landscapes for water conservation measures.

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