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Making efficiency visible – Insights on effective nudging across decision styles and choice models

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# Making efficiency visible –
# Insights on effective nudging across decision styles and choice models[1]

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## ABSTRACT

Engaging consumers in energy efficient behavior is challenging. Despite most consumers consistently claiming to care about energy efficiency – and even in cases where reported consumer attitudes toward energy saving and its positive impact on the environment are high – these attitudes often do not materialise in terms of behaviour, giving rise to the "attitude behaviour gap". This paper reports results from randomized controlled trials (RCTs) focused on behavioral levers at the disposal of utilities or other program administrators in engaging consumers in more efficient 1-time consumer product purchases. They are quasi-field revealed preference studies, in which participants reveal product preferences in an ecologically valid setting, namely what respondents understood to be a test version of a new consumer comparison and shopping platform for appliances and products for the home, and which they were accessing from outside of a laboratory or obvious test setting.

The studies are based on a novel consumer-facing, utility-branded marketplace platform, which has been deployed in the USA and Europe by utilities serving 47 million households as of September 2017. These marketplaces integrate energy efficiency information in two ways. The first is a relative energy efficiency score, on a zero to 100 scale, assigned to each model in a product category, which can function as either a simple heuristic (just aim for the high number) or as a clear product attribute (concrete efficiency measure).

The experimental results presented suggest that the Enervee Score works across both the "hot", more impulsive, attitude-based (brand) and "cold", more deliberative, attribute-based decision-making styles. The same is not true of the second piece of information provided on the marketplace, namely personalized energy bill savings, presented in dollars, for a selected product model, compared to a benchmark new product.

This growing body of experimental results suggests that making efficiency visible (with the granular, daily updated Enervee Score, as well as personalized energy savings), and injecting these cues into the modern – increasingly digital – shopping journey, can nudge consumers to make more energy efficient purchasing decisions, paving the way for new data-driven, market based approaches.

## Introduction

The attitude behaviour gap (Carrington, Neville, & Whitwell, 2010) has been investigated extensively (Antonetti, 2014; Juvan & Dolnicar, 2014; Petrocelli, Tormala, & Rucker, 2007), with arguments being made it exists due to a myriad of social and psychological phenomena such as rational inattention (Sallee, 2014), heuristics-based decision making (Gigerenzer, 2008; Tversky & Kahneman, 1974), social influence (Cialdini & Nolan, 2005), mental accounting (Kahneman, Knetsch, & Thaler,

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[1] This paper draws on underlying Enervee research, recently published in a more academic, in-depth format (Arquit Niederberger & Champniss, 2017)

1991), discounting (Green & Myerson, 2004), reactance (Brehm, 1966) or indeed political affiliation (Costa & Kahn, 2013).

Purchasing highly efficient products and appliances should in theory provide an excellent context in which to create a one-time intervention to drive energy savings, since the consumer is already in market to buy the product or appliance. Energy efficiency labelling attempts to do this, yet both endorsement and categorical label schemes lack differentiation (a high proportion of products in each category may carry the highest efficiency label available) and voluntary schemes do not cover the entire market. As a consequence, the labelling fails to signal the necessary feedback (Hargreavesn, Nye, & Burgess, 2010) for the consumer's decision. Moreover, where more detailed information has been presented to consumers, in the form of estimated average lifetime running costs (DECC, 2014), this has also failed to significantly influence consumer choice.

The benefits from a successful intervention at this natural consumer decision point are compelling. By the authors' estimates, nudging 30% of U.S. product purchase decisions across four product categories (refrigerators, dishwashers, dryers, TVs) in a single year towards super-efficient models with Enervee Scores of 90+ would save over 15,100 GWh, more energy than needed to meet the annual residential electricity demand of Los Angeles and Sacramento combined (Arquit Niederberger & Champniss, 2017). Recognising this opportunity to deliver such a substantial effect through influencing consumer choices at an obvious and friction-free intervention point, we've run a series of experiments to better understand how and when our unique data-points can influence consumers to buy more energy efficient products.

**Experimental Set-Up**

Respondents were invited to visit what they were led to believe was a prototype consumer shopping site, whereby consumers could research potential appliance products. The appliance in this instance was a front-loading washing machine, and they were presented with a choice of nine models (in line with the standard initial search results presented to users of live utility marketplaces). Respondents were requested to imagine they were in the market for a new washing machine purchase and were invited to review and explore the site. The manipulated test sites mimicked the marketplace sites in that respondents could see a search result page (list of washing machines), with key information next to each machine (see Figure 1a) and could then explore any machine in more detail via the individual product model profile page (see Figure 1b).
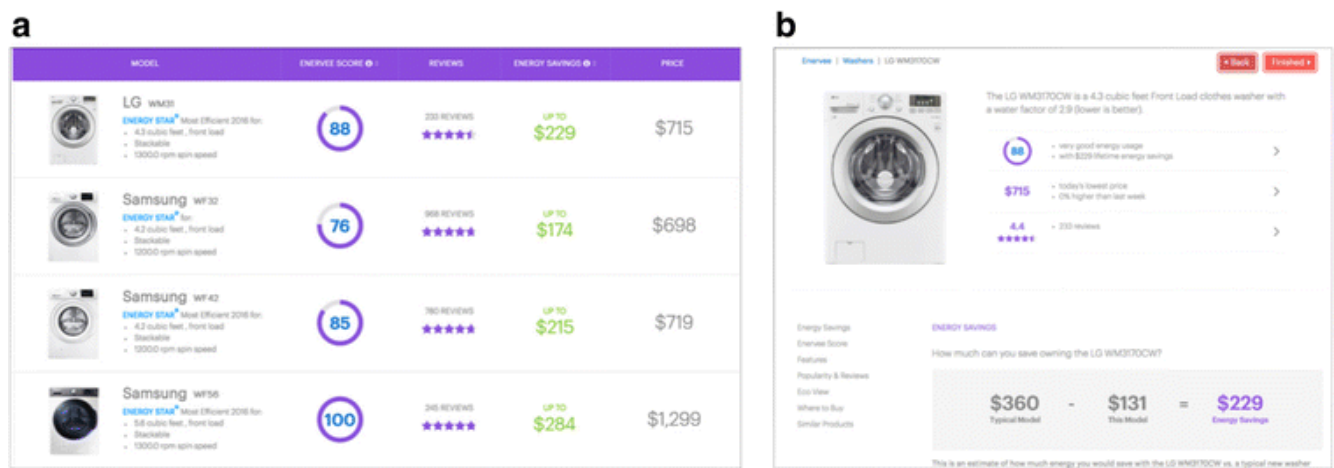


**Figure 1.** Search results (a) and product profile pages (b) for the studies (RCT)

The initial sort order of the search results was random (not determined by underlying energy efficiency) and was consistent across all four conditions. Respondents were able to move between search results and specific product profiles as often as they wanted. Before reviewing and exploring products, respondents were prepared to express their top three product choices, based on their experience on the site. They were informed that once they had made their first, second and third choices, they could proceed to express those choices. Two hundred respondents were recruited via an established academic research panel provider and were allocated at random across each condition until a cell sample of 50 was reached for each condition. Respondents were pre-screened for residency in the USA to bolster face and ecological validity of the study.

We've focused these experiments primarily on the effect of the Enervee Score. As a quick introduction, the Enervee Score is unique to our product, Marketplace, and shows a 0–100 relative energy efficiency score for every product in a category. It's our way of giving the consumer a data point that's both granular (0–100) and dynamic (it's updated every day), but that's also intuitive and easy to understand (just aim for 100). We also design it in such a way that it respects key aspects of a decision that's already been made: if you're looking for a 55" TV, it's not right to try and steer you towards a 40" TV which uses less energy. Instead, the Enervee Score allows you to see which 55" TV is the most efficient.

## The Enervee Score Moves Us

Back to the studies. So far, everything points to the Enervee Score working effectively to lead people to make more efficient choices (Arquit Niederberger & Champniss, 2017). We've seen this across different product categories—from more functional white goods such as washing machines, to more exciting goods such as TVs (Champniss, Arquit Niederberger & Li, in press). In other words, products that may prompt the use of different choice models when we're deciding (from 'affect-driven', to 'attitude-driven', to 'attribute-driven').

Regardless of the choice model, the Enervee Score seems to kick-in and make a positive difference. We've also looked at different consumer groups – for example, the general population vs. low income consumers (discussed in more detail below), or self-reported Republican vs. Democrat consumers – to see if there's an effect. Again, across all of these variables, we see the Enervee Score work drive us toward more efficient purchases.

*It doesn't seem to matter what the product category is, or the consumer type—the Enervee Score moves us. And in a good way.*

This paper discusses results of two independent randomised controlled trials that showed no interaction effect between the energy score and energy bill savings, which may indicate that the score works, regardless of whether a hot or cold decision-making style is in play.

# Implications of Interactions Between Score & Savings

## Low Socio-Economic Status Participants

Prior research results showed that the Enervee Score—a zero to 100 score for every product—consistently drives visitors to make significantly more energy efficient preferences—15%-20% more efficient, to put a number on it. However, when we ran that study, we knew the design would not answer

one of the key critiques of investing ratepayer funds to drive more energy efficient behavior: Isn't saving energy and the environment reserved exclusively for those who have the lifestyle and money to care?

Put another way, can people who are on low incomes, with tight budgets and probably thinking more day-to-day, also afford to make energy efficient choices when replacing appliances for their homes? To test this, we re-ran our exact same study but chose a sample of active US consumers who were on low salaries and who had previously been identified as of low socioeconomic status. We were interested to see if our two key pieces of information presented on Marketplace would make a difference to preferences for this group. To recap, those two pieces of information were:

1. *The Enervee Score—our 0–100 scoring system to show relative energy efficiency of the product compared to all others in the product category,*
2. *The Energy Savings—a detailed estimate of potential financial savings to be made by buying that product compared to a product of standard efficiency in the product category.*

Once again, we created a controlled version of Marketplace featuring a selection of washing machines, and manipulated respondents' access to one of four variations of the site: Enervee Score (yes/no) and Energy Savings (yes/no). We also once again measured if respondents felt the platform was overtly pro-environmental and energy saving in its design, and what their general views were toward the environment (based on a tried and tested scale).

The results both support the earlier conclusions and reveal the potential for Marketplace to operate on multiple levels for different types of appliance shopper. We see the significant effect of the Enervee Score nudging people toward making more efficient choices. Whether recording their first choice for a new machine, or aggregating their top three choices, *when the Enervee Score is present on the platform, low-income respondents steer themselves toward significantly more efficient products*. In fact, the effect is slightly larger with this group than with the original group (see below).
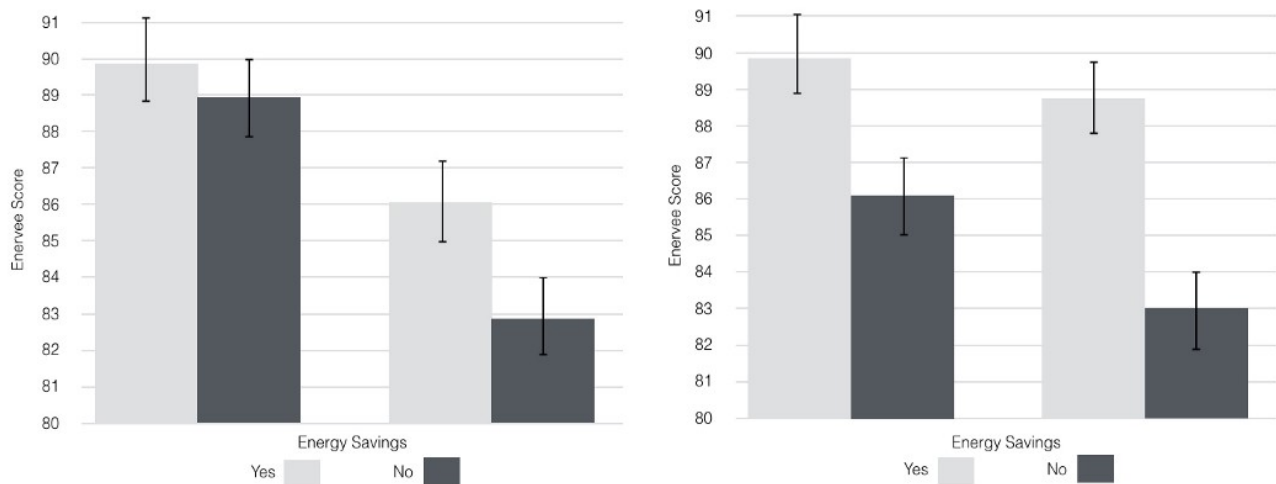


**Figure 2**. Results of RCTs conducted on the general population (left) and on low-income shoppers (right). Paired columns on the left of each chart show the Enervee score conditions.

However, this study also revealed something interesting with respect to the Energy Savings function and its potential influence on making more efficient choices. Whereas in the first experiment (without the required no low-income skew), the Energy Savings function had no effect on making more energy efficient choices, in this second experiment, it looks like it does. Looking at the first choice of

washing machine, its effect is marginally significant, suggesting that with a larger sample of users, we'd secure a clear effect. And looking at the aggregated first three choices, we already see a significant effect of the Energy Savings function on making more efficient choices.

*At first glance, this would make perfect sense. For more financially sensitive shoppers (who made up our second study), it seems sensible to take hard financial benefits (lower outgoings) into consideration when making a new appliance purchase.* Previous research has shown that for those who consider themselves as having little money or under financial pressure, any piece of communication that discusses money (whether it's coming in, or going out) results in those individuals focusing on the financial elements of that communication (Mani et al. 2013), with the reference of money and savings alerting or priming their awareness of belonging to a financially constrained consumer group (Champniss et al. 2016). This could explain what's happening here—whereas the broader user group seemingly glossed over the financial argument presented by the Energy Savings (resulting in no effect), this second group is naturally drawn to this argument, due to their general situation. Further support for this argument is seen in the questions we asked at the close of the study. Whereas in the first study there was no effect of the score and savings functions on people's perceptions of the energy saving positioning of the platform, in this second study, once the energy savings information was in play, respondents saw the platform as significantly more pro-energy savings in its positioning. Again, with financially sensitive consumers already drawn to the financial argument to buy energy efficient via the energy savings function, it's no surprise they carry that focus through to perceiving the platform as a whole to be pro-energy saving.

However, the story's not over yet. If we poke around the results of this second study in a little more detail, we also see there is no interaction effect. An interaction effect describes when two variables combine to affect eachothers' outcomes. In this case, it would be a fair argument to say that the Energy Savings and the Enervee Score should combine forces to deliver the strongest effect in terms of shifting preferences toward energy efficient options.

But we don't see it (we didn't see it in the first study either). So whilst Energy Savings has an effect on its own with this low-income group, it does not double up with the Enervee Score to boost the effect. Why would this be? Well, there's one explanation that is, we think, both the most interesting and the simplest. There is no interaction effect for the simple reason that each of these functions delivers its result by means of a *different underlying psychological effect.*

For the Enervee Score, we'd argue the result driven by a *social status effect.* After all, the Enervee Score not only signals the efficiency of the machine you're choosing, *but also the efficiency of your decision.* In other words, it says something about you as an individual. This effect—referred to signalling—is well documented, and has been used to explain the huge success of Toyota's Prius (the signalling opportunity is considerable with a Prius as it can only be a hybrid). We can call this motivation an *impression management* motivation i.e. it makes us look good.

But for Energy Savings, this financial result is something that no-one else can see—no-one knows that your machine is saving you a dollar amount per month, as its day-to-day cost is invisible to everyone but you and your wallet. So the incentive to engage with this feature is more likely based on more profound personal circumstances rather than social status. In this case, the motivation can be called *intrapsychical* i.e. we don't really care if other people do or don't care.

The argument that these features trigger different underlying mechanisms is further supported if we think about the different forms a behavioral nudge can take. On the one hand, we can have a nudge intervention that activates a heuristic (a mental rule of thumb, or short-cut). The ENERGY STAR label can be thought of as nudge to switch-on a heuristic, as it provides a valid short-cut to making an energy-efficient decision, and it's feasible the Enervee Score could be doing the same, in the sense that it activates a heuristic to 'simply' look for the highest score (in that respect, we'd argue it's a more effective

heuristic than a more standard label for energy efficient buying, as it not only provides a short-cut, but it also triggers a target effect, to try and get as high a score as possible).

An alternative nudge intervention, however, is to switch-off a heuristic and prompt the decision maker to think harder about a decision. This may well be what we're seeing with the Energy Savings figure when presented to the low-income group; as money's already a salient topic for these shoppers, providing a financial benefit of buying energy efficient prompts these shoppers to think more carefully about their choice, leading to more efficient selections.

It's also worth reporting that, as with our broader sample, in this low-income study, we again saw no significant difference between groups across the conditions in terms of their pro-environmental leanings. In other words, once again we find support for our argument that the effects we've seen here are a product of the manipulations, not of underlying and pre-existing attitudes of the respondents.

So does Enervee's Marketplace have the potential to nudge us toward more efficient behaviors via two different effects?

Very possibly. Probably, in fact.

We should, and will, test further. One such area will be trying to understand how to make the Energy Savings figure more salient for those who may not carry the same financial pressures as those in the second study—after all, everyone should like to save money. Whilst we speculated that the failure to see its effect in the first study may have been due to a lack of personalized feedback, the results from this second study open up the opportunity to try other routes. One of these may be variations in fluency and disfluency for energy savings information on Marketplace as a means to switch off the heuristics-driven decision-making for visitors i.e. to nudge all groups to notice and process the financial benefits as much as it seems the financially-stressed do[2].

**Buying Conditions – "Emergency" vs. Planned Replacement**

One variable we've not yet explored is a crucial one in terms of the buying experience and the decision-making model used. It isn't to do with the product, or the type of consumer. It's to do with the reason we're buying the product in the first place. Given that decision-making style, such as hot vs. cold (Peters et al, 2006), reflective vs. impulsive (Strack et al., 2006), or peripheral vs. central (Petty & Cacioppo, 1986) could vary from purchase to purchase, a manipulation is made to the cover story, creating a "why buy?" context variable.

We've recognized for a while that we could segment users of Marketplace based on their reason for buying a product that features on Marketplace. If we think about buying a washing machine, for example, we could be in the market to get one because we're remodeling our home and that includes the laundry room. Or, it could be because our current machine packed up last night, and we need to get a new one to ensure the kids hit school on Monday in something that's (vaguely) clean and (loosely) ironed.

It's not a big stretch to imagine that these two buying contexts—planned and distressed—may have a significant influence on what factors are involved in the decision-making process, including how much the energy efficiency of the product is factored into that decision process.

A planned purchase—which is likely a more deliberative and attribute-driven decision process—we'd call a 'slow buy'. And a distressed purchase—when the product needs to be here now and just get the job done—we'd like to call a 'fast buy'. Yes, we know, it's an awful (mis)use of Daniel

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[2] Preliminary results (Champniss, Arquit Niederberger & Li, in press) highlight the potential importance of user experience and interface, and their roles in making the quantification of energy efficient choices meaningful for consumers, above and beyond the actual dollar savings of such choices.

Kahneman's seminal text on decision making styles, and all for the purposes of arguing for better appliance purchases for our homes. But let's be honest, it's also not the first time we've blatantly used world-class research to make a case for this behavior—we've discussed Richard Thaler's choice of washing machine before now. We've said it before and we'll say it again—no-one ever won a Nobel Prize with a dirty shirt.

Can the Enervee Score lead people to buy better, regardless of why they're buying?

We recognize that buying context could make all the difference in terms of factoring in energy efficiency as a valid attribute in the decision-making process. And we recognize that energy efficiency can seem like an abstract, distant concept at best, and that when under pressure to make a quick decision—to get the clothes clean NOW, for example—those distant and abstract notions can quickly take a back seat. But then again, Enervee is a little different—we try to make energy efficiency less abstract and less distant, by making it relevant, personal and instant.

*With this in mind, we went into the latest experiments confident that we'd see the same effects; than even when people have to buy now, they can still be encouraged to think about the future.* Once again, we returned to our washing machine study, which involves a customized version of Marketplace where respondents are asked to make a choice from a number of genuine products (with genuine product data).

And once again, we manipulated key aspects of the normal Enervee experience in order to better understand how these influence choices: the Enervee Score, and the Energy Savings (projected specific product savings over a fixed period). In addition, we also manipulated the cover story for the study. This time, we introduced respondents to the study with the premise that they were *either* being asked to select a new washing machine based on a wider project to remodel their home (the *'slow buy'*) *or* that they were having to replace the machine in a hurry because their current machine had just stopped working (the *'fast buy'*). Respondents across both of these conditions were then exposed to the exact same manipulations in terms of Enervee Score and Energy Savings information.

Overall, then this gave us a 3-way factorial design: Buying Context (Fast, Slow) x Enervee Score (Yes, No) x Energy Savings (Yes, No). Cell size was 50, which, across the eight permutations, resulted in a final sample of N=207.

Does a distressed washing machine purchase send energy efficiency into a spin? In terms of results, the first thing we see is that *people make significantly less efficient choices overall when they're having to buy in a hurry* (Figure 3). In other words, a distressed, fast buy results in lower energy efficiency.
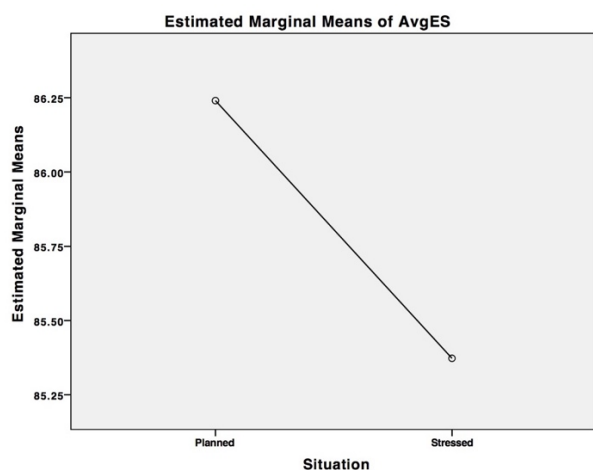


**Figure 3**. Slow buying good, fast buying not so good…

When we've time to plan and buy slowly, the top three washing machines selected had an average Enervee Score of 86.25, compared to 85.35 when in distressed mode (F=6.02, p<.05). This is not surprising—as outlined earlier, it's very likely that when under pressure to make a purchase, that abstract energy efficiency argument struggles to get any purchase in our decision making. Literally, the future gets marginalized by the here and now.

But what about the Enervee Score and the Energy Savings? Did they work?

Yes, they worked.

First up, we see a positive and significant overall effect from both of these features in terms of influencing more efficient choices (Figure 4). To be more precise, the presence of the Enervee Score moved the average efficiency of top three choices from an Enervee Score of 84.8 to 86.7 (F=29.5, p=o.00). And the presence of the Energy Savings information moved the average efficiency of top three choices from an Enervee Score of 85.3 to 86.2 (F=5.9, p<.05).
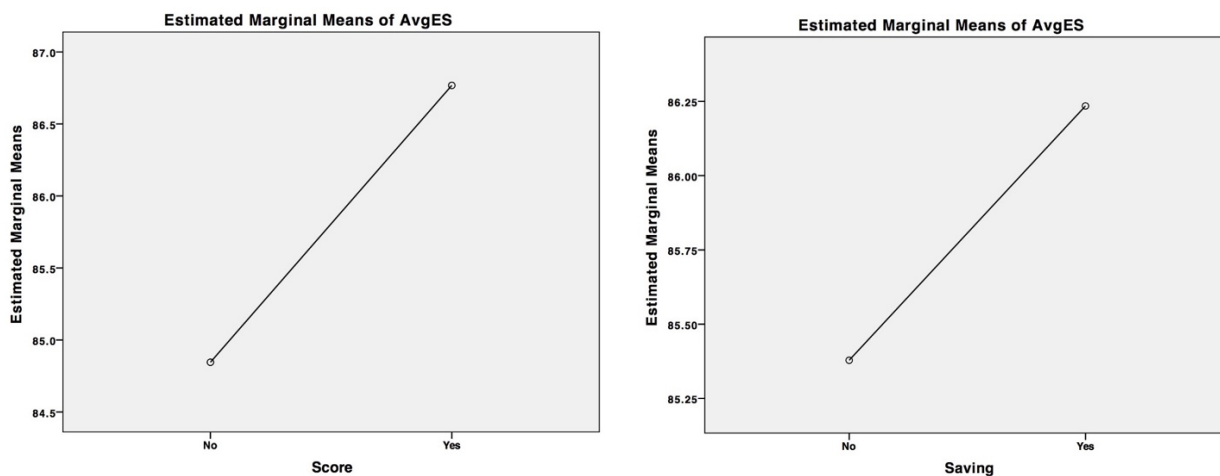


**Figure 4**. The effect of the Enervee Score on efficient purchases (left) and the effect of Energy Savings on efficient purchases (right).

But here's the first of two particularly interesting findings from this study: We see no interaction effect between our two Enervee variables (Enervee Score and Energy Savings) and buying context (Context*Score, F=2.3, p>.1; Context*Savings, F=.001, P>.1). In other words, whether we're buying because we're planning to remodel or because the machine urgently needs replacing, has no effect on the ability of either the Enervee Score or the Energy Savings to influence more efficient purchases.

*In short, the Enervee Score and Energy Savings each show a significant effect on better choices, irrespective of why people are buying.* This is a great result for us, and supports our earlier notion—that by making energy efficiency both real, immediate and personal, even within more compressed decision frames, there's still an opportunity to drive significantly more efficient outcomes.

And here's the second interesting finding from this study—and one we can only see specifically through the design we created (a 3-way factorial design). When we look at the relationship between all three variables (Enervee Score, Energy Savings and Buying Context), we see a 3-way interaction effect (F=3.9, p<.05). This can be a bit heavy going (stay with us) but what this result tells us is that the relationship between the Enervee Score and Energy Savings, in terms of their influence on our choices, *changes* with the buying context. In other words, how we use these two Enervee features together, depends on why they're buying (Figure 5).
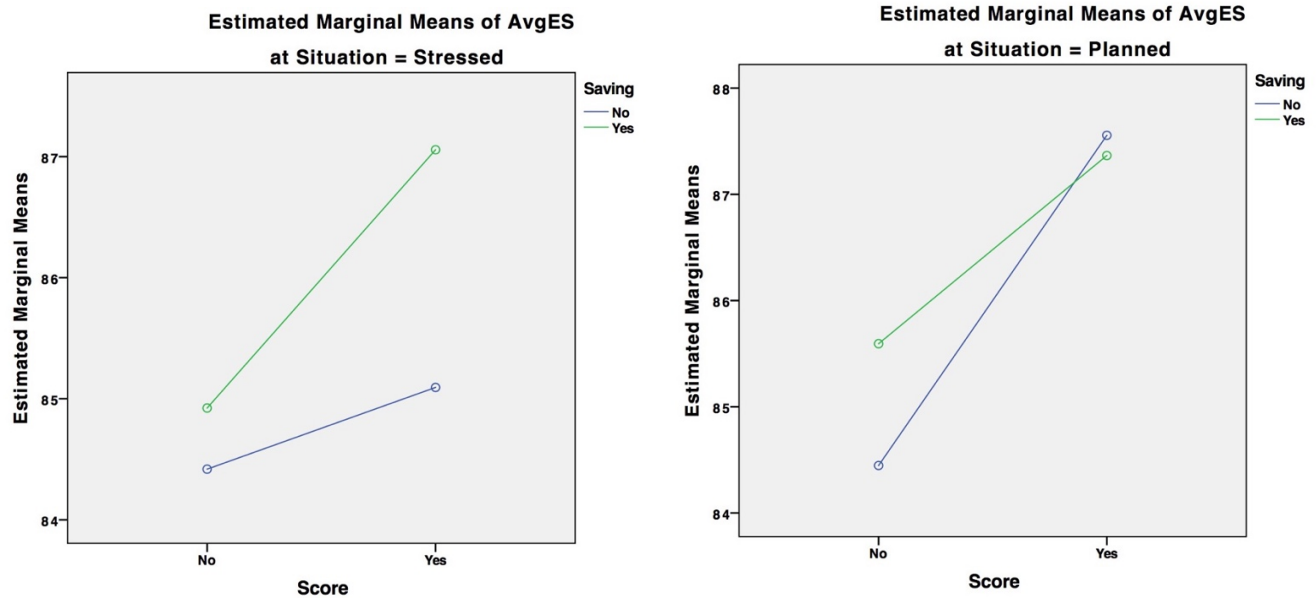
**Figure 5.** How the Enervee Score and Energy Savings work with fast buying (left)…and planned purchases (right)

The results suggest that within a planned, slow buying context, adding the Energy Savings information to the experience with the Enervee Score already given, adds nothing to the decision outcome. In other words, the Enervee Score is the most influential factor here. But when we're buying within a distressed, fast buying context, if we add the Energy Savings information to the Enervee Score, we see a considerable step-up in terms of energy efficiency of choices. In other words, presenting both features here is important.

Why might this effect exist? It likely goes back to our opening argument, in terms of energy efficiency and its frustrating propensity to be abstract, impersonal and distant. Whilst the Enervee Score generally does a good job of disabling these shortcomings (born out by the numerous positive effects we've recorded), maybe this isn't enough to push efficiency over the line for when we're under pressure to make a quick choice. In other words, when we're up against it, in terms of replacing a broken appliance, having the Energy Savings to financially quantify the impact of a high Enervee Score choice for us personally, makes all the difference. It's the final step to keep efficiency in that crucial attribute list, when the decision's being made.

We're aware that a 3-way interaction effect doesn't make for easy and immediate conversations around using Enervee Marketplace. Sometimes research lurches off in what looks like an esoteric direction. But that's really not the case here—we believe this final result adds to an important conversation regarding Marketplace and its ability to nudge us all toward making more efficient choices. Specifically, it adds this:

*When we think about segmenting consumers on energy efficient purchasing behavior, we must keep in mind that why we're buying is an important influence on this behavior.* This context would never be picked up in conventional demographic or even psychographic segmentation techniques. But it's crucial, because it clearly influences how we make choices, and if we want to improve those choices, then knowing this context is important in refining the intervention to deliver that improvement.

So how might we be able to determine these contexts within the consumer buying journey? Well, a sizeable advantage to platforms like Marketplace is that we see long engagement times with consumers—more than 50% of their total yearly online time with utilities is typically spent on

Marketplace in just one visit. And during this time, Marketplace visitors commit to lots of specific and novel actions (such as how they sort, filter, or look at features for example). Once we know how just a few of these behaviors relate specifically to buying context, we'll be able to spot, early in the journey, what that context is, and intervene in that journey in such a way as to have a better shot at driving a more efficient purchase.

Which all means—esoteric 3-way interactions or otherwise—outputs like this help us further refine our proposition to nudge more of us into more efficient choices. Which means less energy consumed and a better buying experience. And which could also mean the kids still get to school with clean clothes on Monday.

## Conclusions

As this body of research builds, policymakers and leading utilities are increasingly acknowledging the foundational importance for successful market transformation of making efficiency both visible and intuitively simple for consumers – and essential if we are to engage the mass of consumers and drive private investment into the most efficient consumer products.

The fact that there was no interaction effect between the two energy attributes in these studies suggests that they function in different ways to elicit the desired response: The simple-to-process energy score elicits a hot/impulsive decision style, whilst the cognitively more complex energy bill savings information prompts a reflective/cool decision style. The Enervee Score does the trick in terms of nudging behaviors in the right direction, even amongst a low-income target group for whom energy efficiency may not be the top priority. And we've also seen what may be the potential of the Energy Savings function to help drive that effect, albeit by a different underlying mechanism.

Moreover, the three-way interaction effect points to buying context influencing decision-making style. Consumers faced with the need to quickly replace a broken appliance (distressed purchase) selected significantly less efficient washer models than those in the planned purchase condition, who had plenty of time to research their choices. However, the energy score continued to be effective across both buying conditions. Whilst this feels intuitively correct, our research offers early empirical support for this view.

These are all valuable insights to inform the continued development of cost-effective and scalable interventions, nudging us all toward making more energy efficient choices, whether these nudges involve the subconscious, the conscious, the emotional, the rational, the selfish, the altruistic, the social or the personal. Because we recognize there'll be more than route to moving us all to buy energy efficient. And we just need to help everyone find their own way.

# References

Antonetti, P. (2014). How categorisation shapes the attitude-behaviour gap in responsible consumption. *International Journal of Market Research*, *57*(1), 51–72.

Arquit Niederberger, A. & Champniss, G. (2017). "Flip sides of the same coin? A simple efficiency score versus energy bill savings information to drive consumers to choose more energy-efficient products" *Energy Efficiency* (https://doi.org/10.1007/s12053-017-9542-3).

Brehm, J. W. (1966). *A theory of psychological reactance*. *New York*.

Carrington, M. J., Neville, B. A., & Whitwell, G. J. (2010). Why ethical consumers don't walk their talk: Towards a framework for understanding the gap between the ethical purchase intentions and actual buying behaviour of ethically minded consumers. *Journal of Business Ethics*, *97*(1), 139–158.

Champniss, G., Wilson, H., Macdonald, E., & Dimitriu, R. (2016). No I won't, but yes we will: driving sustainability donations through social identity effects. *Technological Forecasting and Social Change, 111*, 317–326.

Champniss, G., Arquit Niederberger, A. & Li, V. (in press). Hot and Cold: Harnessing consumers' different decisionmaking styles to drive energy efficient purchasing of appliances. Proceedings EEDAL 17.

Cialdini, R. B., & Nolan, J. (2005). Basic Social Influence Is Underestimated. *Psychological Inquiry*, *16*(4), 158–161.

Costa, D. L., & Kahn, M. E. (2013). Energy conservation 'nudges' and environmentalist ideology: Evidence from a randomized residential electricity field experiment. *Journal of the European Economic Association*, *11*(3), 680–702.

DECC (2014). Evaluation of the DECC/John Lewis energy labelling trial. Retrieved from https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/350282/John_Lewis_trial_report_010914FINAL.pdf

Gigerenzer, G. (2008). Why Heuristics Work. *Perspectives on Psychological Science*, *3*(1), 20–29.

Green, L., & Myerson, J. (2004). A discounting framework for choice with delayed and probabilistic rewards. *Psychological Bulletin*, *130*(5), 769–792.

Hargreavesn, T., Nye, M., & Burgess, J. (2010). Making energy visible: A qualitative field study of how householders interact with feedback from smart energy monitors. *Energy Policy*, *38*(10), 6111–6119.

Juvan, E., & Dolnicar, S. (2014). The attitude-behaviour gap in sustainable tourism. *Annals of Tourism Research*, *48*, 76–95.

Kahneman, D., Knetsch, J. L., & Thaler, R. H. (1991). The Endowment Effect, Loss Aversion, and Status Quo Bias. *Journal of Economic Perspectives*, *5*(1), 193–206.

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Mani, A., Mullainathan, S., Shafir, E., & Zhao. (2013). Poverty impedes cognitive function. *Science, 341*(6149), 976–980.

Peters, E., Vastfjall, D., Garling, T., & Slovic, P. (2006). Affect and decision making: a 'hot' topic. *Journal of Behavioral Decision Making, 19*, 79–85.

Petrocelli, J. V., Tormala, Z. L., & Rucker, D. D. (2007). Unpacking attitude certainty: attitude clarity and attitude correctness. *Journal of Personality & Social Psychology*, *92*(1), 30–41.

Petty, R. E., & Cacioppo, J. T. (2011). *Communication and Persuasion: Central and Peripheral Routes to Attitude Change*. Springer London.

Sallee, J. M. (2014). Rational inattention and energy efficiency. *Journal of Law and Economics*, *57*(3), 781–820.

Strack, F., Werth', L., & Deutsch, R. (2006). Reflective and Impulsive Determinants of Consumer Behavior. *Journal of Consumer Psychology*, *16*(3), 205–216.

Tversky, A., & Kahneman, D. (1974). Judgment under Uncertainty: Heuristics and Biases. *Science*, *185*(4157), 1124–1131.