

**CRICKET LOLLIPOPS AND MEALWORM
CHOCOLATE:
INVESTIGATING RECEPTIVITY TO RADICALLY CREATIVE
PRODUCTS**

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Abstract

This study aims to develop a deeper understanding of the factors at play behind consumer's receptivity to a radically creative product, and whether their personalities, specifically their openness to experience, moderates their intentions to try said product. Creativity research has already established the link between radically creative ideas and the novelty and familiarity dichotomy. I have used products in the entomophagy (edible insects for human consumption) industry as suitably novel products to gauge consumer's intentions-to-try. For this study, a survey of 77 participants generated observations on intention to try edible insect products of varying familiarities, and information about the participants own resistance to change and openness to experience. A regression analysing the interaction between familiarity and intention to try found significant interactions between the two variables for unprimed populations, and also found significant interactions for the effect of openness on the relationship between familiarity and intention to try . Finally, a theory was posited to explain the results, and suggestions were given for further exploration of the nexus between radical creativity, novelty, intention-to-try, and personality factors.

Keywords: Creativity, novelty, familiarity, openness

Introduction

How does the novelty factor of a radically creative product affect receptivity to it? Do people want to try things that are more novel or more familiar? Does this change when people are more open to experience?

Radically creative products, ideas or technologies have, more often than not, been welcomed with distrust, suspicion, or outright fear by the intended recipients. This has been observed in as disparate spheres as art, economics, and even food. Products and ideas ranging from high-frequency algorithmic trading to free agency in professional sport leagues were controversial when first propagated, with fierce resistance from many quarters (Bloomberg Businessweek, 2014). Many of these are commonplace now. In the realm of food, sushi stands out as a product viewed with misgivings by the general populace when the first sushi restaurants opened in Los Angeles in the mid-1960s. Now, of course, sushi is available anywhere from gas stations to Michelin – starred restaurants all over America.

In North America, the idea of eating insects is viewed with the same early suspicion as these disruptive ideas. Americans do have a broad conception that insects are eaten in parts of Asia and Africa. However, when asked to consider incorporating insects in their own diets, American reactions range from bemusement to disgust (Rozin et al, 2008).

The entomophagy industry itself is nascent in the United States and Canada. The earliest players emerged in 2010 and 2011, and the industry has since expanded to about 20 small firms offering a variety of edible insect products. These range from flours made with cricket protein that can be used in baking and cooking to ready to eat snacks such as grasshopper protein bars, mealworm chocolates and even scorpion lollipops.

I have explained below why the entomophagy industry's offerings are radically creative, albeit to different degrees, and investigated how and why this might affect a typical consumer's intention-to-try.

Radical Creativity

While research on the novelty and familiarity dynamic has mostly emerged in the last decade, ideas about creativity have been discussed for half a century. While a great deal of this research focuses on individual creativity and creativity in the fields of marketing and aesthetics, there is much scope to define this relationship in the organizational sense. In particular, there is potential to define the factors that drive radical creativity and influence the novelty/familiarity tradeoff.

The existing scholarship agrees on the definition of *creative innovations* as ideas that are both novel, i.e. have a degree of originality, and useful, i.e. are able to be implemented (Grant, 2011 and Rindova, 2007). The notion of the *radicalness* of an innovation however has been discussed at length in psychology journals even earlier than in the management literature. Some of the earliest definitions describe *radical creativity* in terms of the amount of risk undertaken by the organization (Kaluzny et al., 1972). Other earlier treatments include empirically measuring process innovations to predict the drivers of creative ideas within an organization or industry (Dewar and Dutton, 1986). For the purpose of this research, I will use the definition put forward by Madjar and Gilson in their analysis of the differences between radical and “regular” incremental creativity. In their definition, radical creativity describes imaginative shifts in thinking that are so large that they leap beyond what currently exists, pushing boundaries, and when successful, push consumers, competitors, and society to adapt and change (Madjar and Gilson, 2011). Madjar and others further go on to define radical creativity as a divergent idea that differs substantially with an organization's existing practices (Madjar, 2011) to distinguish it

from incremental creativity. The latter is defined to imply smaller changes and frameworks that offer minor modifications to an organization's existing methods and ideas (Madjar, 2011 and Eisenmann, 2013).

Novelty and Familiarity

The literature also defines frameworks to understand the novelty and familiarity tradeoff. This tradeoff describes the balance of attributes of a radically creative idea. If a radically creative idea is also very novel, it is less familiar to its audience. However, instead of being marked preferences, these two bases have different patterns of dominance across different categories. For example, when presented with pictures of faces, people in general prefer familiar ones, but for landscapes people are drawn to novelty (Liao et al, 2011). Furthermore, several authors are in agreement that the physical aspects of an innovation have effects on the observers' perception of its creativity and 'radicalness' (Eisenmann, 2011 and Berg, 2014).

Therefore, creative workers (i.e., generators of creative ideas) must decide whether to play up or play down the novelty of the product with respect to how familiar its form or function may be to its recipients, and this decision may be changed depending on the audience.

The entomophagy industry in particular faces this tradeoff, and producers have responded by varying the balance of novelty and familiarity in their product and packaging. Contrasting Fig. 1: EXO Cricket flour protein bars with Fig. 2: Hotlixx cricket lollipops show this decision as made by different producers. In the case of the entomophagy industry, more novel products make the insect the centrepiece, showing off the body of the insect and/or alluding to the insect ingredient in the packaging. Products attempting to draw on familiarity, on the other hand, make less overt allusions to the insect ingredient. The EXO cricket bars, for example, play heavily on customer's

pre-existing knowledge of and familiarity with protein bars. The bars look like “normal” protein bars: the body of the insect is not seen, and neither is any image of an insect on the packaging.

Additionally, some authors define a particular reference point to gauge the extent of how disruptive the innovation is. While Einsenmann attributes organizational control and innovation life cycle as an important factor in perceptions of radical creativity (Einsenmann, 2011), Berg points to the state of the idea at its inception as the framework which constrains further perceptions of how radical the idea is (Berg, 2014). My first hypothesis deals with this tradeoff, and investigates whether a positive relationship exists between familiarity (at the expense of novelty) and intention to try or accept the novel idea.

Openness to Experience

An interesting potential moderator of the novelty vs familiarity tradeoff is the individuals’ openness to experience. I use openness in my hypotheses similar to the definition in the Big 5 personality framework, which characterizes the trait as “appreciation for ... unusual ideas, curiosity, and variety of experience” (Digman, 1990). It is important to note that “Intellect” is only one of the potential factors that contribute to Openness, while “Cultural Sophistication,” i.e. education level, interest in art and literature is also only a partial predictor. Indeed, openness encompasses a “broad range of intellectual, artistic and creative preferences... in highly original and creative individuals” (John and Srivastava, 1999).

Instruments that measure openness such as the one used in this study often ask participants to rate themselves based on cultural or intellectual criteria. For present purposes I have used an instrument based on the IPIP Goldberg (1999) markers of the Big Five Factor structure which predicates

openness on creativity and openness to ideas rather than cultural awareness, so as not to conflate openness to experiences such as eating insects with cultural familiarity with the same.

I have also used a methodology that uses a resistance to change scale (Oreg, 2006) as a proxy for (the lack of) openness to experience. While the psychology literature finds a single scale sufficient to measure openness, the resistant to change scale provides an alternate measure for the converse of the second hypothesis. Among other tests, Oreg's measure includes a Routine Seeking subscale and a Cognitive Rigidity subscale, both of which are likely to be useful predictors of participants Intentions to Try.

A mindset promoting openness to experience has potential to be induced via a priming mechanism. It is common in the social organization research to induce personality traits in the short term, such as "adventurous" or "independent" (Bargh and Chartrand, 2000), or even as the case may be, "open to new experiences." Participants have been primed for openness in order to generate creative ideas (Zabelina and Robinson, 2010) or to promote interpersonal sharing in a relationship (Mikulincer and Arad, 1999). It follows that it should be possible to use a conceptual priming mechanism to gauge the influence of openness on the study participants' intention to try edible insects. In priming for openness I have followed the guidelines by Bargh and Chartrand (2000) as well as the model utilized by Zabelina (2010) in manipulating mindsets for creativity and openness.

Intention to try

According to my hypotheses below, a target's intention to try a radically creative product is driven by perceptions of the products' position on the novelty vs. familiarity axis, though this may be influenced by their own openness to experience.

Authors point to social contexts as drivers of both creativity and receptivity to new ideas, i.e. intention to try. The cultural context of a creative individual or organization is important to some authors (Baer, 2012; Chua, 2014; and Goncalo, 2012) while others look into the relationships between individuals and networks (Fleming, 2007 and Grant, 2011). Finally, authors look at outside drivers such as types of funders that encourage creativity at young, innovative firms (Pahnke, 2015).

While the literature on individual creativity is extensive, there remain gaps in the research when analyzing organizational creativity as a whole. There are very few applicable longitudinal studies, in particular, to gauge creativity over a span of time, and changing attitudes to ideas that were once considered revolutionary. Rindova and Petkova (Rindova, 2007), provide the most comprehensive breakdown of the perceptions of value that consumers have toward technological innovation, an area that has many analogues to entomophagy. However, while Rindova discusses the creation of value, it falls to Madjar, Greenberg and Chen (Madjar, 2011) to draw the connection to openness and intention-to-try. Madjar et al. use a sensemaking framework to show how observers relate radically creative innovations to their own frames of reference. This relates to the second hypothesis, in that an individual more open to experience could be more receptive to a radically creative idea even if it is very novel indeed.

My research deals with radical creativity and the balance between novelty and familiarity, again with a focus on the entomophagy sphere. However, research in this domain is limited largely to the psychological field, and many studies focus only on creativity in the artistic or interpersonal sense. However, dealing with creativity in an entrepreneurial sense can help to generate valuable insights regarding the adoption of novel ideas in an organizational setting. Pahnke, Katila, and Eisenhardt (Pahnke, 2015) have covered the differing influences corporate funders vs venture

capitalists have on the creativity of the companies they fund. This may seem specific, but many companies in the entomophagy sphere are small, and Pahnke et al's insights will be directly applicable to that arena.

The Present Research

Significance

This research investigates how radically creative ideas are weighted on a balance between novelty and familiarity, a balance which may be weighted towards familiarity to encourage investment and intention to try. I use the commercial entomophagy (i.e., edible insects) field as a case study to trace responses and attitude towards radically creative ideas over time and as they evolve.

This research, like much else in the broader organizational creativity field, lies at the intersection of management, marketing, and psychology. I believe that it would be useful to academics and researchers in those fields, especially those studying interdisciplinary links between them.

Radical creativity is a relatively new idea to organizational behavior, and distinguishes creativity that optimizes and refines organizational processes from that which disrupts an industry.

Defining the process would appeal to an academic audience interested in how creative ideas are disseminated and normalized. An academically interested audience would expect arguments that linked my conclusions to important ideas in their fields, for example, a study building on this research could draw together a sensemaking framework in which a radically creative idea is accepted by a resistant population by varying the proportion of "novel" vs "familiar" attributes.

The moderation of this balance by the Openness factor also opens up the possibility of studying other personality traits that may contribute to the acceptance of radical ideas.

Investigating why a radically creative idea is accepted (or not accepted) by a target population is applicable to a non-academic audience as well. Commercial organizations with a disruptive idea or technology, especially startups would be interested in how an industry may assist disruptive ideas in spreading into the mainstream. Consider the media frenzy around Peeple, an app purporting to be a “Yelp for people,” (New York Daily News, 2015) where people are rated the same way as restaurants. Some ideas are very foreign indeed when conceptualized, and many startups with disruptive ideas find them to be just too novel in the public eye to begin with. Companies based around a single, landscape changing idea would potentially be interested in this research to understand how to make a very foreign idea palatable to the masses. The entomophagy industry is in the process of doing so. This audience would expect arguments defining the factors that push a radically creative idea down a path to acceptance, or that seem to contribute to intention to try. They would also be interested in the personality profile of a consumer that would pay for a radical innovation. Some questions that could be explored are the effects of personality on willingness to try, the relationship between a novel or familiar product and willingness to pay (as opposed to try for free) and whether downplaying a product’s most novel attributes make it more likely to be accepted into the mainstream.

Similarly, creative workers such as artists, writers, designers and so on would be interested in the balance between novelty and usefulness. Many artists seek to make a statement with their work, and introduce ideas to the public that may be met with negativity. While some artists may seek to court controversy, some may have commercial goals in mind as well. Coca Cola’s 2014 commercial featuring a multilingual version of “America the Beautiful” was met with hostility from many consumers, but welcomed by others (The New Yorker, 2014). Creative workers that wish to push boundaries but still have a commercial goal in mind would be interested in this

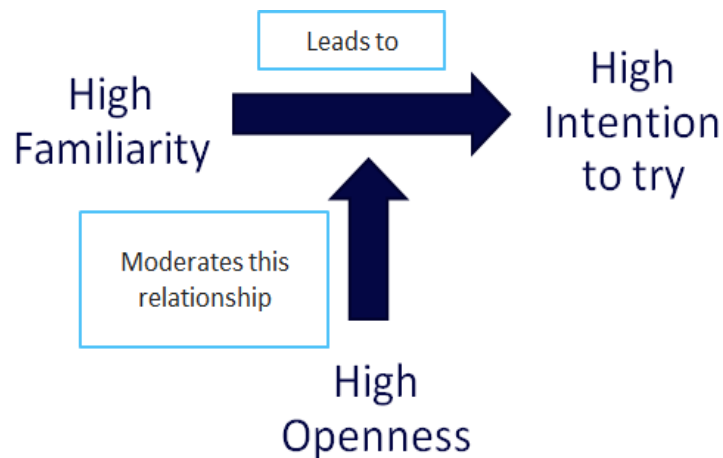
research to understand how to strike a balance between artistic goals and mass appeal. The research could even help them decide which side of the balance they wish to fall on.

Finally, the research will be useful to those interested in the entomophagy sphere, from commercial companies trying to market and sell cricket-flour cookies, to developmental agencies trying to make insects a palatable food source in areas of food scarcity. The entomophagy industry is set to burst upon the mainstream in the next decade, and people within it would surely be interested in trying to normalize the experience of eating insects. For many within the industry the process is already normal, as evidenced by interviews carried out by Samir Nurmohamed with producers in the entomophagy industry (Nurmohamed, 2015), so there is a disconnect with trying to market it to an audience that is not as receptive to eating insects as people in the industry are. This audience would expect arguments based on cultural and anthropological attitudes to eating insects and types of messages that resonate with a prospective audience. I could explore, for example, the cultural or social background that makes people more accepting of radical ideas as opposed to innate openness to experience. I could also argue whether product manufacturers should downplay or draw attention to the novelty of the product in publicity or product packaging, depending on their goals.

Methodology

Hypotheses

I therefore present two hypotheses to explain the tradeoff with regard to radically creative concepts, in this case, eating insects.



Hypothesis 1

Firstly, in dealing with a **radically creative product**, **less novelty (more familiarity)** has an effect on the consumer's **intention-to-try**.

Hypothesis 1A: Intention to try is affected by the novelty-familiarity dichotomy, such that on dealing with a radically creative product, less novelty (more familiarity) leads to **higher** intention-to-try.

Hypothesis 1B: Intention to try is affected by the novelty-familiarity dichotomy, such that on dealing with a radically creative product, less novelty (more familiarity) leads to **lower** intention-to-try.

Hypothesis 1C: Intention to try is **not affected** by the novelty-usefulness dichotomy.

Hypothesis 2

Secondly, the *openness* of the audience (a consumer) moderates the relationship between *familiarity* and *intention to try*, such that the positive relationship is weaker for people with greater openness.

Hypothesis 2A. The openness-resistance to change dichotomy moderates the relationship between familiarity and intention to try, such that the positive relationship is **weaker** for people with greater openness and a lower resistance to change.

Hypothesis 2B: The openness-resistance to change dichotomy moderates the relationship between familiarity and intention to try, such that the positive relationship is **stronger** for people with greater openness and a lower resistance to change.

Hypothesis 2C: The openness-resistance to change dichotomy does not moderate the relationship between familiarity and intention to try.

The survey was analysed based on the variables outlined below:

1. Independent variables: novelty/familiarity, prime for openness
2. Dependent variables: Intention to try (including intention to try for free, willingness to purchase, willingness to recommend to a friend and willingness to share on social media)
3. Control variables : control prime; familiarity control

Participants

In order to determine the correlation between the novelty/usefulness tradeoff and intention-to-try, I distributed a fifteen minute survey to two sample populations. A total of 138 individual respondents were surveyed.

The first sample population was sourced on Amazon's Mechanical Turk service, and compensated for their time. 101 respondents completed the survey, ultimately 77 responses were analysed. The second sample consisted of University of Pennsylvania undergraduates, who filled out the survey individually as volunteer participants. This sample consisted of 37 responses.

Materials

The survey consisted of four parts.

The **first** was either a conceptual prime to manipulate participants into a state of openness to experience or a neutral control. As described above, I have used conceptual priming to induce intention to try in participants. The priming condition was randomly varied in equal proportion with the neutral condition. Participants who drew the priming condition were asked to describe an experience they had which was new to them. The instructions indicated that they could describe learning a new skill, travel to a new destination or tasting a new cuisine, or any other experience which was new to them. In contrast, the neutral condition instructed participants to describe their favorite meal as a child, so as to not induce any feelings of novelty or creativity but rather induce an inward-looking mindset of familiarity.

Once participants had been primed, the **second** part of the survey randomized between descriptions of three different manifestations of ready-to-eat food products which contained insects. (See Fig.3) These products are fictional, but based on real products currently available

commercially through edible-insect companies. The three products' attributes were coded on the novelty and familiarity scale as follows:

- a. **Least novel/Most familiar:** Bar based on EXO cricket protein bar, with no insect images or views of insect parts. Relying on participants' familiarity with protein and sports bars.
- b. **Moderately balanced:** Chocolate bar based on EntoMart's dark chocolate covered insects. Moderately novel in attribute, with identifiable insect allusions on packaging and an obscured but identifiable view of insect parts in the food product itself. This was the **control product** which reactions to the most and least familiar products would be compared against, because it has a moderate balance of both attributes.
- c. **Most novel/least familiar:** Transparent cricket-filled lollipop based on Hottlixx lollipops. Identifiable whole insect in product and most emphasis on the novelty of the lollipop and cricket ingredient.

To control for possible preferences or aversions to specific insects, all the simulated products were described to be containing only crickets as the insect ingredient (as opposed to other common ingredients such as mealworm or grasshopper).

The **third** part of the survey was a series of personality and preference assessments to assess openness to experience, resistance to change and general attitudes towards eating insects.

- a. The first question gauged previous familiarity with the idea of eating insects. This would allow me to identify and discount a participant that has had extensive experience with eating insects, i.e. someone for whom the idea was not radically creative at all.

- b.** The second question asked participants to rate which attributes were most important to them from a list including environmental impact, personal health and sustainability and trying new experiences.
- c.** The third question used a 10-item International Personality Item Pool scale by Goldberg (1992), using the items in the IPIP that measure the Big Five Factor Markers. Only the scales in the Openness section were used, I.e., only the key that measured Factor V, Openness to Experience. The ten-item scale has an $\alpha = 0.82$). All the questions were calibrated on a 5 point Likert scale, where 1= strongly disagree and 5 = strongly agree. Care was taken to have half of the questions +ve keyed and half -ve keyed, so participants would have to read questions carefully before answering. This was the primary measure of Openness to Experience that test hypothesis II, to investigate whether a high score on Openness to Experience moderates any relationship (whether positive or negative) between intention to try more novel or more familiar products.
- d.** The fourth question incorporated Oreg's Resistance to Change instrument (2006). This question used Resistance to Change as a proxy for the lack of Openness to Experience, with the benefit that any cultural and intellectual bias resulting from the previous Openness scale would be partially mitigated by this more general scale, which tests Routine Seeking behaviors, Emotionality of Reactions, Short term focuses and Cognitive Rigidity. While this scale was used as a proxy for openness, it also tested for conventionality more explicitly than the Goldberg scale. Results from this question were also used in investigating hypothesis II. All the questions were calibrated on a 5 point Likert scale, where 1= strongly disagree and 5 = strongly agree.

The **fourth** and final part of the survey asked participants about their basic demographic information, including age, sex, country of birth, ethnicity, country of residence, education, employment status and annual household income. Participants were also asked if they had deeply held religious or ethical beliefs that would outright prevent them from eating insects.

Results

The correlations, regressions, R-values, means and standard deviations of all variables can be found in the Appendix.

The result groups were coded as follows with regard to the randomly selected questions that the participant answered. This leads to six distinct results groups as shown below

- Group A was primed for Openness to Experience, while group B was the control.
- Group 2 was assigned the most novel/least familiar food product, Group 1 was assigned the moderately balanced food product, and Group 0 was assigned the least novel/most familiar food product.

Primed (Group A)	Count	Control (Group B)	Count
A2: Primed for Openness to Experience, assigned most novel/least familiar product, i.e Lickit Cricket	14	B2: Control for Openness prime, assigned most novel/least familiar product, i.e Lickit Cricket	11
A1: Primed for Openness to Experience, assigned moderately balanced product, i.e. Bug's Life Chocolate	11	B1: Control for Openness prime, assigned moderately balanced product, i.e. Bug's Life Chocolate	15
A0: Primed for Openness to Experience, assigned least novel/most familiar product, i.e. Exo Bar	11	B0:: Control for Openness prime, assigned moderately balanced product i.e. Exo Bar	15
Total Primed	36	Total Unprimed	41

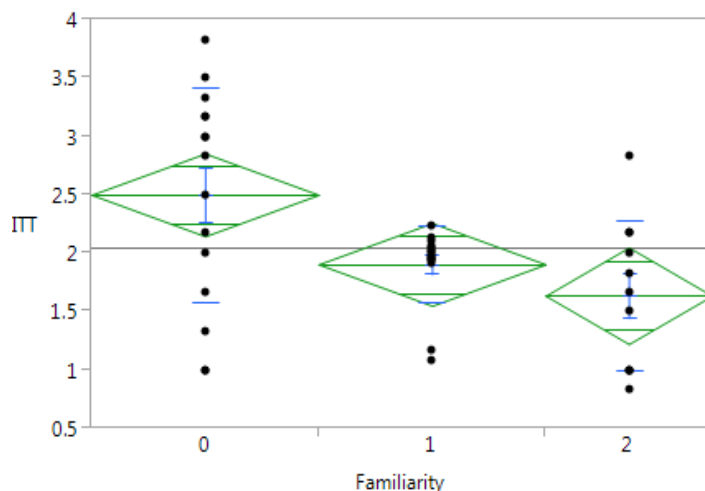
Analysis, Discussion and Theories

Regressions

To test the first hypothesis, I carried out a simple linear regression on the both primed and control sample groups to model the relationship between familiarity and intention to try. Both intention to try and familiarity were plotted as ordinal variables, with familiarity coded as 0 for most familiar, 1 for a moderate balance of attributes (the control), and 2 as least familiar as described in the above subgroups.

I performed this regression separately on primed and non-prime groups. For the intention to try metric, I used a weighted average of the 5 markers used in the second portion of the survey for greater reliability and for a more thorough picture of intention to try. These markers varied from “please indicate how likely you would be to try this product if it was offered to you for free” to “please indicate how much you would pay for this product,” and together provide a much fuller picture of intention to try than any one individual marker.

1a. Oneway analysis of Intention to try (ITT) by Familiarity for *Unprimed* participants



Summary of Fit

Rsquare	0.231017
Adj Rsquare	0.190544
Root Mean Square Error	0.677267
Mean of Response	2.050488
Observations (or Sum Wgts)	41

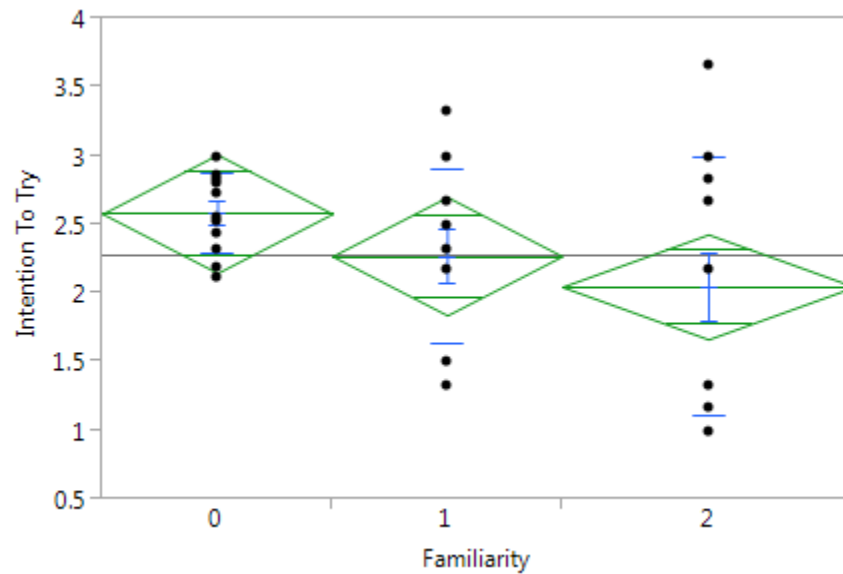
Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Familiarity	2	5.236362	2.61818	5.7080	0.0068*
Error	38	17.430228	0.45869		
C. Total	40	22.666590			

Means for Oneway Anova

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
0	15	2.50000	0.17487	2.1460	2.8540
1	15	1.90467	0.17487	1.5507	2.2587
2	11	1.63636	0.20420	1.2230	2.0498

1b. Oneway analysis of Intention to try (ITT) by Familiarity for participants *primed* for Openness to experience



Summary of Fit

Rsquare	0.096814
Adj Rsquare	0.042075
Root Mean Square Error	0.702394
Mean of Response	2.278889
Observations (or Sum Wgts)	36

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Familiarity	2	1.745156	0.872578	1.7687	0.1863
Error	33	16.280799	0.493358		
C. Total	35	18.025956			

Means for Oneway Anova

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
0	11	2.58000	0.21178	2.1491	3.0109
1	11	2.27182	0.21178	1.8409	2.7027
2	14	2.04786	0.18772	1.6659	2.4298

An examination of these regressions shows significantly different interactions on familiarity for the unprimed population with non-overlapping confidence intervals. The coefficients of regression for the unprimed are in line with the first hypothesis: intention to try seems to increase the more familiar a product was to the consumer, with a mean of 2.50 for on intention to try for the least novel/most familiar sample, 1.9 for the control and 1.63 for the most familiar/least novel sample. The primed population does also seem to show similar results. While the interactions are above the significance threshold, the means are higher with a 2.58, 2.27 and 2.04 progression on the intention to try scale. If these results would have proved to be significant, this would have been a signal that priming for openness increases intention to try over all three familiarity categories.

Interactions

To test for the second hypothesis, I carried out a multiple regression to test the interaction between the relationship between familiarity and intention to try and openness to experience, for both primed and unprimed populations.

I also carried out a second multiple regression to test the interaction of the subject's resistance to change with the familiarity/intention to try relationship, as a useful proxy for cognitive rigidity and routine seeking behaviours, so as to test the second hypothesis more rigorously.

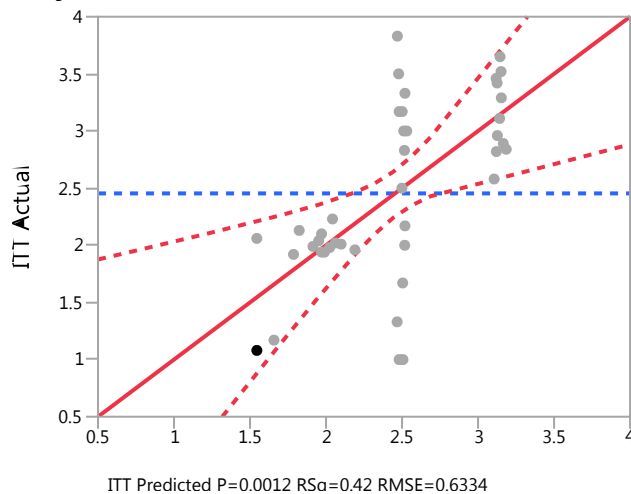
For this analysis, I have created two variables:

1. "Ext" is extremely novel, and was coded as 1 for the population that rated their intention to try based on the least familiar option, i.e. the cricket lollipop
2. "Lea" is least novel, and was coded as, 1 for the population that rated their intention to try based on the most familiar option, i.e. the protein bar

3. Both variables were coded as 0 for the control; i.e. for participants who rated their intention to try the chocolate bar which had a moderate balance of both products

2a. Interaction of Openness with Familiarity and Intention to try with *unprimed* population

Actual by Predicted Plot



Summary of Fit

RSquare	0.422673
RSquare Adj	0.340198
Root Mean Square Error	0.633447
Mean of Response	2.453902
Observations (or Sum Wgts)	41

Analysis of Variance

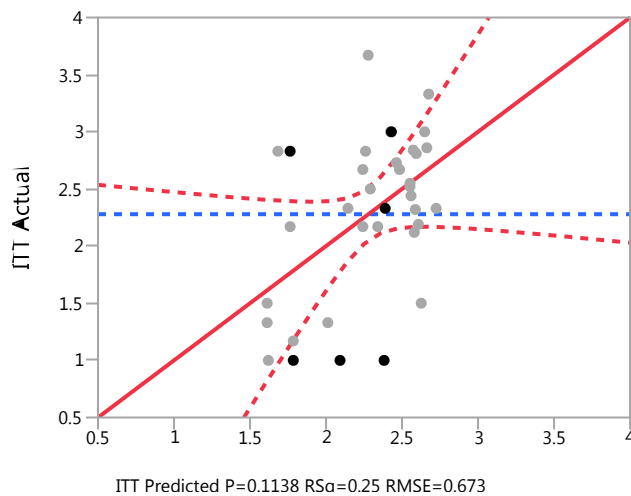
Source	DF	Sum of Squares	Mean Square	F Ratio
Model	5	10.281849	2.05637	5.1248
Error	35	14.043927	0.40126	Prob > F
C. Total	40	24.325776		0.0012*

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob> t
Intercept	2.7306199	0.561511	4.86	<.0001*
Ext[0]	-0.611155	0.13846	-4.41	<.0001*
Lea[0]	-0.280075	0.122163	-2.29	0.0280*
Open	0.0263256	0.158805	0.17	0.8693
Ext[0]*(Open-3.47683)	-0.168727	0.171114	-0.99	0.3309
Lea[0]*(Open-3.47683)	-0.170738	0.180674	-0.95	0.3511

2b. Interaction of Openness with Familiarity and Intention to try with *primed* population

Actual by Predicted Plot



Summary of Fit

RSquare	0.246183
RSquare Adj	0.120547
Root Mean Square Error	0.67301
Mean of Response	2.278889
Observations (or Sum Wgts)	36

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	5	4.437684	0.887537	1.9595
Error	30	13.588271	0.452942	Prob > F
C. Total	35	18.025956		0.1138

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob> t
Intercept	1.9042125	0.986974	1.93	0.0632
Extremely Novel[0]	-0.030482	0.150066	-0.20	0.8404
Least Novel[0]	-0.261153	0.155848	-1.68	0.1042
Openness	0.1158366	0.257774	0.45	0.6564
Extremely Novel[0]*(Openness-3.83306)	0.2340287	0.253781	0.92	0.3638
Least Novel[0]*(Openness-3.83306)	0.4675552	0.329613	1.42	0.1664

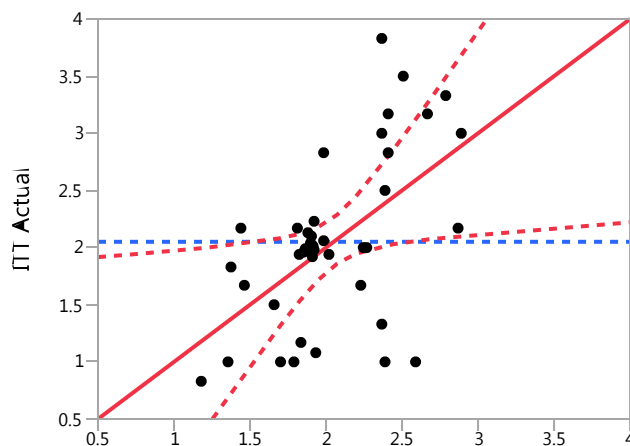
An analysis of these graphs and means shows significantly different results for the familiarity variables for the *unprimed* population and their intention to try with relation to their openness.

The coefficients for both variables are negative (-0.61 for “Ext” and -0.20 for “Lea”), which implies that openness makes people most willing to try to moderately balanced product (i.e. the control) which has a positive coefficient of 2.7 as the intercept.. This differs from the unprimed sample regression *not* taking into account openness to experience, which had the result that people were more likely to try the most familiar product rather than the moderately familiar product. The coefficient for the extremely novel variable is also negative, but this only implies that while openness does have a moderating influence, this influence is not nearly strong enough to induce people to try an extremely novel or very unfamiliar product.

Both the (Ext*open) and (Lea*open) interactions between the two variables are not significant. Both have negative coefficients in any case, which means that I cannot prove my second hypothesis. If the data were indeed significant, the results would point to the theory that there is indeed a moderating factor with openness to experience on the interaction between familiarity and intention to try, however, we cannot say for certainty if the positive relationship is reversed. It seems likely according to the results that the moderating influence has a small effect, and it makes people most likely to try the moderately familiar product.

For the *primed* population, none of the interactions are significant. However, these results would be interesting with significant results because while the coefficients of the Lea and Ext variables are still negative, the interactions do have positive coefficients (0.23 for Ext*Open and 0.46 for Lea*Open), which would imply that respondents would have a higher intention to try the most and least familiar alternative. It is interesting to note that intention to try would still be greater for the “Lea” variable, i.e. the most familiar and least novel alternative.

2c. Interaction of Resistance to Change with Familiarity and Intention to try with *unprimed* population



ITT Predicted P=0.0218 RSq=0.30 RMSE=0.6716

- Summary of Fit

RSquare 0.30345
 RSquare Adj 0.203943
 Root Mean Square Error 0.671638
 Mean of Response 2.050488
 Observations (or Sum Wgts) 41

- Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	5	6.878188	1.37564	3.0495
Error	35	15.788402	0.45110	Prob > F
C. Total	40	22.666590		0.0218*

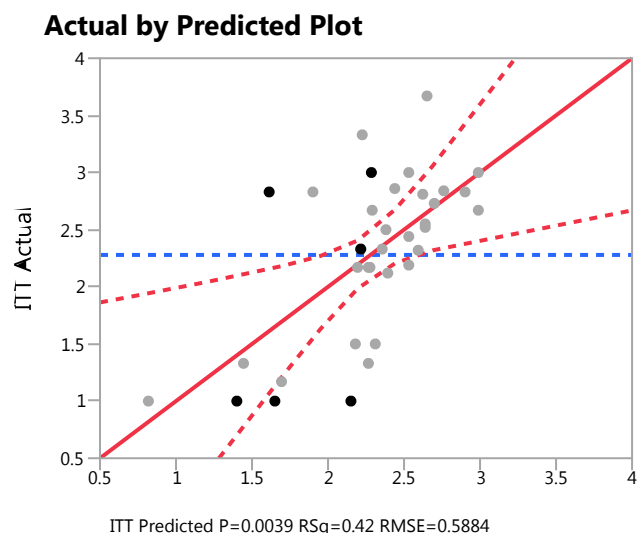
- Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	29	11.326752	0.390578	0.5252
Pure Error	6	4.461650	0.743608	Prob > F
Total Error	35	15.788402		0.8860
			Max RSq	0.8032

- Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob> t
Intercept	2.044731	0.52128	3.92	0.0004*
Ext[0]	0.1251536	0.133452	0.94	0.3548
Lea[0]	-0.303218	0.122719	-2.47	0.0185*
ResChg	0.0128074	0.168742	0.08	0.9399
Ext[0]*(ResChg-2.98878)	-0.206258	0.18651	-1.11	0.2763
Lea[0]*(ResChg-2.98878)	0.1069511	0.196696	0.54	0.5901

2d. Interaction of Resistance to Change with Familiarity and Intention to try with *primed* population



Summary of Fit

RSquare	0.423792
RSquare Adj	0.327757
Root Mean Square Error	0.588408
Mean of Response	2.278889
Observations (or Sum Wgts)	36

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	5	7.639248	1.52785	4.4129
Error	30	10.386707	0.34622	Prob > F
C. Total	35	18.025956		0.0039*

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob> t
Intercept	3.5440118	0.638643	5.55	<.0001*
Extremely Novel[0]	0.1365197	0.118774	1.15	0.2595
Least Novel[0]	-0.163494	0.126274	-1.29	0.2053
Res Chg	-0.427792	0.211471	-2.02	0.0521
Extremely Novel[0]*(Res Chg-2.91694)	0.3504167	0.136961	2.56	0.0158*
Least Novel[0]*(Res Chg-2.91694)	0.1526882	0.227318	0.67	0.5069

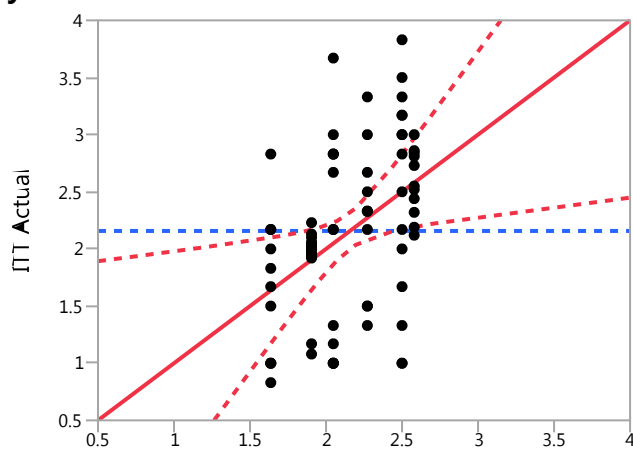
In contrast to the openness interactions, the above two reports test the interaction of *resistance to change* with the familiarity/ intention to try relationship.

For the unprimed population, the coefficients for both Lea is significant and negative, and the coefficient for Ext is positive but not significant. If it was, the data would suggest that people with a high resistance to change would be more likely to try the extremely novel or least familiar product. This would be a surprising results, but the no significance of the interactions make it impossible to state the result with confidence.

The only significant coefficient in the *primed* population report is the interaction between novelty and resistance to change, which is positive. This, along with the positive coefficient for the Ext variable again suggests that the participants with a higher resistance to change will be more amenable to trying extremely novel products. This is very interesting in the primed population, and merits further study.

Two way full factorial ANOVA

Finally, I carried out a two-way factorial ANOVA (Analysis of Variance) test to measure the interaction of the priming effect with familiarity and its effect on openness. Familiarity was again coded as 0/1/2 for most to least familiar, while priming was a binary variable. Again, I carried out a separate analysis on the effect of the two variables on resistance to change.

Actual by Predicted PlotITT Predicted $P=0.0088$ $RSq=0.19$ $RMSE=0.6891$

1.

Summary of Fit

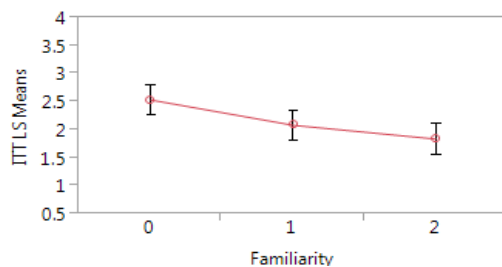
RSquare 0.191437
 RSquare Adj 0.134496
 Root Mean Square Error 0.68906
 Mean of Response 2.157273
 Observations (or Sum Wgts) 77

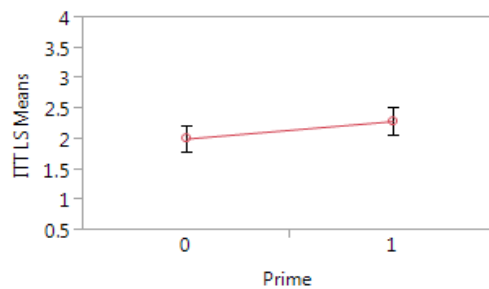
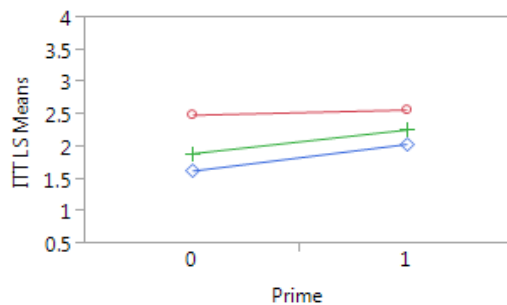
Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	5	7.981500	1.59630	3.3620
Error	71	33.711027	0.47480	Prob > F
C. Total	76	41.692527		0.0088*

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob> t
Intercept	2.1567843	0.079357	27.18	<.0001*
Familiarity[0]	0.3832157	0.111948	3.42	0.0010*
Familiarity[1]	-0.068542	0.111948	-0.61	0.5423
Prime[0]	-0.143108	0.079357	-1.80	0.0756
Familiarity[0]*Prime[0]	0.1031075	0.111948	0.92	0.3602
Familiarity[1]*Prime[0]	-0.040468	0.111948	-0.36	0.7188

LS Means: Familiarity

LS Means: Prime**Familiarity*prime**

It is important to note that here the intercept and control is the least novel/most familiar alternative, not the moderately balanced alternative as was the case in the previous interactions. An analysis of these results shows that familiarity is a significant predictor of intention to try, and in general more familiarity will lead to a greater intention to try as evidenced by the positive coefficient on the familiarity variable.

However, the priming does not seem to have been a good predictor of intention to try: the interaction is almost significant, but the coefficients are negative.

Theory

Consolidating insights from the above reports allows the formation of a few theories to explain the results. My first hypothesis seems to be validated by the results: people are indeed more likely to try a more familiar product, and this is regardless of whether they have been primed for openness or what their personal threshold for openness to experience or resistance to change is. The second hypothesis is difficult to prove either way. If the results had been significant, results would have probably pointed to a moderating effect of openness on intention to try, such that the participants would have been more willing to try the moderately novel alternative. I doubt that openness would moderate the radicalness of the product so much that even a participant scoring high in openness would be willing to try the extremely novel alternative. The Hotlixx candy producers seem to know this: the insect lollipops are marketed entirely as novelties to “freak your friends and kids out.”

Finally, priming for openness to experience does not seem to have made a significant difference to the final results. One suspects that priming would only make a difference in the short term in any case, and longer term intention to try would be more affected by the person’s innate openness to experience or cognitive rigidity, etc. This has interesting implications for marketing decisions for radically creative products, because marketing is a type of prime in itself. If the effectivity of such priming mechanisms is in question, the producers of radically creative ideas may think to re-examine their marketing strategies.

Of course, the analysis had its limitations. The small pool of surveyed participants meant that much of the data was not significant. For future analysis, I would like to expand the pool of participants while also controlling more tightly for demographics, especially education level and location.

Conclusion and Avenues for Future Research

The purpose of this research was to gauge how radically creative, underdog companies and products are perceived by their target market, and how these creative workers can formulate, market and position their products to cater to audiences that may still have an aversion or fear to their product. While this analysis seems to indicate that in general, people will choose the most familiar product, companies should investigate the potential greater openness to experience or low resistance to change of certain potential target markets, such as international travellers or diasporic communities from places that have an insect eating history.

Further avenues for empirical research would involve gauging intention to try with live participants and real product samples. This would be both more expensive and legally difficult to implement than the current analysis, but would deliver much more reliable results and cross the knowledge/action gap. Demographics could also be more thoroughly examined to try to identify and isolate the likely populations described above.

Finally, non-empirical other research that could benefit the entomophagy industry could involve a focused case study on similar highly creative products that did pass into the mainstream. Sushi is one of them, and the edible insect industry could use the marketing, creativity and product decisions in the sushi industry as a model. Such a treatment could include interviews and surveys, but also could include a retrospective of media and popular perceptions of eating sushi then, and insects now, and compare and contrast the approaches made by creative workers to try to replicate the success of the sushi model in the underdog entomophagy industry.

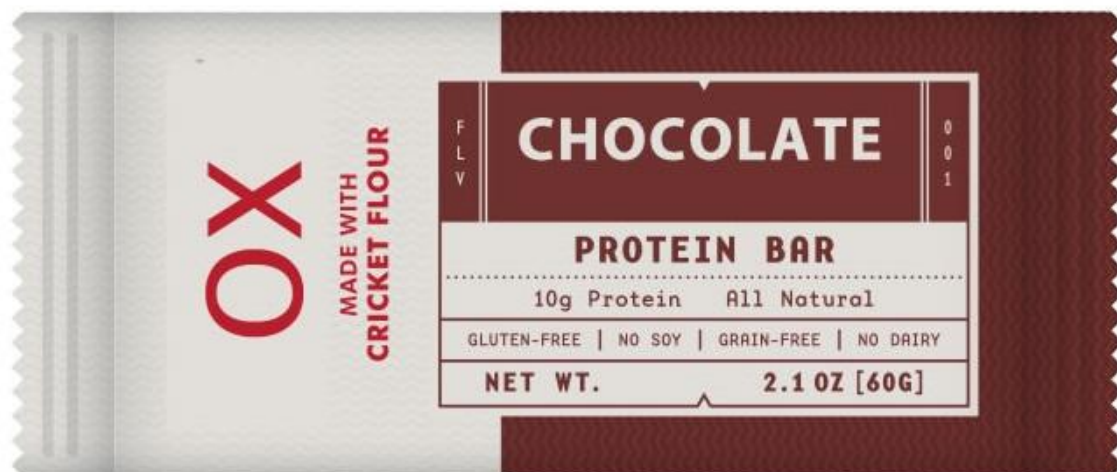
Appendix with Supporting Materials

Sample products described in survey section II

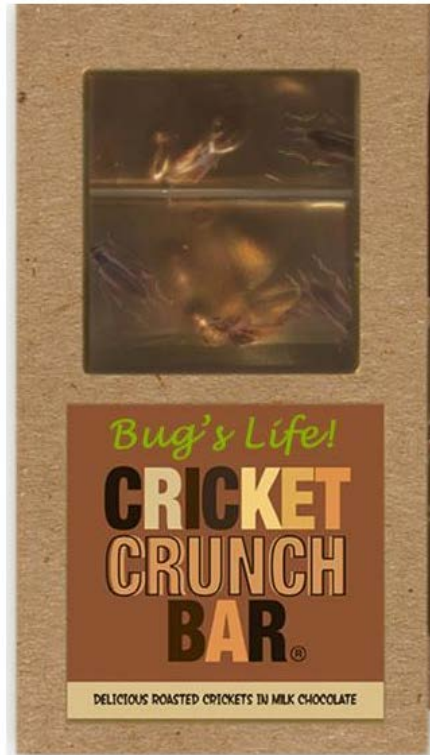
1. Most Familiar/Least Novel: Similar to Exo Bar

Ox makes nutrient-dense protein bars, designed by a three-Michelin-starred chef. They combine minimally-processed cricket flour protein with ultra-premium ingredients. The bar is gluten, grain, soy, and dairy-free and is available in a variety of flavors. They are advertised as "perfect as a meal-replacement, healthful snack or pre/post-exercise." According to Ox, the chocolate flavored bar "tastes like the brownie you're craving" and pairs well with a cup of coffee.

Crickets are a complete protein source, containing all the essential amino acids. Crickets are more nutrient dense than beef, chicken, salmon or eggs. Cricket cultivation uses significantly fewer resources and generates far fewer greenhouse gases than cattle or poultry farming.



2. Moderately Balanced Attributes: Similar to EntoMart Chocolate Crunch Bar



Bug's Life makes edible insect products created for everyday consumption, such as this Roasted Cricket Crunch Bar. The bar contains about two tablespoons of organic crunchy roasted crickets covered in creamy milk or dark chocolate. The company advertises the bar as "tasting so great you'll want to eat crickets at every meal!"

Crickets are a complete protein source, containing all the essential amino acids. Crickets are more nutrient dense than beef, chicken, salmon or eggs. Cricket cultivation uses significantly fewer resources and generates far fewer greenhouse gases than cattle or poultry farming.

3. Most Novel/Least Familiar: Similar to Hotlixx Insect Candy

Lickit Cricket makes a variety of insect candy, including the cricket lollipop pictured above. The lollipop is a ribbon style toffee flavored candy with a whole cricket trapped inside. The company advertises the candy as "perfect to freak out your kids and co-workers with REAL insect suckers!"

Crickets are a complete protein source, containing all the essential amino acids. Crickets are more nutrient dense than beef, chicken, salmon or eggs. Cricket cultivation uses significantly fewer resources and generates far fewer greenhouse gases than cattle or poultry farming.



a. Openness instrument (IPIP, 1999)

+keyed for Openness (-ve keyed for Conventionality)

I see myself as someone who is original, and comes up with new ideas
I am curious about many different things
My imagination tends to be active and vivid
I value artistic and aesthetic experiences
I get excited when exposed to new ideas
I like trips to the art museum or orchestra
I tend to vote for liberal political candidates
I like to carry the conversation to a higher level

-- keyed for Openness to Experience (+ve keyed for Conventionality)

<i>I am not interested in abstract ideas</i>
<i>I prefer a set routine when I work</i>
<i>I have few artistic interests</i>
<i>I think governments spend too much tax money on supporting artists</i>
<i>I tend to vote for conservative political candidates [?]</i>
<i>I do not enjoy going to art museums</i>
<i>I prefer to avoid philosophical discussions</i>
<i>I am not interested in theoretical discussions</i>
<i>I rarely daydream</i>

Resistance to Change instrument (Oreg, 2003)***Routine Seeking Subscale***

I generally consider changes to be a negative thing.
I'll take a routine day over a day full of unexpected events any time.
I like to do the same old things rather than try new and different ones.
Whenever my life forms a stable routine, I look for ways to change it. (-ve keyed)
I'd rather be bored than surprised.

Emotional Reaction Subscale

If I were to be informed that there's going to be a significant change regarding the way things are done at school, I would probably feel stressed.
When I am informed of a change of plans, I tense up a bit.
When things don't go according to plans, it stresses me out.

Short Term Focus Subscale

If one of my professors changed the grading criteria, it would probably make me feel uncomfortable even if I thought I'd do just as well without having to do extra work.
Changing plans seems like a real hassle to me.
Often, I feel a bit uncomfortable even about changes that may potentially improve my life.

Cognitive Rigidity Subscale

When someone pressures me to change something, I tend to resist it even if I think the change may ultimately benefit me.
I sometimes find myself avoiding changes that I know will be good for me.
I often change my mind. (-ve keyed)
I don't change my mind easily.
Once I've come to a conclusion, I'm not likely to change my mind.
My views are very consistent over time.

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