

# Interpersonal Dynamics of Residential Solar Adoption

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8%

Of U.S. homeowners have  
adopted rooftop solar



# MISMATCH

## CURRENT PRACTICE



or



## REALITY



**72%** Of U.S. households are multi-occupant (U.S. Census Bureau, 2023)





# Study goals



## Characterize

interpersonal dynamics  
underlying residential solar panel  
adoption



## Examine

impacts of these dynamics on  
residential solar adoption  
decisions





# Studies

1. Interviews with couples
2. Survey of “lost” rooftop solar customers
3. Survey of current rooftop solar adopters

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# STUDY I METHODS



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**Procedure:** Zoom interviews

**Participants:** N=39 co-habiting couples

- Mean age = 49 years (SD=12.6)
- Gender: 40 women, 37 men, 1 nonbinary
- Education: 56% bachelors+
- Political affiliation: moderate (mean=3.75, range 1-7)
- Race: 90% Caucasian, 5% Asian, 2% African American
- \*Median household income: \$90,000-\$99,000
- \*Solar adoption stage
  - 69% still deciding (n=27)
  - 18% adopted (n=7)
  - 13% declined to adopt (n=5)

\*household-level variable, else individual-level

## STUDY I RESULTS



2.35 years  
(1.98)

Mean  
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2.2/month  
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1.79 (0.86)

Did one  
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1=definitely more unilateral  
2=somewhat more unilateral  
3=roughly equal

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1.79 (0.86)

Did one  
person play a  
more  
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1.63 (0.85)

Did one  
person  
tend to  
initiate  
discussions?

1=definitely more unilateral  
2=somewhat more unilateral  
3=roughly equal

## STUDY I RESULTS



The more solar pursuit was bilateral (vs. unilateral),  
the more likely couple was to:

- × Apply for and/or obtain permits,  $\chi^2_{(3)} = 8.182, p < 0.05$
- × Adopt,  $\chi^2_{(6)} = 14.54, p < 0.03$



# Studies

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## STUDY 2 METHODS

**Participants:** N=270 “lost” solar customers who had done one or more with regards to rooftop solar:

1. Contacted an industry representative to discuss (82%)
2. Had home inspected for suitability (16%)
3. Applied for and/or obtained permits (2%)

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## STUDY 3 METHODS

**Participants:** N=121 rooftop solar adopters

## BOTH

Recruited from prolific  
Resided w/others  
Qualtrics survey

# STUDIES 2 & 3 PARTICIPANTS

	Study 2 (lost)	Study 3 (current)
Mean age in years (SD)	41.6 (12.5)	43.3 (13.1)
Gender (% women)	43%	36%
Education (% bachelor's+)	65%	73%
Political affiliation (1= very liberal, 7=very conservative)	3.23	3.16
Median household income	\$80k-90k	\$90k-100k
Community type		
Suburban	59%	65%
Urban	17%	20%
Rural	22%	14%
Mean occupancy (SD)	2.51 (1.26)	3.07 (1.68)

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# STUDIES 2 & 3 MEASURES

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For each household member...

- × To what extent did each person tend to **initiate discussions?** (1=not at all, 5=a great deal)
- × To what extent has each person **executed tasks** in the interest of adopting solar for your household? (1=not at all, 5=a great deal) – e.g., set up appointments, examine finances
- × To what extent did each person **influence** the decision whether or not to adopt rooftop solar at your current residence? (1=not at all, 5=a great deal)
- × How has each person influenced the decision to adopt rooftop solar at your current residence? (**Valence**; 1=very negatively, 7=very positively)

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- × To what extent did each person **influence** the decision whether or not to adopt rooftop solar at your current residence? (1=not at all, 5=a great deal)
- × How has each person influenced the decision to adopt rooftop solar at your current residence? (**Valence**; 1=very negatively, 7=very positively)
- × Created new variables:
  1. Weighted mean household-level valence
  2. (dis)agreement: SD weighted household valence<sup>6</sup>



## Study 2: Lost customer dynamics

	Self	Partner	Parent	Child	Sibling	Other Family	Non-family
<b>% with this person</b>	<b>100%</b>	<b>80%</b>	<b>33%</b>	<b>11%</b>	<b>15%</b>	<b>19%</b>	<b>16%</b>
To what extent did each person tend to <b>initiate discussions</b>	3.55 (1.27)	2.86 (1.36)	2.70 (1.22)	2.56 (1.26)	3.00 (1.16)	3.17 (1.46)	2.94 (1.48)
To what extent has each person <b>executed tasks</b> in the interest of adopting solar for your household	3.55 (1.22)	2.77 (1.32)	2.36 (1.36)	1.96 (1.21)	2.47 (0.98)	2.86 (1.30)	2.55 (1.19)
To what extent did each person <b>influence the decision</b> whether or not to adopt rooftop solar at your current residence	3.95 (1.20)	3.36 (1.26)	3.21 (1.33)	2.38 (1.42)	3.16 (1.04)	2.93 (1.22)	3.18 (1.40)
<b>Valence:</b> How has each person influenced the decision to adopt rooftop solar at your current residence (1= <i>v. neg</i> -7= <i>v. pos</i> )	5.08 (1.69)	4.77 (1.62)	4.39 (1.70)	5.00 (1.44)	4.97 (1.84)	5.00 (1.82)	4.68 (2.10)

# Study 3: Adopter dynamics

	Self	Partner	Parent	Child	Sibling	Other Family	Non-family
<b>% with this person</b>	<b>100%</b>	<b>79%</b>	<b>48%</b>	<b>9%</b>	<b>23%</b>	<b>23%</b>	<b>42%</b>
To what extent did each person tend to <b>initiate discussions</b>	3.90 (1.20)	3.70 (1.35)	3.43 (1.31)	3.88 (0.83)	2.82 (1.47)	3.24 (1.55)	2.31 (1.45)
To what extent has each person <b>executed tasks</b> in the interest of adopting solar for your household	3.92 (1.30)	3.67 (1.41)	3.43 (1.46)	3.63 (1.30)	2.33 (1.11)	2.84 (1.38)	2.37 (1.42)
To what extent did each person <b>influence the decision</b> whether or not to adopt rooftop solar at your current residence	4.13 (1.17)	3.77 (1.37)	3.49 (1.28)	3.33 (1.12)	2.63 (1.13)	3.33 (1.15)	1.93 (1.19)
<b>Valence:</b> How has each person influenced the decision to adopt rooftop solar at your current residence (1= <i>v. neg</i> -7= <i>v. pos</i> )	6.34 (0.92)	4.31 (0.97)	3.74 (1.13)	4.00 (0.67)	3.47 (1.07)	3.57 (1.16)	3.41 (1.28)

# STUDIES 2 & 3 RESULTS

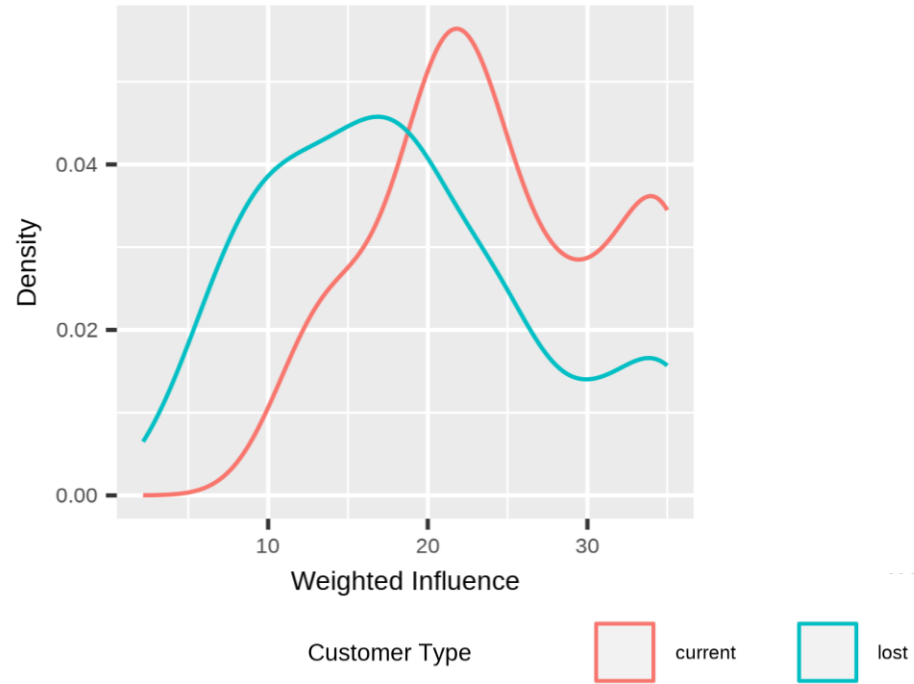


	Estimate	SE	z
intercept	-7.04	1.02	-6.93***
Initiate discussion	-0.06	0.22	-0.25
Execute tasks	0.35	0.23	1.53
Weighted valence	0.12	0.03	4.65***
(dis)agreement	0.16	0.03	5.81***
Occupancy	0.40	0.10	3.97***
Income	0.02	0.05	0.52

\* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.0001$

McFadden pseudo- $R^2 = 0.22$

# STUDIES 2 & 3 RESULTS



# What does it all mean?

- Among couples...
  - Solar pursuit tends to be more unilateral than bilateral
  - *but bilateral support* → *(more actions taken towards) adoption*
- In multi-occupant adopter (vs. lost customer) households...
  - More household-wide support for solar (weighted)
  - More disagreement
  - Holds controlling for occupancy, income, discussing solar, tasks
- Limitations: single reporter, generalizability, non-causal design

# Thank you



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