Understanding Consumer Preferences and Demand for Ornamental Plants

Presented by

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Ornamental Horticulture Pollinator Workshop

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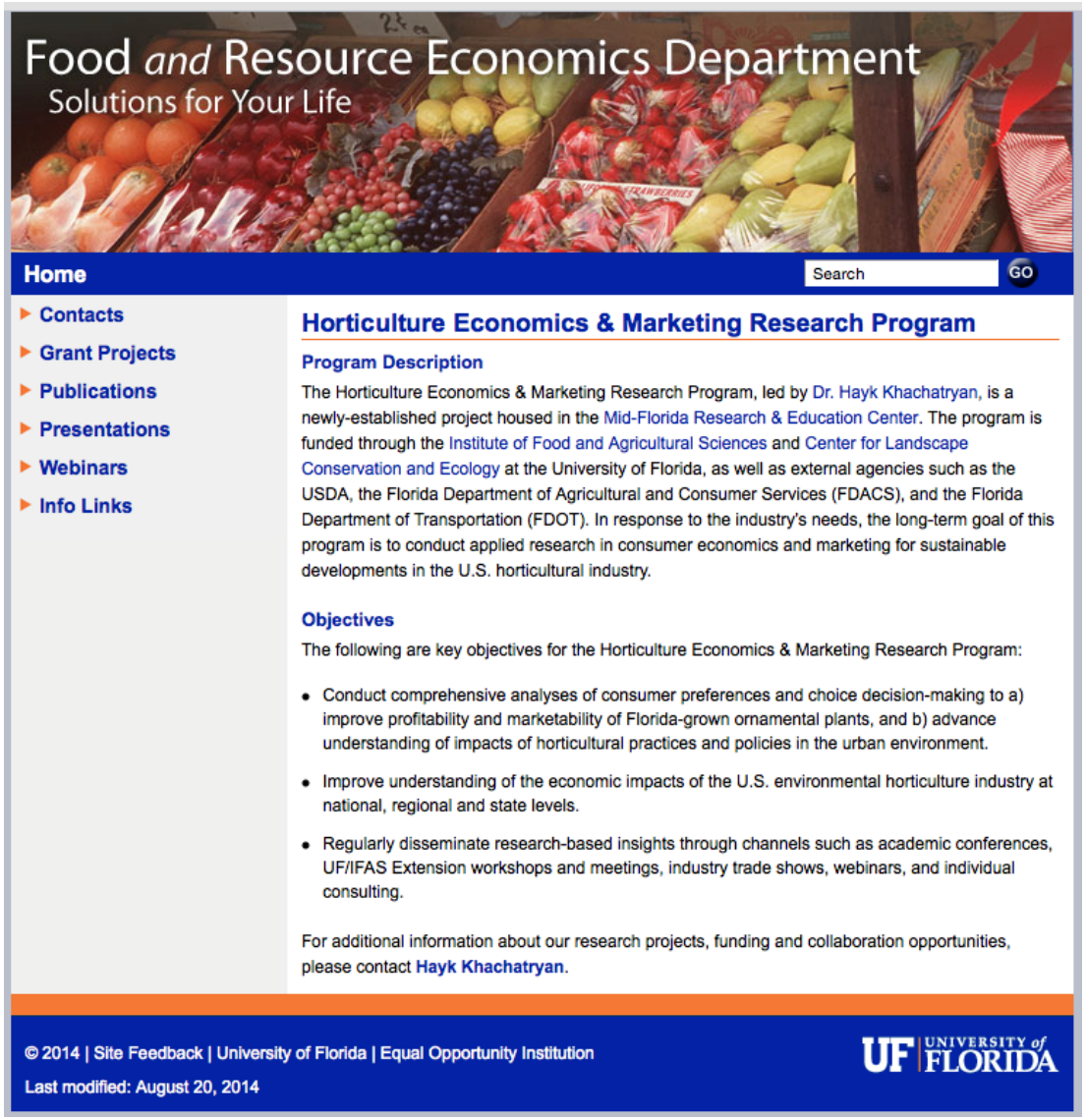
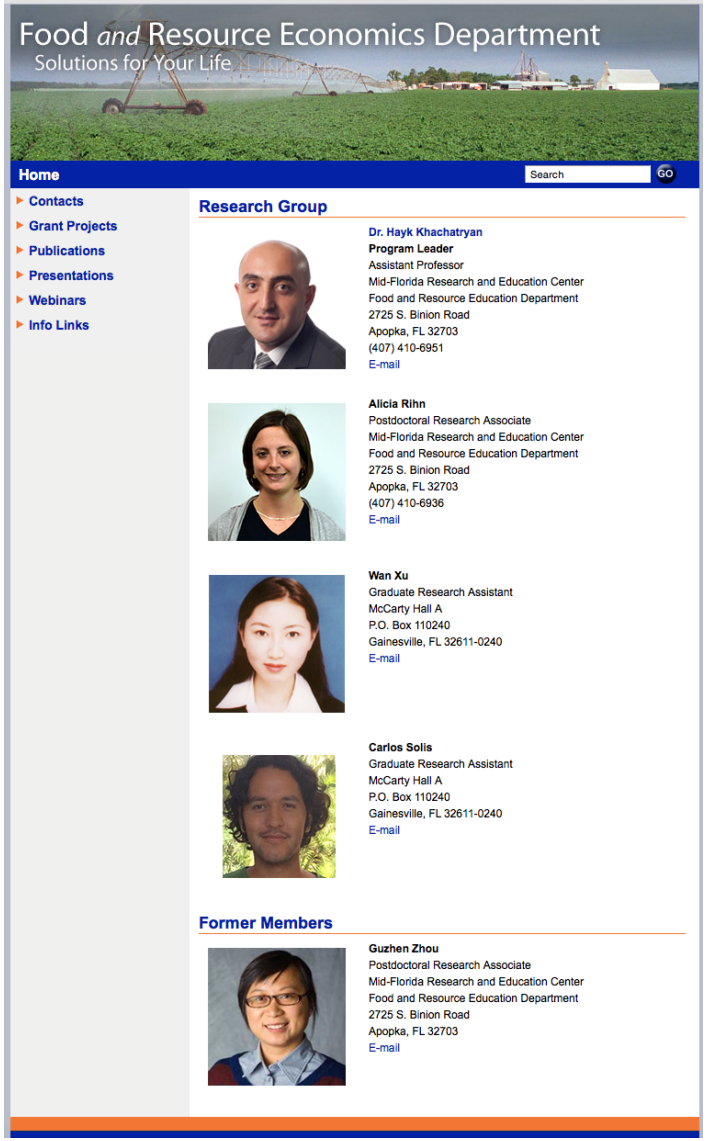
Horticulture Economics and Marketing Research Program





Acknowledgment

Collaborators

- Charles Hall, Texas A&M University
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- Jennifer Dennis, Purdue University

Current Grant Projects

- Environmental and Economic Incentives for Sustainable Residential Landscaping Practices in Florida (UF/IFAS CLCE)
- Promoting Florida-Grown Ornamental Plant Sales through Smart Labels and Targeted Advertising Strategies (FDACS)
- Economic Analysis of Greenhouse Citrus Production (FDACS)
- Economic Analysis of Pest (Chilli Thrips) Management in Ornamental Nursery Production (USDA NIFA)
- Investigation of Economic Impacts of Florida's Highway Beautification Program (FDOT)
- The Role of Plant Brands in Consumer Preferences for Plants and their Perceptions of Plant Quality (USDA FSMIP)

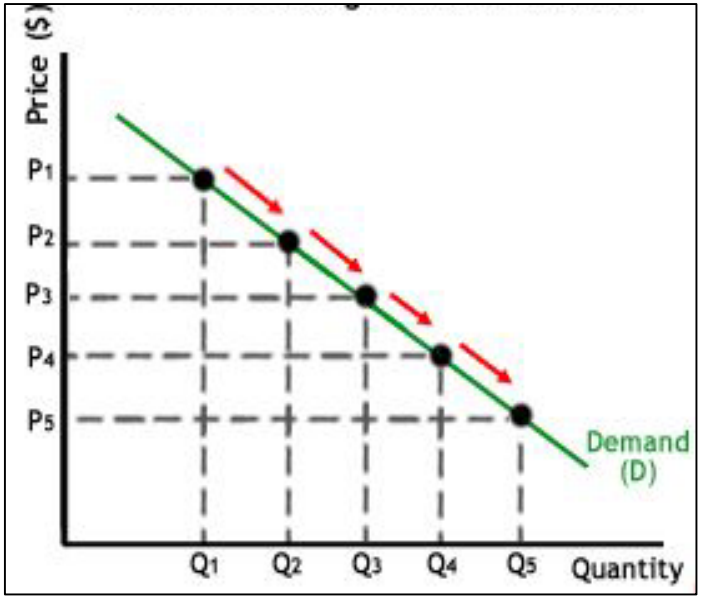
Major Factors Affecting the Economics of Ornamental Horticulture Industry

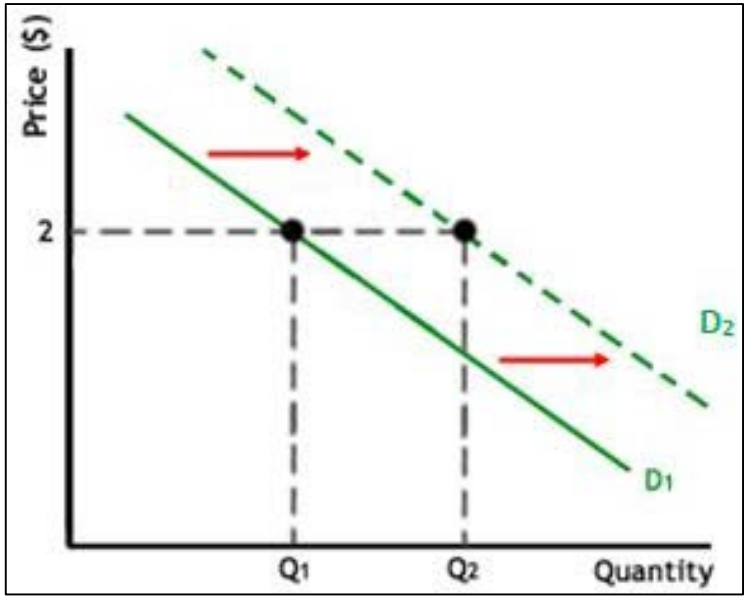
- Production costs
  - Input costs
  - Tech. innovation
  - Economies of scale/scope
- Market Demand
  - Tastes/Preferences
  - Marketing campaigns/Ads
  - Income/responsiveness to price changes
- Competition
  - Domestic/Int'l

My research focus - understanding product- and consumer-specific factors that influence preferences and demand for ornamental plants.

Steps in Consumer Decision-Making

Understanding Determinants of Demand: Movement along Demand Curve vs. Shifters





Movement along the demand curve: Caused by change in price

Shift in demand: Caused by changes in tastes and preferences, income, population/demographic changes, expectations, price and availability of substitute goods/services, etc.

Potential effects of pollinator-friendly labeling

U.S. retailers look to limit pesticides to help honeybees

BY **CAREY GILLAM**

Wed Jun 25, 2014 3:19pm EDT

RELATED TOPICS

Environment »

(Reuters) - Home Depot and other U.S. companies are working to eliminate or limit use of a type of pesticide suspected of helping cause dramatic declines in honeybee populations needed to pollinate key American crops, officials said on Wednesday.

The moves include requiring suppliers to label any plants treated with neonicotinoid, or neonic, pesticides sold through home and garden stores.

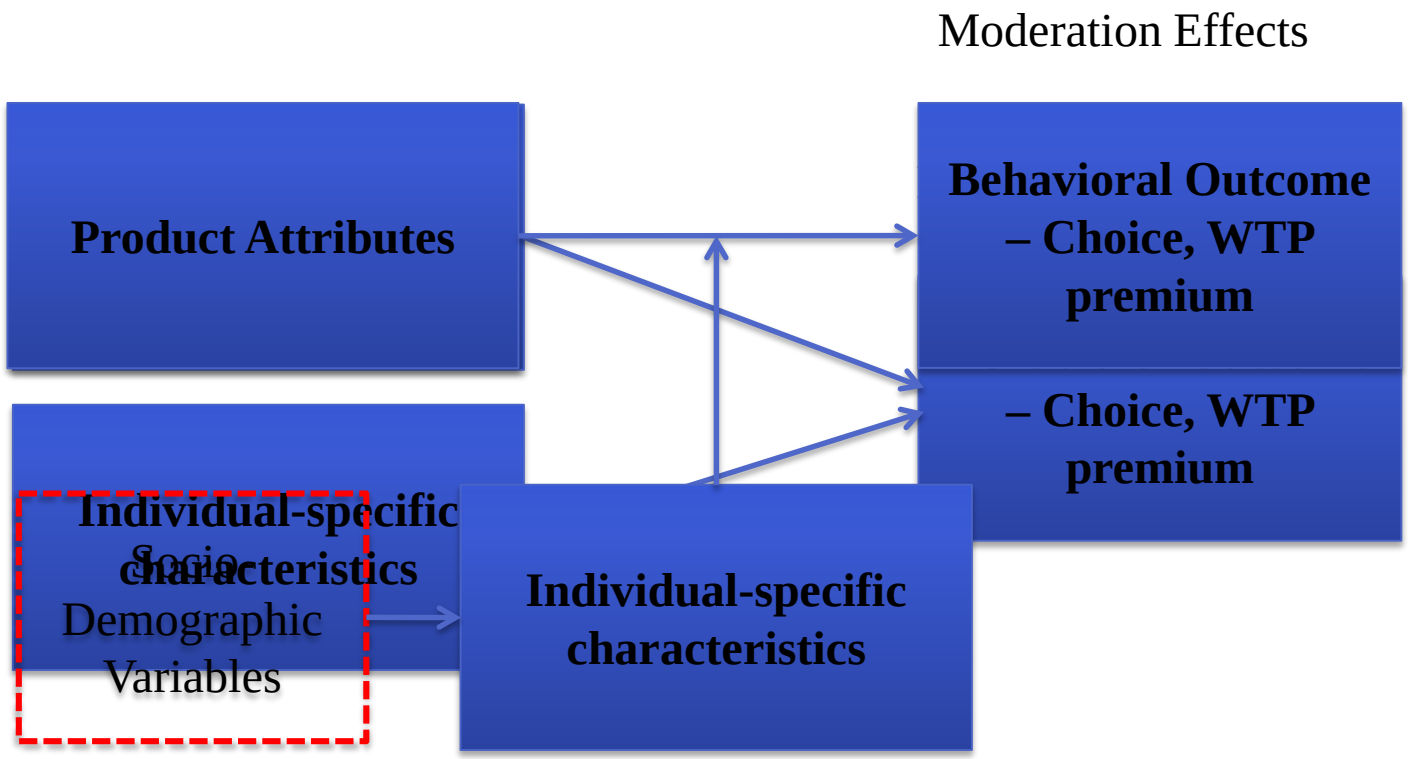
Atlanta-based Home Depot, the world's largest home improvement retailer, is requiring its suppliers to start such labeling by the fourth quarter of this year, said Ron Jarvis, the company's vice president of merchandising/sustainability. Home Depot is also running tests in several states to see if suppliers can eliminate neonics in their plant production without hurting plant health, he said.

Demand for Ornamental Plants is Elastic: Consumers are highly price-sensitive

- A 10% increase in prices leads to:

Perennials	Price elasticity estimates	% decrease in quantity demanded		Annuals	Price elasticity estimates	% decrease in quantity demanded
Coreopsis	1.13	11.35%		**Impatiens**	2.54	25.42%
Mums	1.15	11.45%		**Begonia**	1.32	13.20%
Daylily	1.19	11.89%		**Geranium**	1.31	13.11%
Hosta	1.25	12.54%		**Pansy**	1.17	11.72%
African violet	1.16	11.58%		**Marigold**	1.30	13.01%

Attributes, Individual Characteristics and Outcomes



Environmental Concerns (ECs) and Preferences for Plant Attributes

Objectives:

- To investigate the effects of ECs on the WTP for environmentally friendly attributes.
- To calculate the WTP estimates by egoistic, altruistic, and biospheric orientations of the EC scale.
- Data: Online survey; N=2500

Experimental Design

- Attributes and levels used in the choice scenario part of questionnaire

Plant Attributes	Levels	Base Level
1. Production Methods	Sustainable, Energy-saving, Water-saving	Conventional
2. Container Types	Compostable, Plantable, Recyclable	Plastic (i.e., conventional)
3. Origin of Production	Local, Imported	Domestic (i.e., grown within this country)

Willingness To Pay for Attributes
(models with EC-Total Scores)

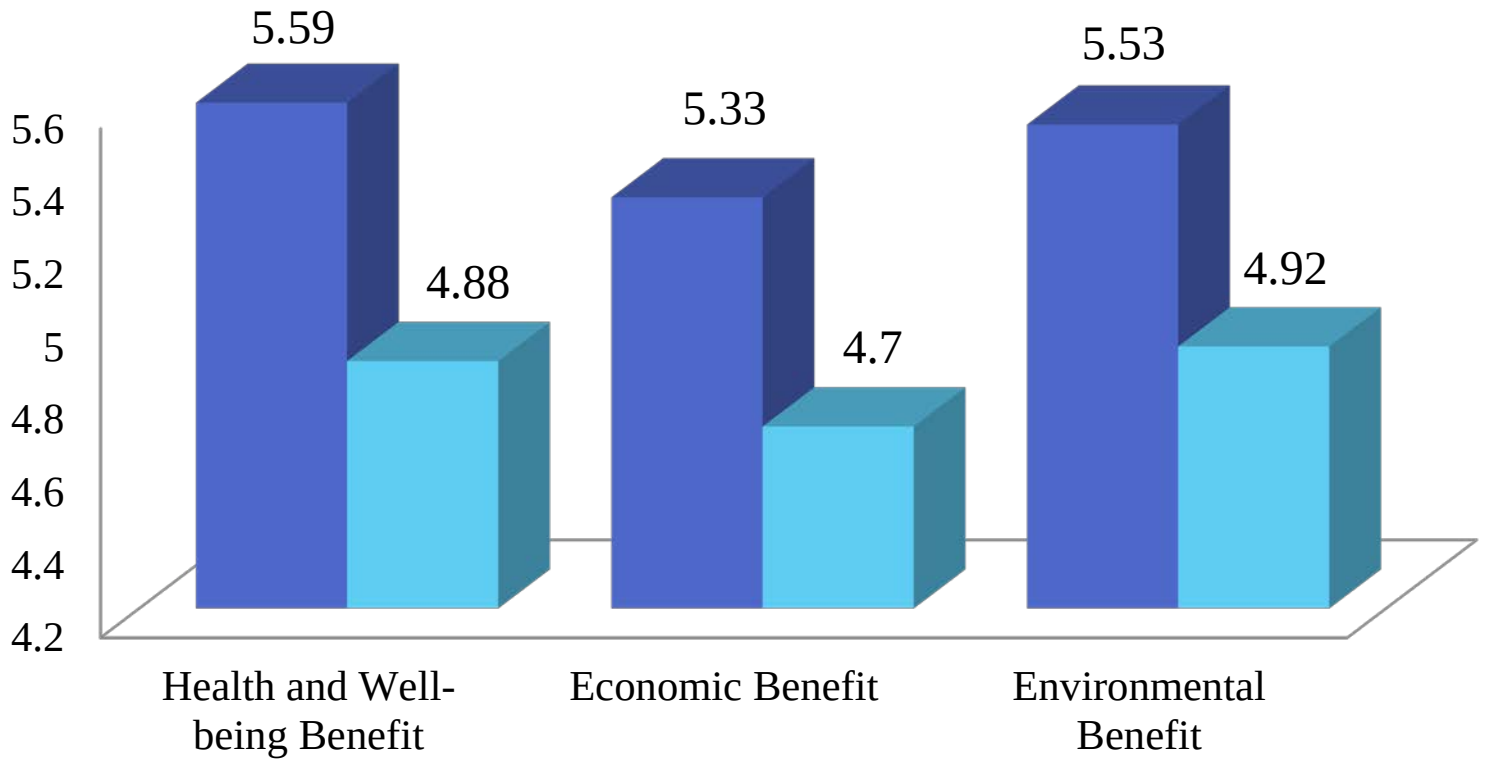
	Model 1 (Base Model)	Model 2 (EC-Total Higher Scores)	Model 2 (EC-Total Lower Scores)
Tomato	0.180***	0.290***	0.003
Basil	-0.280***	-0.171***	-0.46***
Sustainable	-0.009	0.004	-0.043
Energy-saving	0.131***	0.148***	0.084
Water-saving	0.036	0.038	0.024
Compstable	0.227***	0.255***	0.183**
Plantable	0.122***	0.143***	0.090
Recyclable	0.155***	0.175***	0.126
Locally produced	0.222***	0.288***	0.112
Imported	-1.518***	-1.765***	-1.031***

Willingness To Pay for Attributes
(models with EC orientations)

	Model 1 (Base Model)	Model 3 (EC-Egoistic High)	Model 3 (EC-Egoistic Low)	Model 4 (EC-Altruistic High)	Model 4 (EC-Altruistic Low)	Model 5 (EC-Biospheric High)	Model 5 (EC-Biospheric Low)
Tomato	0.180***	0.365***	-0.208	0.449***	-0.238	0.455***	-0.173*
Basil	-0.280***	-0.051	-0.963***	0.003	-0.861***	-0.006	-0.738***
Sustainable	-0.009	0.022	-0.092	0.021	-0.101	0.026	-0.081
Energy-saving	0.131***	0.138*	0.081	0.143*	0.082	0.148**	0.102
Water-saving	0.036	0.045	0.026	0.033	0.048	0.047	0.034
Compstable	0.227***	0.241***	0.217*	0.272***	0.177	0.269***	0.167*
Plantable	0.122***	0.099	0.099	0.131*	0.069	0.128*	0.097
Recyclable	0.155***	0.114	0.199	0.162**	0.148	0.169**	0.109
Locally produced	0.222***	0.324***	-0.020	0.344***	0.022	0.309***	0.049
Imported	-1.518***	-1.813***	-0.925***	-1.964***	-0.892***	-1.928***	-0.953***

Average Effects of Information on Purchase Behavior

(1=Very Useless/Very Unlikely; 7=Very Useful/Very Likely)



Considerations of Future and Immediate Consequences Influence Willingness to Pay for Plants

Objective

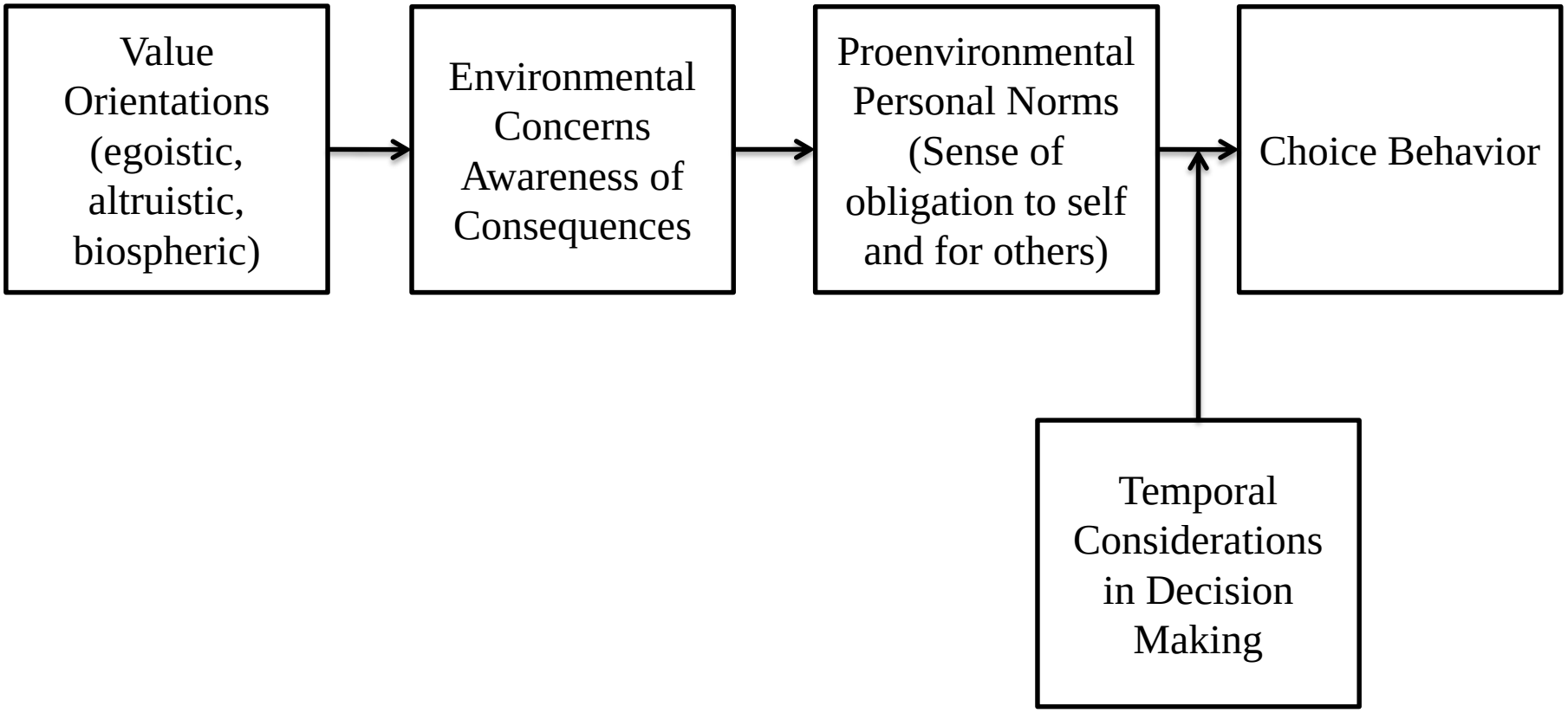
- To estimate the effects of temporal considerations on choice decision making and WTP for environmentally friendly attributes

- Data: Choice experiment auctions in Texas, Minnesota and Ontario (N=160)

Temporal Considerations on Individuals' Preferences

- Individuals tend to underestimate and/or give less importance to future consequences.
- What do these activities have in common?
  - Dieting, exercising, saving, recycling
- Temporal function formalized as hyperbolic discounting in the economics literature.

Temporal Considerations Moderate the VBN Chain (cont.)



Willingness To Pay for Attributes

Variables	Base Model		CFC-Immediate		CFC-Future	
	Coef.	P-value	Coef.	P-value	Coef.	P-value
Production Methods						
Sustainable	**0.119**	0.027	0.154	0.132	**0.167**	0.028
Energy-saving	**0.156**	0.004	0.188	0.064	**0.165**	0.029
Water-saving	**0.136**	0.011	**0.200**	0.048	0.120	0.113
Container Types						
Compostable	**0.147**	0.006	**0.211**	0.039	**0.182**	0.017
Plantable	**0.139**	0.010	0.181	0.074	**0.143**	0.059
Recyclable	0.048	0.373	0.068	0.504	0.036	0.639
Origin of Production						
Local	**0.126**	0.007	0.171	0.064	**0.153**	0.020
Imported	**-0.352**	0.000	-0.096	0.345	**-0.378**	0.000
Plant Alternatives						
Tomato	**-0.773**	0.000	-1.060	0.000	**-0.551**	0.000
Basil	**-0.875**	0.000	-1.083	0.000	**-0.649**	0.000
Demographics	Y		Y		Y	
Intercept	**2.495**	0.001	2.294	0.082	**2.718**	0.030
Indiv. random effect	1.442		**1.763**		**1.707**	
N	2428		940		1375	
Log-Likelihood	-3592.28		-1544.134		-2126.114	
Wald X2 (19)	502.5		195.87		184.45	
Prob > X2	0.001		0.001		0.001	
AIC	7228.562		3132.268		4296.227	
BIC	7356.048		3238.877		4411.204	

Consumer Perceptions of ‘Pollinator-friendly’ Plants

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Background

- 70% of 124 food crops depend on pollinators (Klein et al., 2007)
- Many factors negatively impact pollinator health
  - Nutrition (Wratten et al., 2012)
  - Pesticides (Pimentel, 2005)
  - Parasites/pathogens (Schacker, 2008)
  - Genetics/biology/breeding
- Many studies on the production side, but what about end-customers?

Consumer Perceptions

- Very limited research
- Important because:
  - Increased urbanization decreases/fragments pollinator habitat
    - 68 million acres in the U.S. are urban (Cox, 2012)
    - 90 million U.S. households have potential pollinator habitat - yards/gardens (Kiesling & Manning, 2010)
    - Pollinators live in urban gardens but have distinct plant preferences (Frankie et al., 2005; Hostetler & McIntyre, 2000)

- Potential to influence consumer plant selection through in-store marketing

Research Goals

1. Determine the impact of the ‘pollinator-friendly’ attribute on consumer purchasing decisions and visual attention.
2. Identify what factors (if any) affect consumer perceptions toward pollinator health.
3. Assess current actions consumers partake in to improve pollinator health.

Methodology

Step 1

- **Conjoint Analysis** (16 scenarios)
- **Eye-tracking Analysis**
  - ✓ Attribute importance & WTP
  - ✓ Correlations between visual attention and choice

Step 2

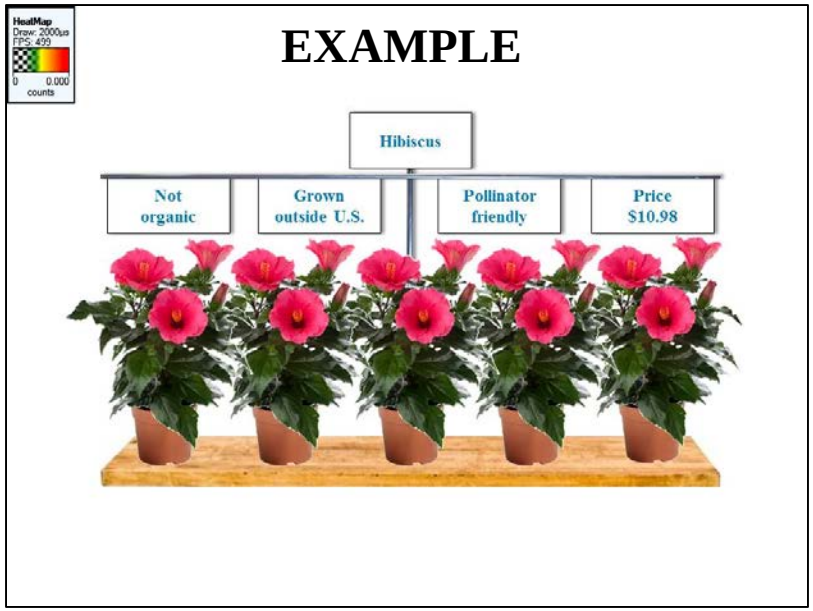
- **Questionnaire**

  - ✓ Perceptions, attitudes, & actions
  - ✓ Demographic information

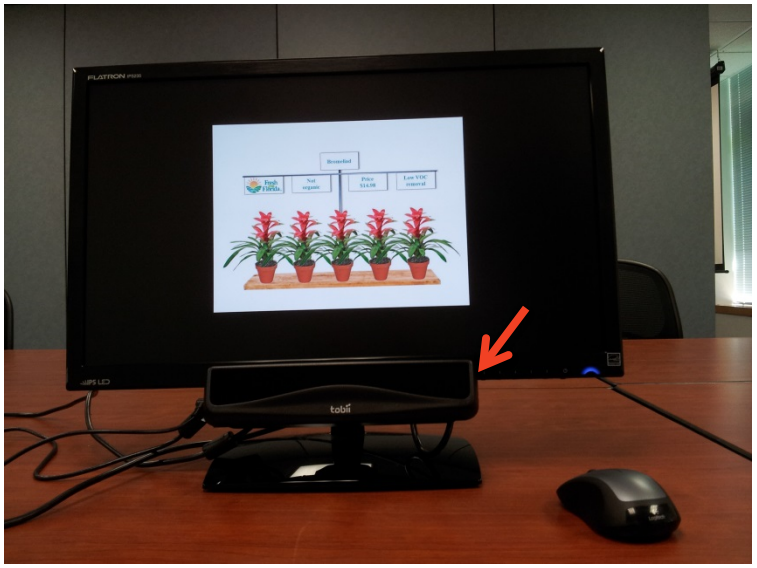
Step 1 – Conjoint Analysis & Eye-tracking

Attribute	Levels
Plant type	Petunia* Pentas Hibiscus
Price	$10.98* $12.98 $14.98
Pollinator	Pollinator-friendly Not rated*
Production method	Certified organic Organic production Conventional*
Origin	In-state (Fresh from Florida) Domestic Imported*

* Indicates base variables for analysis.



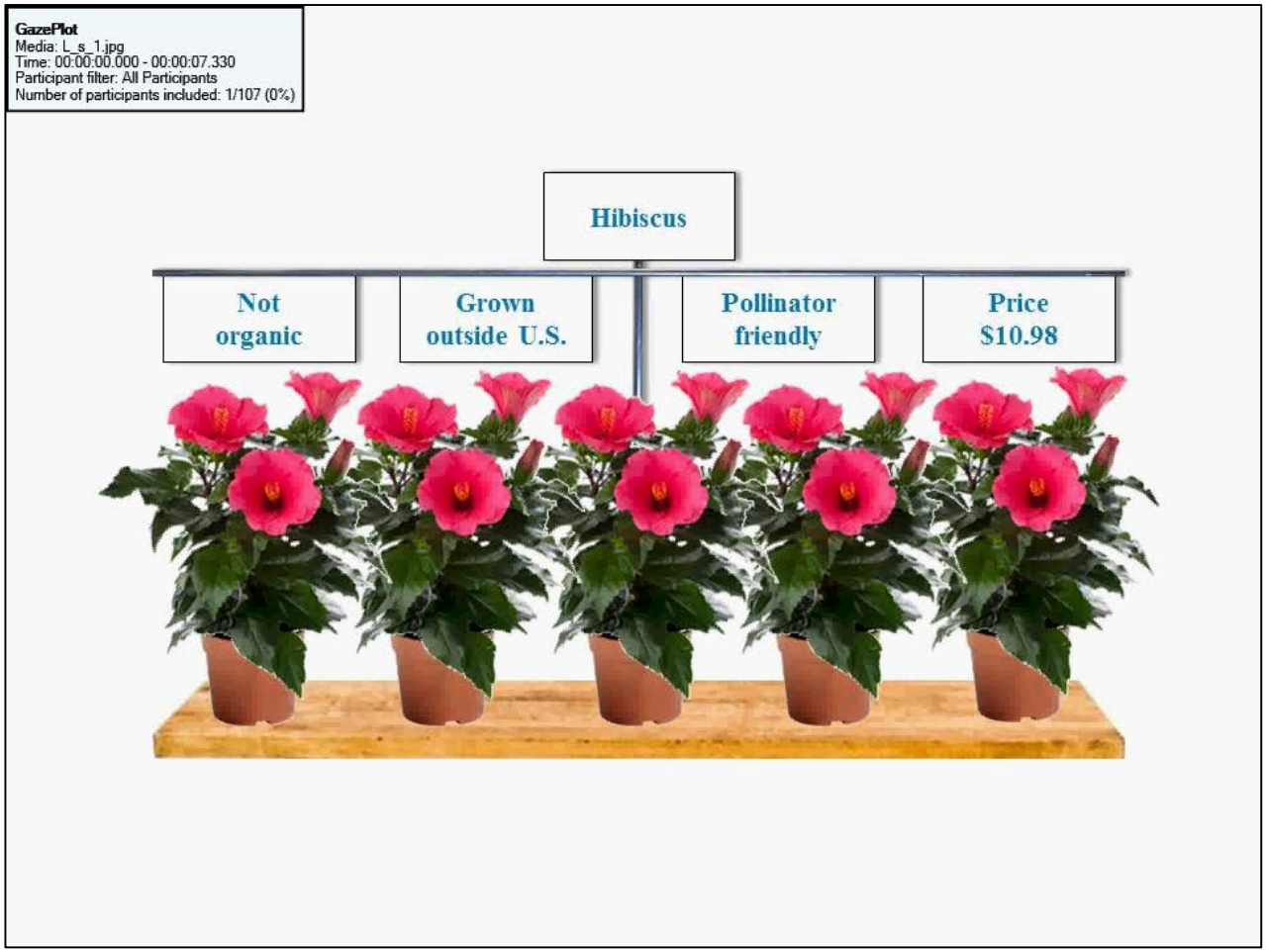
Equipment & Recordings



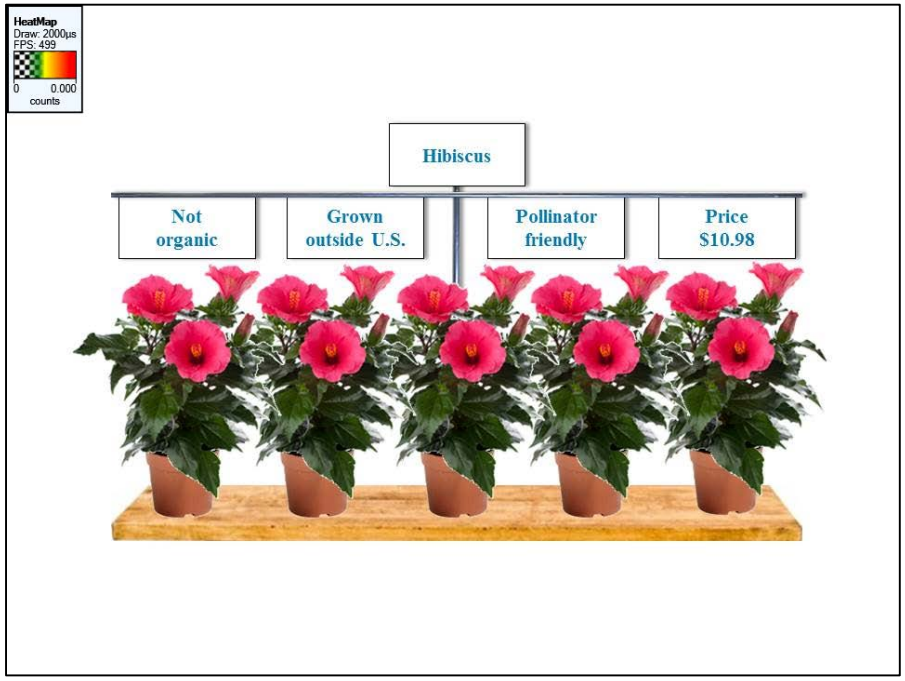
Tobii 1x Light Eye Tracker

Recordings – Fixation counts (FC)

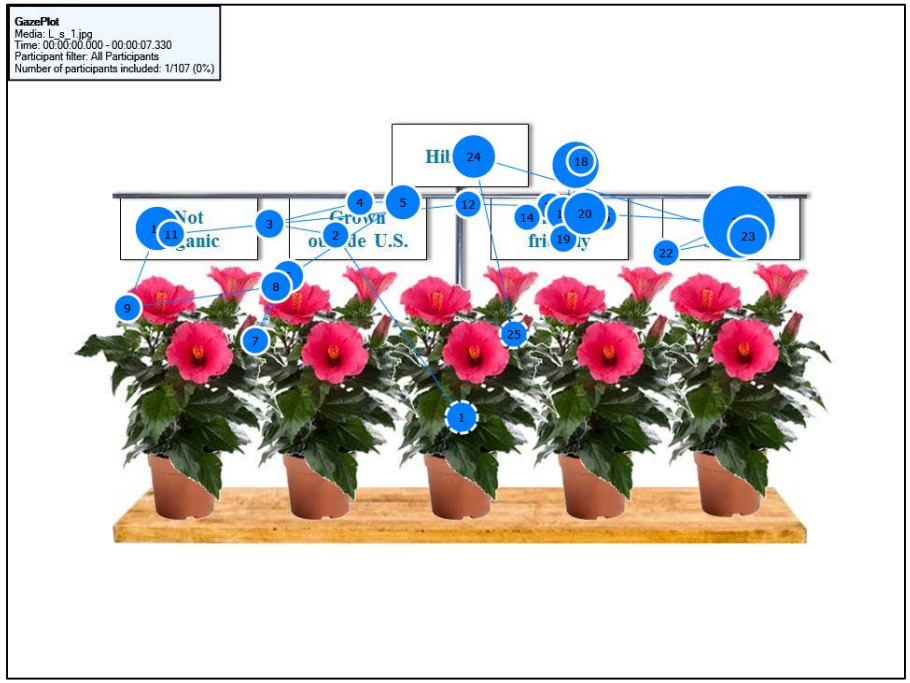
Example


GazePlot
Media: L_s_1.jpg
Time: 00:00:00.000 - 00:00:07.330
Participant filter: All Participants
Number of participants included: 1/107 (0%)
Hibiscus
Not organic
Grown outside U.S.
Pollinator friendly
Price $10.98

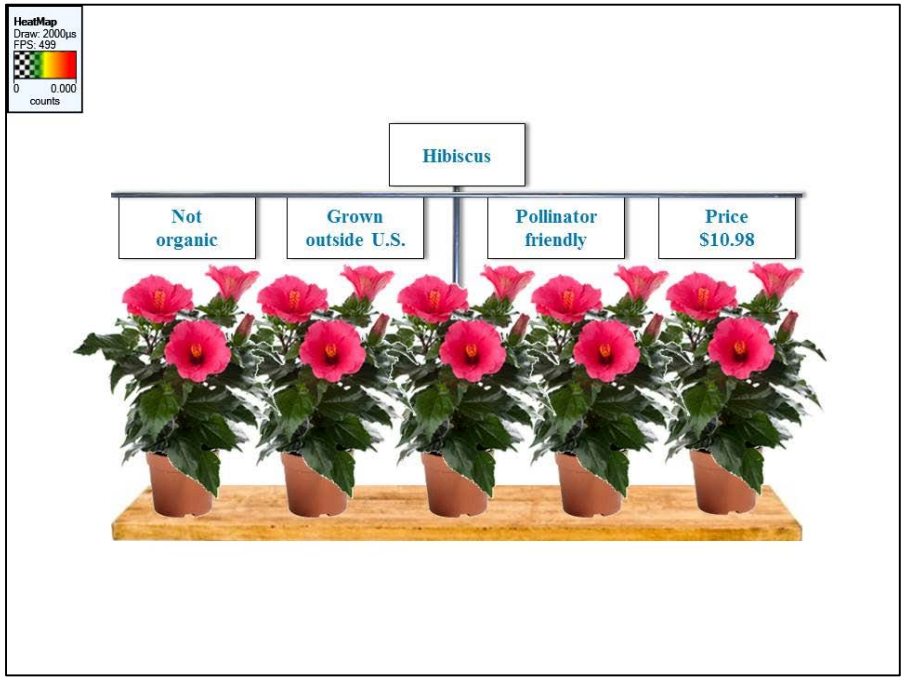
Original Image



Gaze Plot of Image (n=1)



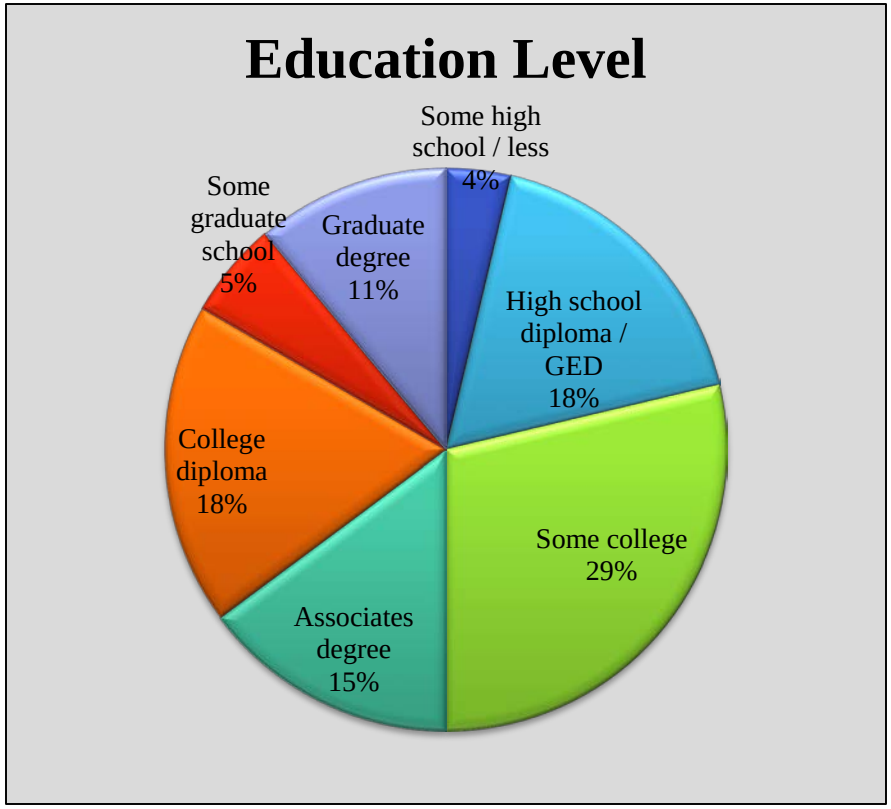
Original Image



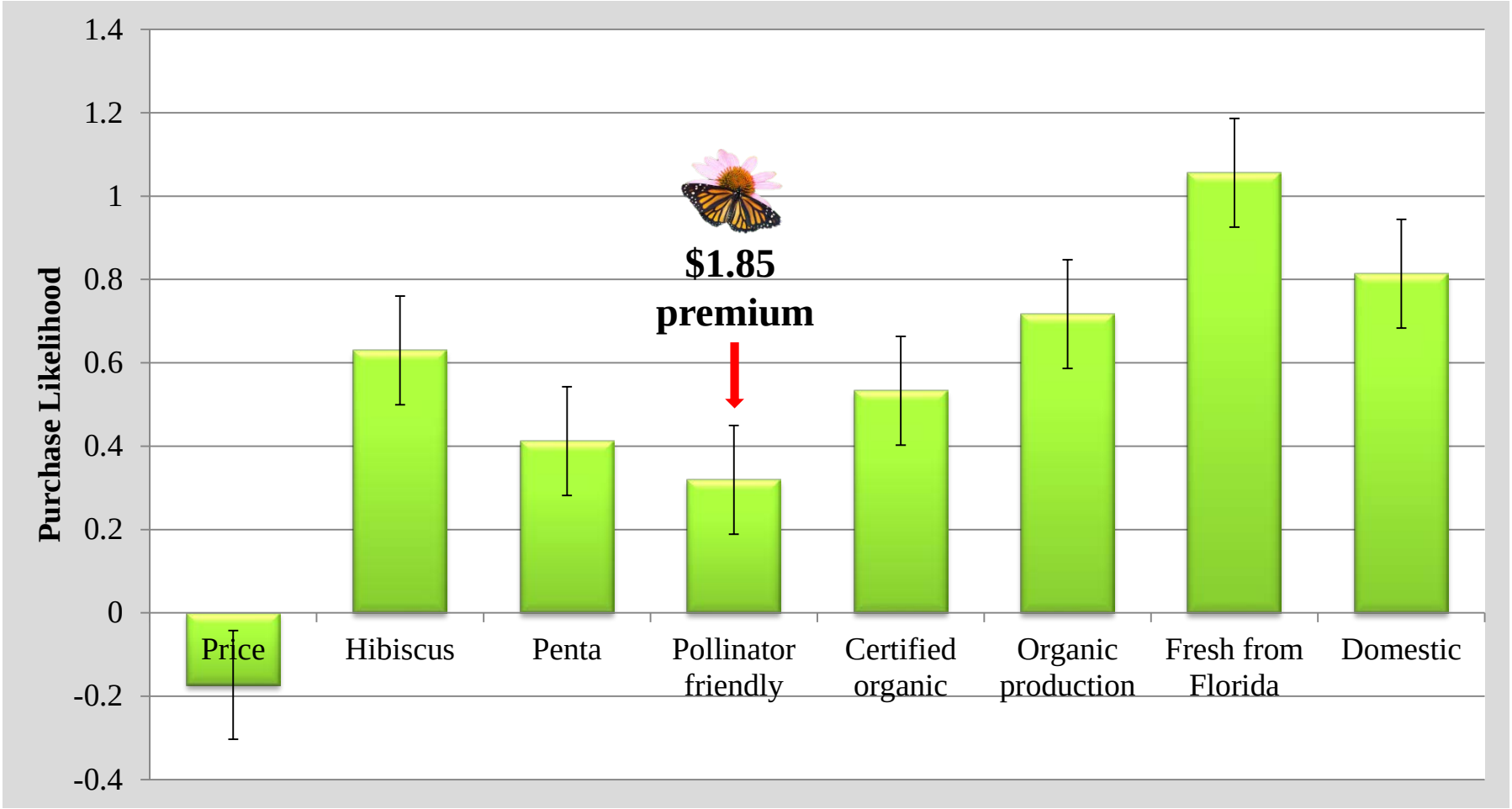
Heat Map of Image (n=104)

Results
Sample Demographics

- n=104
- 53 years old
- 39% male
- 2013 household income: $51,000 – 60,000
- 1-2 people per household

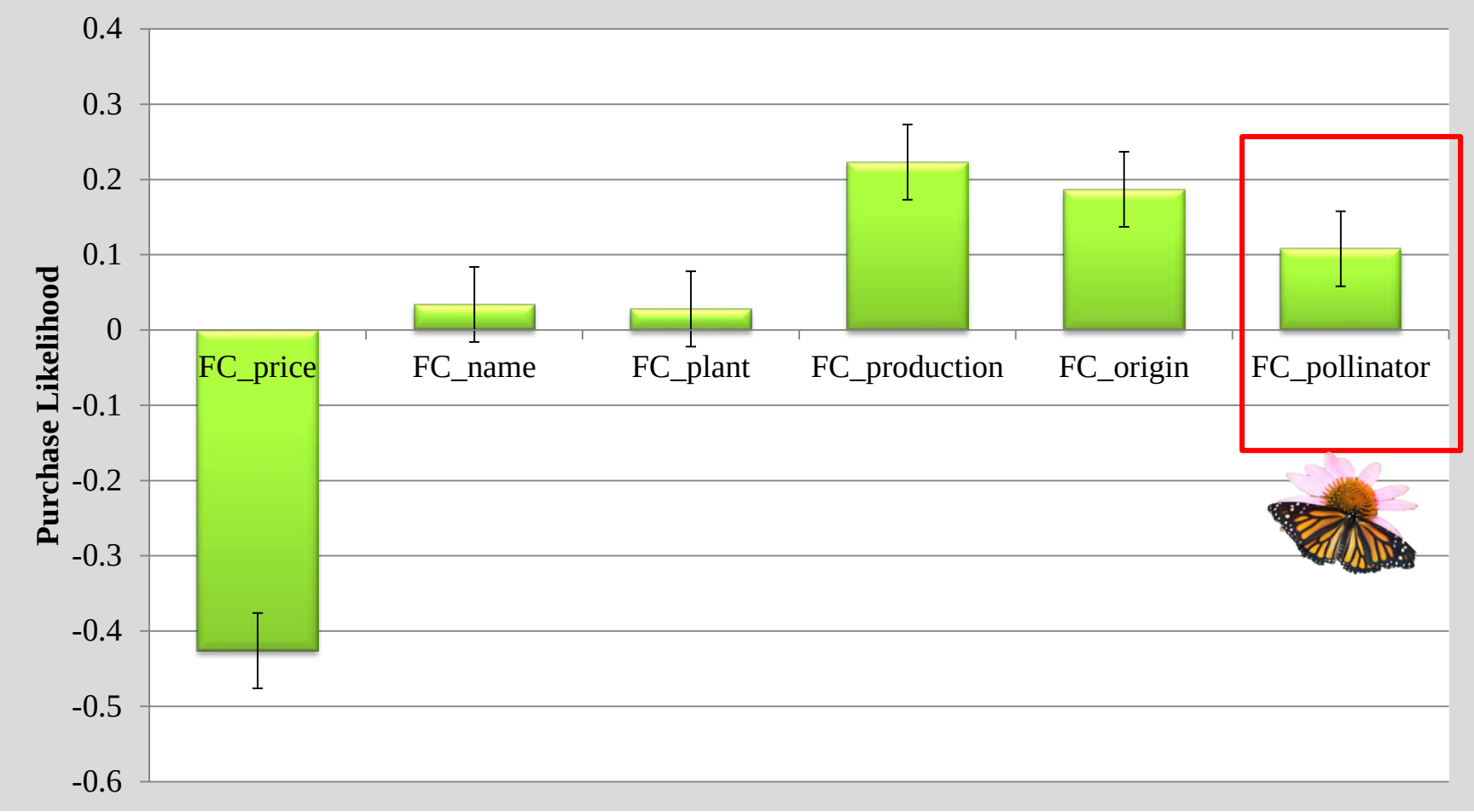


Attributes' Impact on Consumers' Purchase Likelihood for Ornamental Landscape Plants (n=104)

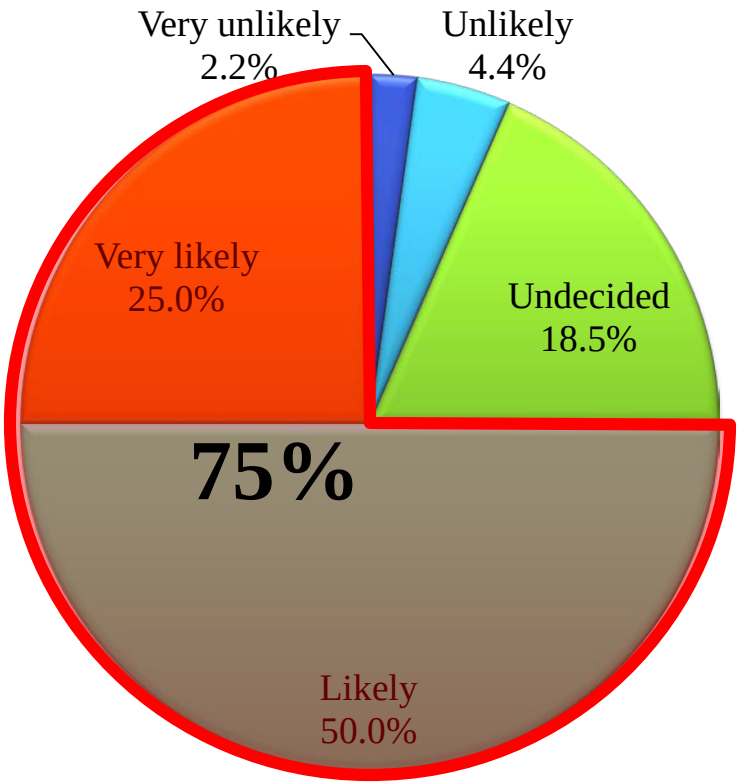


Premiums Consumers are Willing-to-pay for Ornamental Plant Attributes

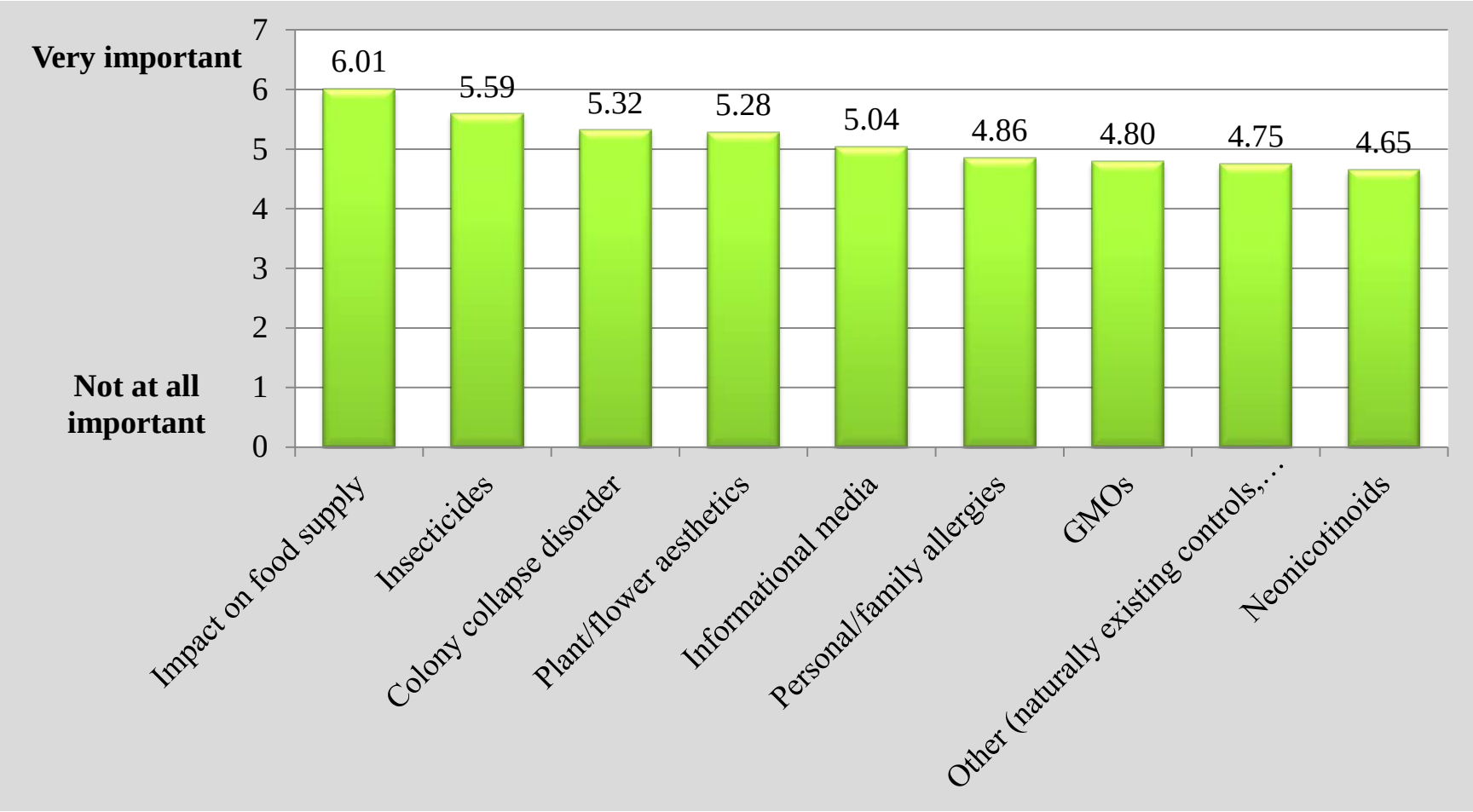
Visual Attention's (Fixation Counts) Influence on Consumers' Purchase Likelihood for Ornamental Landscape Plants (n=104)



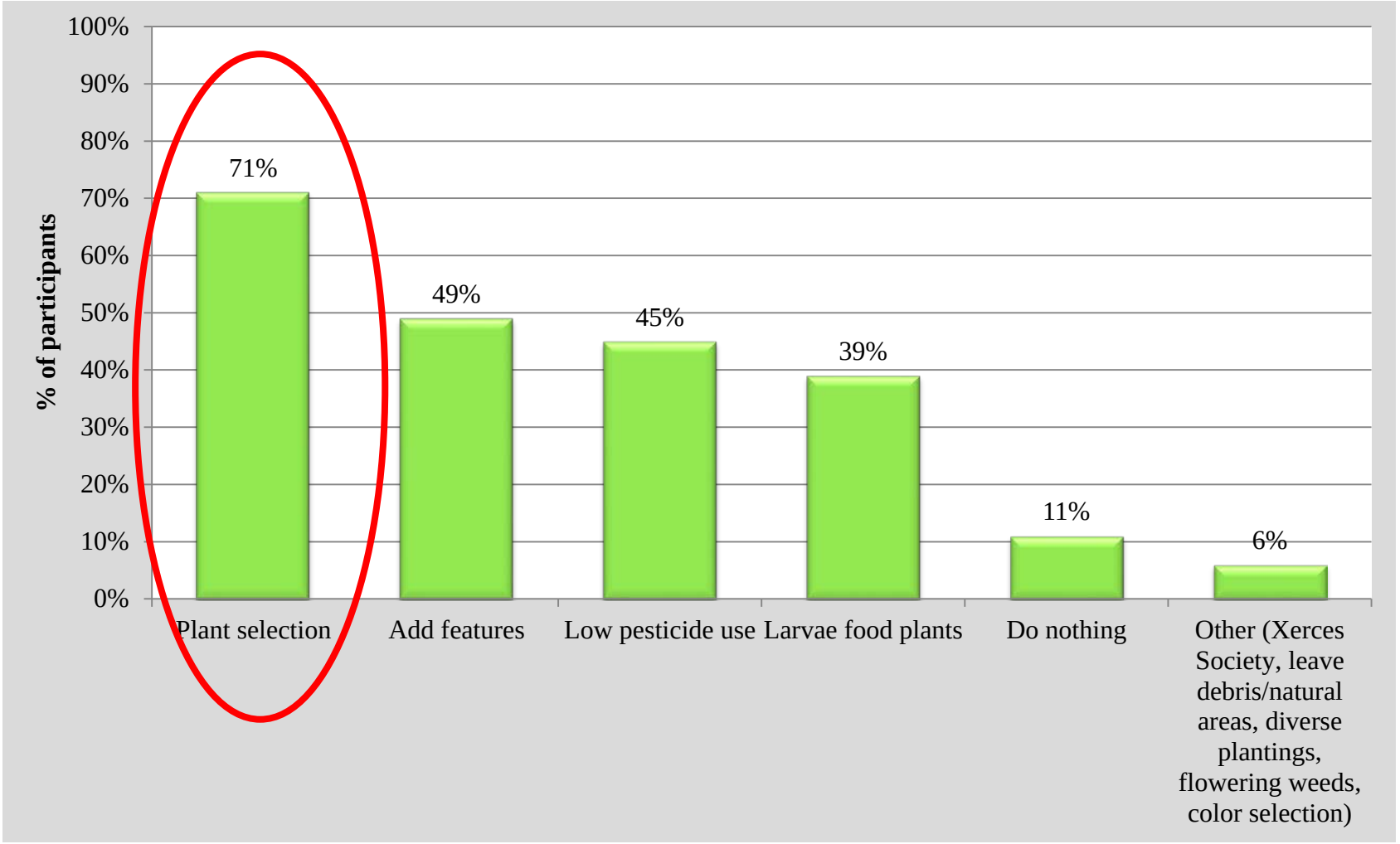
What is the Likelihood that a 'Pollinator-Friendly' Plant Label Would Change Your Purchasing Preferences? (n=104)



Relative Importance of Factors Impacting Consumers' Attitudes towards Pollinator Health (n=104)



Percentage of Participants Using the Following Strategies to Improve Pollinator Health (n=104)



Conclusion

- Our results demonstrate consumer interest, specifically:
  - ‘Pollinator-friendly’ is perceived positively and increases purchase likelihood
  - WTP $1.85 for ‘pollinator friendly’ plants
  - Greater visual attention to ‘pollinator friendly’ increases consumers’ purchase likelihood

Conclusion

- The most important factors influencing consumer perceptions of pollinator health are:
  - Impact on food supply
  - Insecticides
  - Colony collapse disorder

Conclusion

- Consumers are actively trying to aid pollinators through:

  1. Plant selection
  2. Adding landscape features
  3. Low pesticide use

Conclusion

- Our results suggest in-store promotions are necessary to:
  - Inform and educate consumers
  - Differentiate pollinator-friendly plants
  - Influence plant selection and purchasing decisions

Questions?