

Who is Abuzz about Bees? Explaining Residents' Attitudes in Phoenix, Arizona

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Research Gap and Goals

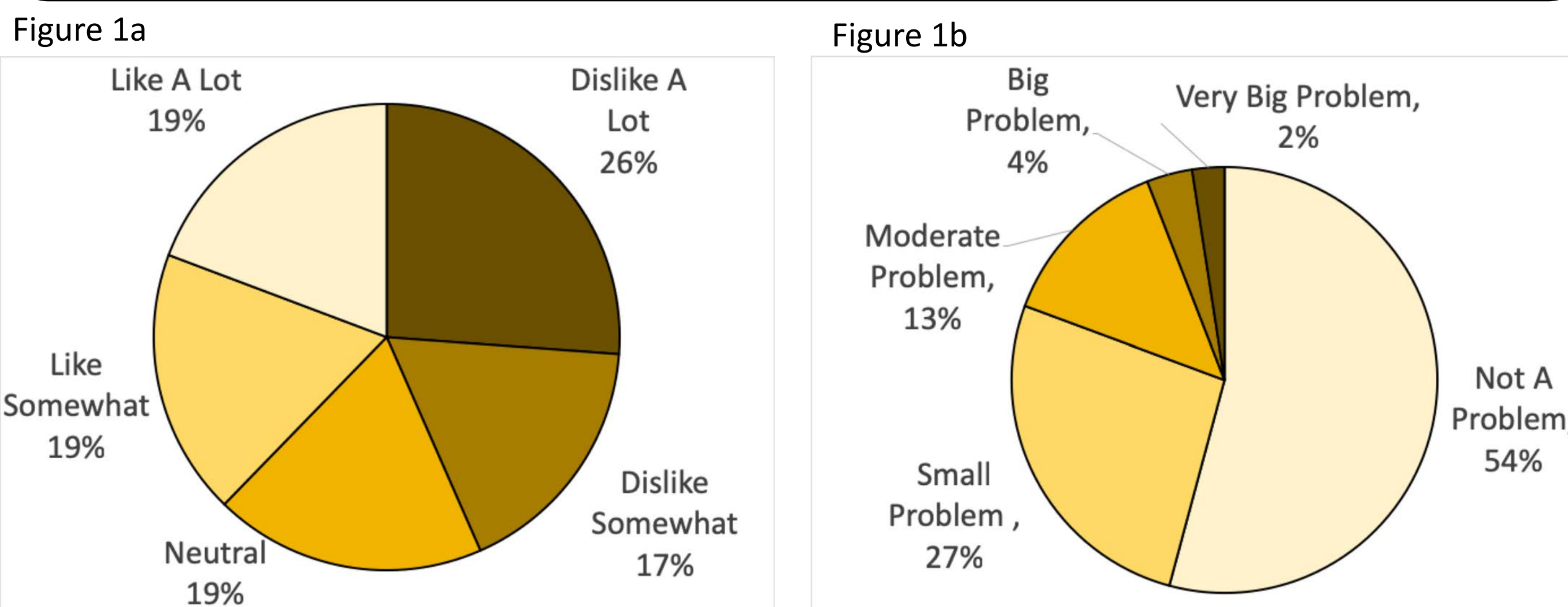
Bees provide essential ecosystem services, such as pollination of agricultural crops and the maintenance of biodiversity. The Sonoran Desert, which is home to the Phoenix metro region, boasts the greatest diversity of bee species worldwide. In general, few studies have focused on how people view and interact with bees. Therefore, we used survey data to explore attitudes and perceptions about bees in the Phoenix area, as well as how these relate to land management practices that potentially affect bees.

Our Research Questions

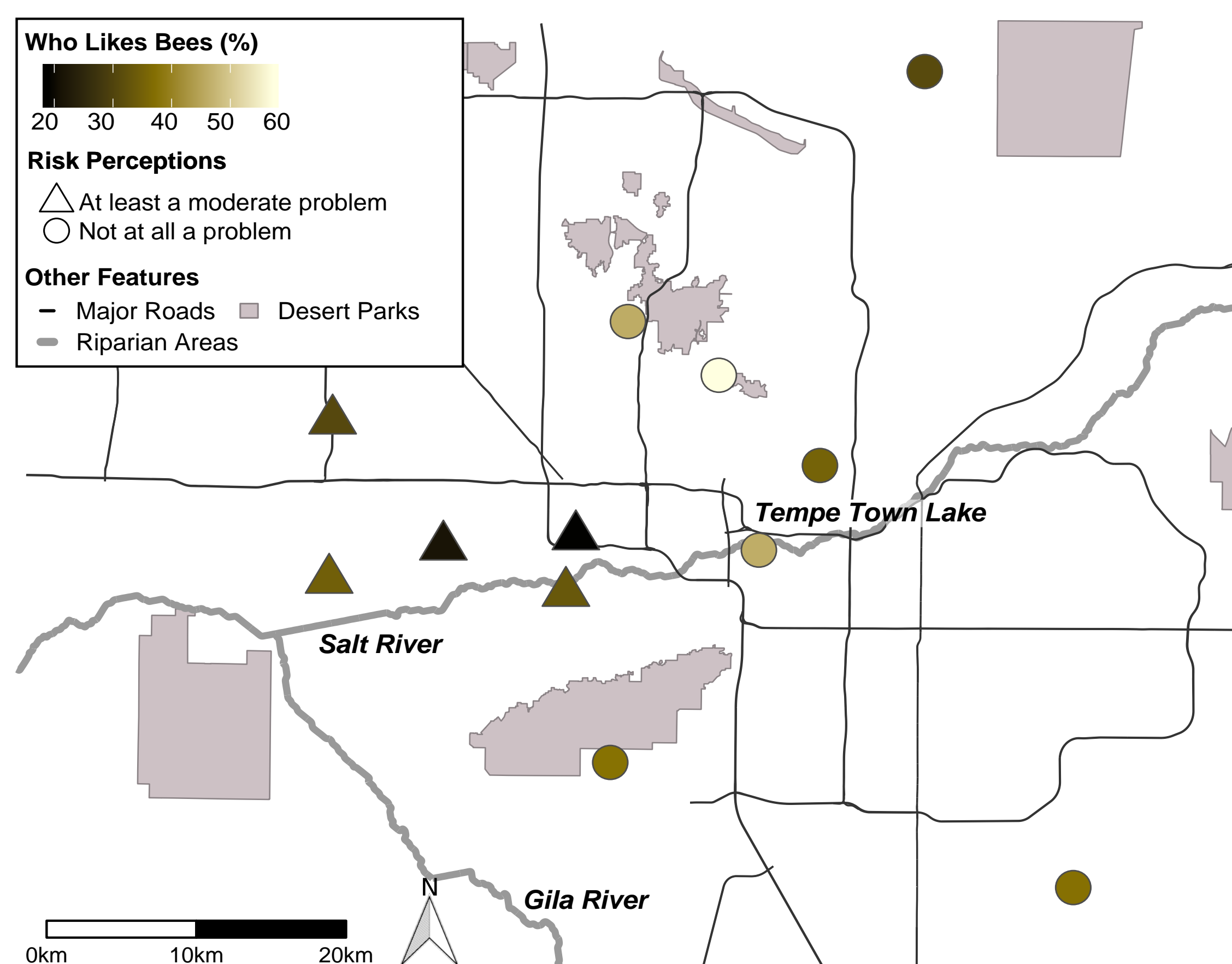
1. What cognitive, environmental, and social factors explain whether people like or dislike bees?
2. How do attitudes and perceptions about bees relate to land management practices, specifically landscaping choices, herbicide and pesticide use, and desert plantings?

Survey Methods & Response Rates

- Primary data source: 2016-17 Phoenix Area Social Survey (PASS). The response rate was 39.4%, yielding 496 respondents.
- Survey questions: **To what extent do you like or dislike bees?** (Figure 1a) & **To what extent are bees a problem in your home?** (Figure 1b)
- Analyses: 1) OLS regression models, and 2) ANOVA with Tukey's tests.



Attitudes across 12 Neighborhoods in Phoenix, AZ



1. Factors that Explain Residents Like of Bees

Cognitive Factors	Environmental Factors	Social Factors
Values and specific beliefs that influence attitudes about bees	Human experience and geographical location, such as proximity to parks, that influence attitudes about bees	Demographic attributes such as gender, age, income, and ethnicity

- Perceived bee risks most significantly explained a dislike of bees. Bee attitude and perception variables share 38% of the variance.
- Residents who live closer to desert parks expressed a stronger like of bees.
- Possessing pro-ecological worldviews, as well as cat and dog ownership, influenced a stronger like of bees.

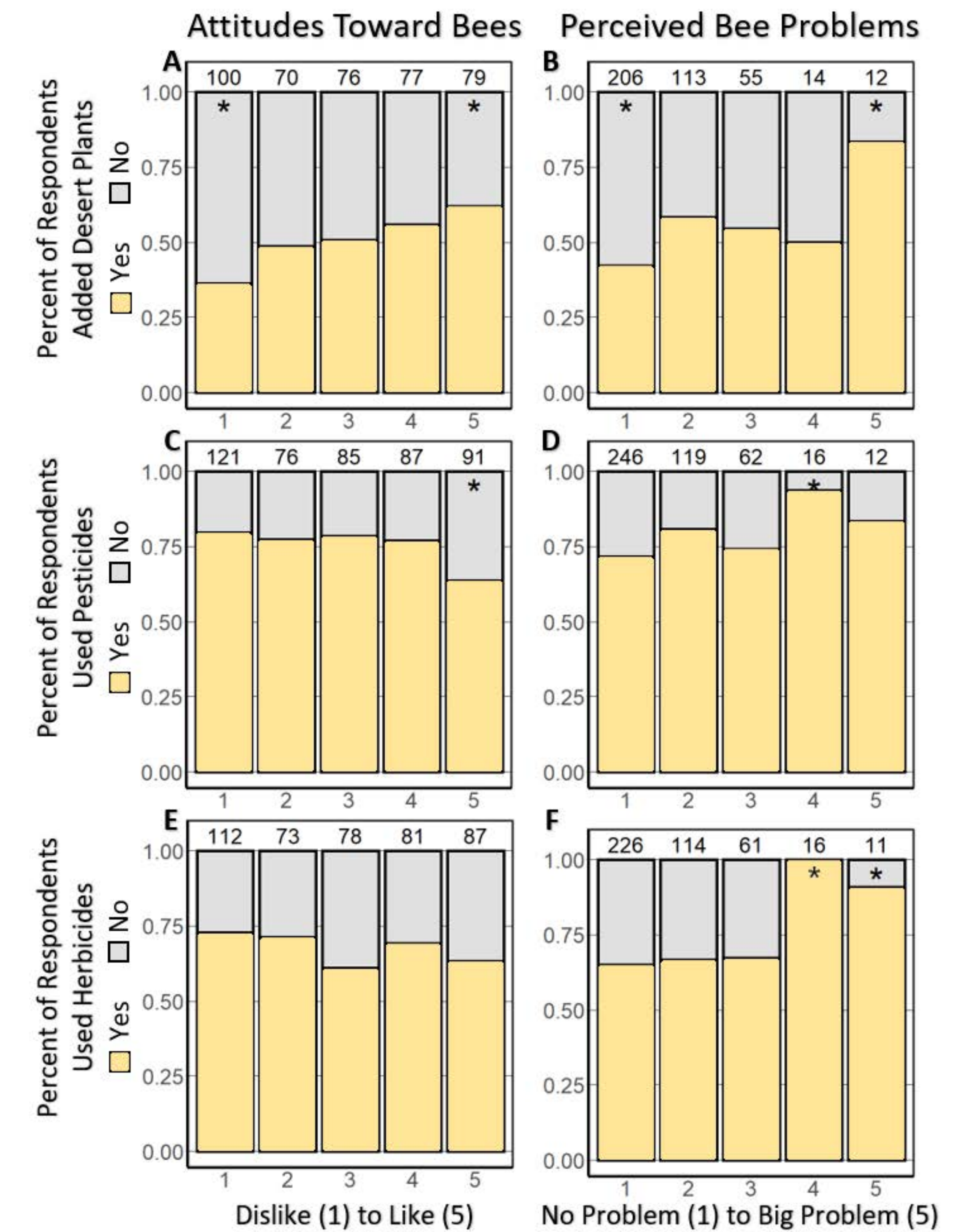
Explanatory Variables	Unstandardized Coefficients		Standardized Coefficients
	B	Std. Error	Beta
(Constant)	2.42	0.74	
Pro-ecological worldviews	0.28	0.10	0.13*
Perceived bee problems ¹	-0.48	0.07	-0.32*
Distance to desert parks (km)	-0.04	0.17	-1.18*
Fringe/exurban location ²	-0.07	0.08	-0.04***
Pool	-0.25	0.14	-0.09**
Age	0.01	0.00	0.09**
Latinx/Hispanic ¹	-0.30	0.18	-0.09**
Women ¹	-0.23	0.13	-0.08**
Education	0.07	0.06	0.05***
Income	-0.01	0.02	-0.03***
Dogs	0.44	0.13	0.15*
Cats	0.36	0.15	0.10*

*p<0.10, **p<0.05, and ***p<0.01

¹When the perceived risks from bees variable is dropped from the model, Latinx/Hispanic ethnicity (t=-2.41, p=0.016) and women (t=-2.17, p=0.031) are significant at the p < 0.05 level. The in/significance of all other variables remain the same.

2. Linkages among Attitudes & Landscaping Practices

- Residents who have added desert plants to their yard in recent years liked bees and did not see them as problematic compared to those who have not added desert plants.
- Residents who utilize pesticides dislike bees more than non-users.
- No significant difference in attitudes related to herbicide use.
- Landscaping preferences and yard types were not significantly associated with any yard practices.



*Asterisks indicate that the corresponding attitude/perception score has a significantly different use/disuse of the particular practice compared to the group response rate (ANOVA with Tukey's HSD, p < 0.05). The numbers at the top of each bar are the samples sizes (n) for each response category.

Conclusion & Next Steps

- Overall, residents hold neutral to slightly negative attitudes toward bees.
- Most people do not perceive bees to be a problem at their homes.
- The addition of floral resources in areas where attitudes are positive (e.g., near desert preserves) could enhance conservation efforts.
- Provisioning of bee habitats in areas where pesticides are used is not recommended.
- More research on public attitudes and perceptions about wildlife is needed, especially for understudied arthropods such as bees.

