Green consumption signals altruism and elevated social status

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Abstract

Recent studies (e.g., Griskevicius, Tybur, and Van den Bergh, 2010) have suggested that green consumption, similar to other instances of altruistic behaviour, may be used as a signal of elevated social status. The purpose of this study was to test this hypothesis using a series of three web-based experiments (total $N = 1,223$). We manipulated the green profile and costs of grocery products bought by a hypothetical consumer. Participants then evaluated the consumer's social status using direct and indirect measures of social status. Our results showed that green consumption was perceived by external observers both as a signal of altruism and elevated social status. Interestingly, we found that even though the price of products had a positive effect on the perceived social status of a consumer, it did not interact with the green profile of consumption as would be expected by the theory of costly signalling of altruism. Green consumption thus seems to be a very strong signal of elevated social status, quite independent of the explicit costs associated with such consumption.

Keywords: green consumption; social status; altruism; costly signalling

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1. Introduction

The tendency to seek higher social status seems to be universal (Anderson, Hildreth, and Howland, 2015), not least because social status brings its bearer many benefits such as financial success, power, and attractiveness (Price, 2015). Social status is not something objectively given but always a perception of others (Anderson, Hildreth, and Howland, 2015). Thus, individuals are on one hand motivated to infer the social status of others from the tiniest bit of information available on those people, including what they wear or drive (e.g. Mandel, Petrova, and Cialdini, 2006; Belk, Bahn, and Mayer, 1982; Veblen, 1899), and, on the other hand, they are motivated to send a signal about themselves that would increase their social status in the eyes of others (e.g. Rucker and Galinsky, 2008; Hardy and Van Vugt, 2006; Iredale and Van Vugt, 2011). One type of information that has been noted as having considerable influence on perception of social status is information about one's level of altruism (e.g., Iredale and Van Vugt, 2011; Bliege Bird and Smith, 2005; Gintis, Smith, and Bowles 2001; Smith and Bliege Bird, 2000), even though there is not full consensus on whether this occurs because of the positive sanctioning of altruists by others (reciprocity theory, e.g., Alexander 1987; Milinski, Semmann, and Krambeck, 2002a), or because a display of altruism increases a person's attractiveness (costly signalling theory, e.g., Bliege Bird, Smith, and Bird 2001; Gintis et al. 2001; Sosis 2000) by signalling to others that the person is endowed with desirable qualities such as health and vigour (e.g. Smith and Bliege Bird 2000). There are many ways how one can signal to others his or her altruism, such as an ostensible charitable donation, driving an environmentally friendly car, or volunteering for community work (Van Vugt, Snyder, Tyler, and Biel, 2000; Milinski, Semmann, and Krambeck, 2002b; Barclay and Willer, 2007; Griskevicius, Tybur, and Van den Bergh,

2010). Recent studies have indicated that green consumption, an example of altruistic behaviour which involves additional personal costs and contributes to the social goals of environmental protection and social betterment (Sachdeva, Jordan, and Mazar, 2015; Kaiser, Doka, Hofstetter, and Ranney, 2003; Stern, 2000), is also taken by external observers as a signal of elevated social status (Griskevicius, et al., 2010).

1.1. Green consumption and social status

Some of the studies which focused on the relationship between green consumption and social status have pointed out that it is not green consumption as such but, rather, the consumption of expensive green products which is related to the perception of elevated social status (Griskevicius, et al., 2010; Sadalla and Krull, 1995). This perspective builds on the theory of costly signalling of altruism, which predicts that only costly signals of altruism will be perceived by other as genuine and as such will affect the perception of social status (Zahavi, 1975; Smith and Bliege Bird, 2000). Findings regarding whether the effect of green consumption of status is moderated by the cost of consumption are not clear. One study has supported the cost moderation hypothesis by finding that status-seeking individuals have a preference for green products only when these are costly (Griskevicius et al., 2010). However, the study did not manipulate the profile of consumption independent of its costs and also did not directly measure the perceived social status. Another piece of evidence in support of the cost moderation has been provided by Sadalla and Krull (1995) who found that altruistic, but cost-saving energy conservation measures, actually undermine social status. On the other hand, the only study conducted so far which has attempted to measure the effect of green labels on perceived social status did not find any such effect, not even for a costly green label (Berger, 2017).

1.2. Research goals

The purpose of this research is to examine the effect of green consumption on social status. More specifically, we aim to disentangle the effect of green consumption from the effect of consumption costs and to examine the potential moderating effect of consumption costs on the signalling of social status through green consumption. This work consists of three web-based experiments which allow us to manipulate the green profile of consumption (Studies 1-3) and the associated explicit costs of consumption (Studies 2-3). Unlike in previous studies (Sadalla and Krull, 1995; Griskevicius et al., 2010; Berger, 2017), we measure the effect of green consumption on perceived social status with the direct measures of social status (Studies 1-3) and also indirect measures based on the rating of status-relevant qualities (Study 2) and on favourable treatment (Study 3).

We hypothesize that (i) consumption with green profile (i.e., consumption of goods labelled as organic, natural, bio or *Fairtrade*) will have a positive effect on the social status of the consumer (see, e.g., Barclay and Willer, 2007; Roberts, 1998). We also hypothesize that (ii) cost of goods consumed will have a positive effect on the social status of the consumers (see, e.g. Nelissen and Meijers, 2011). Finally, we also hypothesize that there will be a positive interaction of the green profile of consumption and its cost as expected by the theory of costly signalling of altruism (see, e.g. Griskevicius et al., 2010; Zahavi and Zahavi 1997; Smith and Bliege Bird, 2000).

2. Study 1: Perceived social status of green consumers¹

Green consumption, an example of altruistic behaviour (Sachdeva, Jordan, and Mazar, 2015), is supposed, according to the theory of costly signalling (Van Vugt, 2001; Iredale and Van Vugt, 2011), to convey implicit information about one's elevated social status (Bliege Bird and Smith, 2005, Gintis et al. 2001). In Study 1, we focus on whether green consumers are perceived as having higher social status.

2.1. Method

2.1.1. Participants

A convenience sample of Czech adults recruited from a dedicated survey site, *Vyplnto.cz*, participated in a web-based experiment ostensibly focusing on the perceived traits of consumers. The final sample ($N = 259$; response rate = 43%) was variable in terms of age ($M = 33.1$, $SD = 13.3$), gender (78.8% were females), and education (52.0% had tertiary education).

2.1.2. Materials

2.1.2.1. Manipulation of consumer profile

To manipulate altruism levels associated with consumer behaviour, we used a procedure adapted from Haire (1950) and Sadalla and Krull (1995). Participants were shown a shopping list featuring nine items that a hypothetical male (named Jiri) or female (named Marie) consumer had bought in a grocery store. Two different shopping lists featured either six green products and three conventional products (green profile of consumption), or two green products and seven conventional products (conventional profile of consumption). Of the nine items, three conventional items and two green items were the same in the two profiles of consumption. The remaining items were either green items (green profile of

¹ Materials, data, and analysis scripts for all three studies can be found here: https://osf.io/r9b84/?view_only=14114d35a83a4192ab4a88a8800908fd. Preregistration of Study 3 can be found here: https://osf.io/k56er/?view_only=d833df02d2774fb0bc45dbe16c5a0785.

consumption) or conventional items (conventional profile of consumption); the two sets of items were close substitutes in terms of both products and packaging sizes (for details of the shopping lists, see Appendix A). The items were derived from existing products available on the Czech market. The shopping lists indicated product names, the environmental quality of items (by adding the words organic and bio to the product label), and information about package sizes.

2.1.2.2. Measures of perceived social status

Two alternative measures were used to assess perceived social status. The *indirect* measure of social status was adopted from Sadalla and Krull (1995) and consisted of five semantic scales, each having five points with endpoints anchored in adjective pairs (rich–poor, educated–uneducated, intelligent–unintelligent, manager–manual worker, and cultural–non-cultural). Items were recoded prior to analysis so that higher values indicated higher levels of social status. The internal consistency of this indirect measure of social status was sufficient ($\alpha = .76$).

The *direct* measure of social status consisted of one item asking participants to evaluate the social status of a hypothetical consumer on a 5-point bipolar scale ranging from -2 (high social status) to +2 (low social status). This direct measure has been previously found to correlate strongly with the prominence and influence people receive in their relevant social groups (Anderson, John, Keltner, and Kring, 2001). The direct measure was reverse coded in the subsequent analysis so that higher values reflected higher social status. The two measures of perceived social status (direct and indirect) were highly correlated, $r_s(257) = .60, p < .001$.

2.1.2.3. Measure of perceived altruism (a manipulation check)

A direct measure of perceived altruism was used to check that the green profile of consumption was perceived as an altruistic signal. This measure consisted of one item asking participants to evaluate a hypothetical consumer on a 5-point bipolar scale ranging from -2

(altruistic) to +2 (non-altruistic). This item was also included in the list of adjectives describing the hypothetical consumer's personality, together with items measuring social status. The measure of perceived altruism was reverse-coded so that higher values reflected higher altruism.

2.1.3. Design and procedure

Study 1 had a 2 (gender of the hypothetical consumer: male vs. female) x 2 (profile of consumption: green basket vs. conventional basket) full-factorial between-subjects design. After accessing the questionnaire online and providing their implicit informed consent, participants were randomly assigned to one of four experimental conditions. Participants were then asked to read carefully through the shopping list of a hypothetical consumer and were instructed to try to form a detailed mental image of the consumer by visualizing "what she or he is like and what she or he does". Participants then evaluated the consumer.

The evaluation section consisted of participants rating the hypothetical consumer using a battery of 34 evaluative items in which were embedded the two measures of social status and the manipulation check. Next, participants provided their socio-demographics (gender, age and education level) and proceeded to the debriefing section, at which point they learned about the purpose of the study (an investigation of shared stereotypes about green consumers), were given contact information in case they wanted to learn more about the study, and could decide to withdraw from the study. Participants did not receive any financial compensation for completing the study.

2.2. Results

2.2.1. Manipulation check

Manipulation of altruistic signal through green consumption was successful; ordinal logit model (see Appendix B) revealed that the green consumers were perceived as more

altruistic than the conventional consumers, $OR = 2.21$, 95% CI [1.32, 3.70], $z = 3.03$, $p = .002$.

2.2.2. Signalling of social status

Ordinal logit model with the direct measure of social status as the dependent variable revealed that a consumer who purchased green products was perceived as having a higher social status than a consumer who purchased conventional products (see Table 1 for details). These results did not change when we entered the socio-demographic characteristics of participants in the model (see Appendix C), suggesting that these results are rather independent of the socio-demographic characteristics of participants.

Essentially the same results were obtained with the OLS model which had the indirect measure of social status as the dependent variable (see Appendix D for details). This model also revealed that a consumer who purchased green products was perceived as having a higher social status than a consumer who purchased conventional products, $b = 2.29$, 95% CI [1.47, 3.11], $t(5, 252) = 5.42$, $p < .001$, $\beta = 0.32$.

Table 1: Effect of green profile of products on direct measure of social status (ordinal logit model, Study 1)

	OR	95% CI	z	p
Green	2.05	[1.30, 3.21]	3.11	.002
Male_target	1.16	[0.74, 1.81]	0.65	.515
Green x Male_target	1.26	[0.51, 3.08]	0.50	.617
-2 -1	0.04	[0.02, 0.08]	-10.24	.000
-1 0	0.28	[0.21, 0.38]	-8.34	.000
0 1	1.38	[1.08, 1.78]	2.53	.011
1 2	7.29	[5.03, 10.56]	10.49	.000

Residual deviance: 732.65

BIC: 771.544

$N = 259$

Note: *Green* is a dummy indicator of green condition; *Male_target* is a dummy indicator of a hypothetical consumer being male. Both indicators were mean-centred to facilitate interpretation of their interaction.

2.3. Discussion of Study 1

The results of Study 1 corroborated the hypothesis derived from costly signalling theory (Bliege Bird and Smith, 2005, Gintis et al. 2001), and supported by previous empirical evidence (Griskevicius, Tybur, and Van den Bergh, 2010), that green consumption, an instance of altruistic behaviour, signals superior social status. However, since green goods are usually more expensive (Consumer reports, 2015; ČSÚ, 2014), the question remains whether this effect was produced by the green profile of the goods as such, or their implicit price as perceived by consumers (see e.g., Nellisen and Meijers, 2011). Such elevated implicit cost could have led participants to infer the superior social status of green consumers. To explore this possibility, we systematically varied the explicit product prices in Studies 2 and 3.

3. Study 2: Price of green products and the effect on a consumer's social status

The second study aimed to disentangle the effect of altruism conveyed by the environmental quality of products on perceived social status from the effect of perceived prices. Based on the theory of conspicuous consumption, we expected that the price of products would have a positive effect on the perceived social status of their consumers (Nellisen and Meijers, 2011). Based on the costly signalling theory (Van Vugt, 2001; Iredale and Van Vugt, 2011), we also expected that the environmental quality of products would

have a positive effect on perceived status, but only when green products were costly. In other words, we expected a positive interaction between the price and green profile of products.

3.1. Method

3.1.1. Participants

A sample of 280 adult Czechs, recruited from a proprietary Internet panel, was invited to participate in the study and fill out an online questionnaire for remuneration (20 CZK, approx. 0.8 Euro). Thirteen (5%) of the invited participants did not complete the questionnaire. The remaining sample of participants ($N = 267$) was variable in terms of age ($M = 44.6$, $SD = 13.3$), gender (48.3% were males) and education (20.2% had tertiary education).

3.1.2. Materials

3.1.2.1. Manipulation of consumer profile

The same procedure as in Study 1 was used to manipulate the altruistic signal in consumption. The only difference being that in Study 2 the shopping basket included nine items, of which either six (in green profile of consumption) or two (in conventional profile of consumption) were green products (for details see Appendix E).

3.1.2.2. Manipulation of costs of products

To manipulate the costs of products bought by a hypothetical consumer we displayed either high prices or low prices for each set of products, with high prices being on average 1.3 times higher than the low prices. Experimental conditions were not labelled as high- or low-price. We also included a third price level which was the same as the low-price condition, apart from the fact that it was specifically labelled as "reduced price"; this price condition was used only for green products (see Appendix E for a display of consumer baskets).

3.1.2.3. Presentation of the consumer

The same procedures as in Study 1 were used to present the hypothetical consumer, apart from the fact that we presented a female character only.

3.1.2.4. Measures of perceived social status

The same direct and indirect measures of social status were used as in Study 1; these measures were embedded in a list of 24 items and were recoded prior to analysis so that higher values indicated higher levels of social status. The internal consistency of the indirect measure of social status was sufficient ($\alpha = .77$). The direct measure of perceived social status correlated highly with the indirect measure, $r_s(259) = .65, p < .001$.

3.1.2.5. Manipulation check

The same manipulation check as in Study 1 (i.e. perceived level of altruism) was used.

3.1.3. Design and procedure

This study had a 2 (profile of consumption: conventional vs. green shopping basket) x 2 (price of products: high price vs. low price) full-factorial between-subjects design with an additional condition (low-price green products with a "reduced price" label).

This experiment was part of a larger study. Therefore, after accessing the online questionnaire and providing their implicit informed consent, participants first participated in an unrelated 10-minute experiment on moral regulation processes and then proceeded to this experiment. At the beginning of this experiment, participants were randomly assigned to one of the five experimental conditions.

3.2. Results

3.2.1. Manipulation check

Manipulation of a consumer's altruism through the presentation of green and conventional shopping baskets was successful, as indicated by the fact that consumers who bought more green products were perceived as being more altruistic (see Appendix F for details). Importantly, a consumer who bought more expensive green products was not perceived as being more altruistic than a consumer who bought cheaper green products. The fact that the interaction of green profile and price did not elevate perceived altruism beyond the effect of green profile (and price) indicated that green consumption is perceived as an honest signal of altruism regardless of its cost.

3.2.2. Costly signalling of social status

An ordinal logit model with direct measure of social status as the dependent variable revealed that only the green profile of products had a positive effect on the rating of social status, whereas price had no effect on the rating of social status (see Table 2 for details). Contrary to expectations derived from the theory of costly signalling of altruism, there was no interactive effect between the price and green profile of products on the rating of social status. Of note is the fact that even when green products were specifically labelled as having a "reduced price", this had no additional effect on the rating of a consumer's social status. These results remained basically the same when we entered the socio-demographic characteristics of participants in the model (see Appendix G), suggesting that these results are rather independent of the socio-demographic characteristics of participants.

Table 2: Effect of price and green profile of products on direct measure of social status(ordinal logit model, Study 2)

	OR	95% CI	<i>z</i>	<i>p</i>
Green	2.54	[1.55, 4.17]	3.70	.000
Highprice	1.07	[0.64, 1.78]	0.25	.803
Green x Highprice	1.15	[0.42, 3.17]	0.27	.790
Green x Reducedprice	0.30	[0.05, 1.73]	-1.35	.177
-2 -1	0.02	[0.01, 0.04]	-9.05	.000
-1 0	0.16	[0.11, 0.23]	-9.77	.000
0 1	1.08	[0.81, 1.44]	0.55	.583
1 2	7.48	[5.02, 11.14]	9.88	.000

Residual deviance: 677.18

BIC: 721.6915

N = 261

Note: Green is a dummy indicator of green condition; Highprice is a dummy indicator of a high price condition; Reducedprice is a dummy indicator of a reduced price condition. All indicators were mean-centred to facilitate interpretation of their interaction.

Essentially the same results were obtained using an OLS model with the indirect measure of social status as the dependent variable (see Appendix H for details): perceived status is higher for buyers of green products, $b = .36$, 95% CI [0.20, 0.52], $t(7, 253) = 4.46$, $p < .001$, $\beta = 0.27$, but neither high price nor interaction of high price and green quality of products had a significant effect on social status. It should be mentioned though that the "reduced price" label has, in this model, a marginally significant negative effect on the rating

of social status, consistent with the theory of costly signalling of altruism, $b = -.55$, 95% CI [-1.14, 0.04], $t(7, 253) = -1.82$, $p = .071$, $\beta = -.42$ (see Appendix H).

3.3. Discussion of Study 2

Similar to the results obtained in Study 1, this study also showed that green consumption signals altruism and superior social status. Moreover, it also showed that, contrary to the theory of costly signalling (Griskevicius et al., 2010), green consumption does not need to be more expensive to be accepted as an honest signal of altruism and thus affect perception of social status. However, the lack of a theoretically expected direct effect of price on perceived social status may suggest that the price differences between low-price and high-price levels (the average price difference was 30%) were not sufficient in Study 2 to affect the perception of social status. To address this issue, we increased the price differences in Study 3.

4. Study 3: The effect of costly altruism with elevated cost differences

Study 3 aimed to corroborate the findings of Study 2 regarding the main effect of green profile and a lack of interactive effect of price and green profile of consumption on the rating of a consumer's social status. Specifically, Study 3 used approximately three times larger differences of product costs, and used three (rather than two) levels of altruism, signalled by the purchase of conventional, green and green products with an additional "Fairtrade" label. Moreover, this study used a different indirect measure of social status than had been used in the two previous studies to check for the generalizability of their results. Study 3 has been preregistered (see https://osf.io/k56er/?view_only=d833df02d2774fb0bc45dbe16c5a0785).

4.1. Method

4.1.1. Participants

A convenience sample of Czech adults, recruited from a proprietary internet panel of an opinion poll company, participated in this study for remuneration of 28 CZK (equivalent of € 1.1). Out of 878 participants who accessed the questionnaire, 85 (9.7%) did not finish the experiment. Furthermore, based on pre-registered exclusion criteria, we excluded 3 participants (0.3%) who opted to drop-out in the debriefing, 37 (4.2 %) participants who completed the questionnaire in either an extremely short or extremely long completion time (more than 3 *SD* from mean), and 50 (5.7 %) participants who incorrectly answered two attention checks. The remaining sample of participants ($N = 703$) was variable in terms of age ($M = 42.61$, $SD = 12.94$), gender (47% were males) and education (15% had tertiary education).

4.1.2. Materials

4.1.2.1. Manipulation of consumer profile

The same procedure was used to manipulate the profile of consumption as in Studies 1 and 2. All six products used in Study 3 were real products offered on the Czech market. In addition to the two profiles of consumption used in the two previous studies (e.g., conventional and green), in this study we used a third profile labelled as "Fairtrade and green", which was the same as the green profile except that the word "Fairtrade"² had been added to the product label as an additional signal of altruism (see Appendix I for details). Note that since we used a similar procedure as in previous studies to manipulate altruistic signal, we did not include the manipulation check in this study.

² "Fairtrade" label signals products which were obtained from producers under favorable trade deals which help producers to maintain their welfare and reduce their poverty (<https://www.fairtrade.net>; Accessed 21st December 2017).

4.1.2.2. *Manipulation of cost of products*

Two levels of product prices were used in this study (similar to those in Study 2) except for the fact that the upper price levels were two times higher than the lower price levels, resulting in an approximately three times larger price difference than in Study 2. Note that the true prices of the products on the Czech market lay between the lower and higher price levels used in the experiment (for details, see Appendix I).

4.1.2.3. *Measure of perceived social status*

The measure of perceived social status, adopted from Anderson et al. (2001), was conceptually similar to that used in Studies 1 and 2 except for the fact that it had 7 points (rather than 5) and its polar points denoted "very low" and "very high" social status.

The indirect measure assessed perceived social status through willingness to delegate power and to cooperate with the hypothetical person (items were adapted from Hardy and Van Vugt, 2006). Examples of such items were: "*How much would you prefer Marie to coordinate a group in which you were a member?*" and "*How much would you prefer Marie to represent a group in which you would work?*" Participants indicated their answers on a 7-point scale ranging from 1 (not at all) to 7 (very much). The indirect measure had an excellent internal consistency reliability (6 items, $\alpha = .93$). However, the correlation between the direct and indirect measure of social status was rather low, $r_s(701) = .20, p < .001$.

The preregistered analysis used, as the main dependent variable, a summed score from the direct measure and the six indirect items (7 items, $\alpha = .90$). Because of the low correlation between the direct and indirect measures, we also report an analysis conducted with the direct and indirect measures separately. Because this analysis has not been preregistered, it should be considered an exploratory analysis.

4.1.3. Design and procedure

This study had a 3 (profiles of consumption: conventional, green, green and Fairtrade shopping basket) x 2 (price levels of the products: low vs. high) full-factorial between-subjects design. After accessing the web-based questionnaire and providing their implicit informed consent, participants first took part in a 10-minute long unrelated experiment on moral regulation processes, answering a battery of 50 items which measured their environmental attitude. After completing these tasks, participants proceeded to the current experiment.

At the beginning of this experiment, participants were randomly assigned to one of six experimental conditions each featuring one of the six shopping baskets bought by a hypothetical female consumer named Marie. Participants were asked to form a detailed mental picture of Marie and proceeded to direct and indirect measures of social status. After this, participants provided their socio-demographics (gender, age, education level) and proceeded to the debriefing and remuneration.

4.2. Results

An OLS model with the pre-registered measure of perceived social status (summed score from the direct and indirect measures) revealed no significant effect of green profile of purchased goods or price levels, or their interaction on perceived social status (see Table 3 for details). Similar results were obtained with a model that included also the socio-demographic characteristics of participants (see Appendix J), suggesting that these findings were rather independent of the socio-demographic characteristics of participants. We will return to the failure of this measure to capture the effects of green consumption or consumption costs on social status in the General Discussion.

Note also that very similar results were obtained with an OLS model which had the indirect measure of social status as the dependent variable alone (see Appendix K): estimates from this model also revealed no direct effect of price or product type, or their interaction.

Table 3: Effect of green and Fairtrade profiles and price of products on indirect measure of social status (OLS model, Study 3)

	<i>b</i>	95% CI	<i>t</i>	<i>p</i>	β
(Intercept)	3.86	[3.74, 3.98]	62.07	.000	NA
Green	-0.02	[-0.16, 0.12]	-0.26	.797	-0.01
Green&fairtrade	0.02	[-0.08, 0.12]	0.44	.663	0.01
Highprice	0.03	[-0.15, 0.21]	0.38	.708	0.02
Green x Highprice	0.10	[-0.12, 0.32]	0.91	.361	0.04
Green&fairtrade x Highprice	0.00	[-0.12, 0.12]	0.00	.997	0.00
Adjusted R ² : 0.0					

Note: $N = 703$. *Green* is a dummy indicator of green condition; *Green&fairtrade* is a dummy indicator of a condition which combined labels green and Fairtrade; *Highprice* is a dummy indicator of high price condition. All variables which entered interactions were mean-centred to facilitate interpretation of the interaction terms.

However, we obtained a very different picture, similar to Studies 1 and 2, when we conducted an analysis with an ordinal logit model and the direct measure of social status as the dependent variable (see Table 4 for details). This model revealed a theoretically expected main effect of price and green profile of the shopping basket. The effect size is similar (small) but the 95% CI is much wider in the case of price effect, suggesting that our estimate of price effect is considerably less precise. Interestingly, additional altruistic signals (label

"Fairtrade") had no significant effect on perceived social status above and beyond that of the green profile of consumption. Contrary to the expectation derived from the theory of costly signalling, there was no interactive effect of price and green profile of products. Note that essentially the same results were obtained when we controlled for the socio-demographic characteristics of participants (see Appendix L).

Table 4: Effect of price and green profile on direct measure of social status (ordinal logit model, Study 3)

	OR	95% CI	<i>z</i>	<i>p</i>
Green	1.49	[1.26, 1.75]	4.69	.000
Green&fairtrade	1.07	[0.97,1.18]	1.35	.178
Highprice	1.42	[1.08, 1.86]	2.51	.012
Green x Highprice	0.94	[0.68, 1.30]	-0.38	.701
Green&fairtrade x Highprice	1.07	[0.88, 1.30]	0.70	.487
1 2	0.00	[0.00, 0.01]	-8.41	.000
2 3	0.02	[0.01, 0.03]	-14.38	.000
3 4	0.09	[0.07, 0.12]	-17.77	.000
4 5	0.60	[0.52, 0.70]	-6.41	.000
5 6	3.89	[3.23, 4.68]	14.44	.000
6 7	25.00	[17.20, 36.34]	16.86	.000

Residual deviance: 1968.62

BIC: 2040.731

N = 703

Note: *Green* is a dummy indicator of green condition; *Green&fairtrade* is a dummy indicator of a condition which combined labels green and Fairtrade; *Highprice* is a dummy indicator of high price condition. All variables which entered interactions were mean-centred to facilitate interpretation of the interaction terms.

4.3. Discussion of Study 3

The preregistered analysis which collapsed direct and indirect measures of social status revealed no effect of product profile, or price of products, or their interaction, on perception of social status. However, additional analysis conducted with the direct measure of social status revealed a theoretically expected positive effect of consumption profile and consumption costs on the rating of social status, but not their interaction as predicted by the theory of costly signalling of altruism.

5. General discussion

The purpose of this study was to examine whether altruism manifested in green consumption is perceived as a signal of elevated social status. More specifically, we were interested in whether this perception depends on the elevated cost of green products without which green consumption should not be perceived as a trustworthy signal of altruism (Bliege Bird and Smith, 2005). Our results clearly and consistently indicate that green consumers are perceived as having higher social status in comparison to consumers of conventional products. However, we have not seen much evidence that the explicit price of green products must be high in order for green consumption to be perceived as an honest signal of altruism and thus only lead to a perception of elevated social status. Some of our results (Study 3) corroborate the notion of conspicuous consumption (Nellisen and Meijers, 2011; Veblen, 1899) whereby an elevated price of products increases the perceived social status of consumers. But even here, we have not seen that the price of products would moderate the

effects of green consumption on perceived social status. In other words, our results suggest that green consumption is a strong signal of altruism and elevated social status, quite independent of the explicit prices of products.

Our findings that green consumption increases perceived social status are consistent with recent findings that people who want to increase their social status prefer green products over conventional products (Griskevicius et al., 2010) and they are also in line with the general notion that altruistic behaviour is perceived as a signal of elevated social status (Van Vugt, 2001; Iredale and Van Vugt, 2011). However, our results do not support the notion that green products have to have a high explicit cost to be perceived as a genuine signal of altruism as predicted by the theory of costly signalling of altruism (Bliege Bird and Smith, 2005).

One possible explanation for why we did not observe the moderating effect of price is that the effect of price on the perceived social status of a consumer was not sufficiently manipulated in our studies. This might have been the case of Study 2, which did not find any direct effect of price while using a relatively small price ratio of 1.3 prices in the low-price and high-price conditions. However, even significantly stronger manipulation of price in Study 3, which used a ratio of price differences equalling to two, produced only a small effect of price on status. These findings suggest that the effect of price on status perception is rather small and price variations that one can typically observe for one product on the same market may not be sufficient to produce the theoretically expected interaction of the price and green profile of the product. Interestingly enough, a costly signal of altruism was observed with a relatively small price difference. Griskevicius et al. (2010) observed the cost moderation effect on preference for green products in status-seeking individuals when price ratio was 1.25. Nellissen and Meijers (2011) observed the main effect of luxury brand labels placed on a associate's clothes (no label, Slazenger and Lacoste) on status-related benefits in social

interaction with a price ratio 3, i.e. much higher. Berger (2017) on the other hand did not observe the main effect of green (*Bio*) and the same luxury brand label (*Lacoste*) on advantageous social interaction.

Perhaps more interesting than the lack of moderating price effect is the main effect of green consumption on the rating of social status. Such main effect is not fully predicted by the theory of costly signalization of altruism as this theory predicts that only a purchase of costly green products would be perceived as a genuine signal of altruism (Bliege Bird and Smith, 2005). One possible explanation for our observation is that presenting the absolute price levels in between-subjects design, as was done in Studies 2 and 3, did not allow participants notice that products in the low-price condition were actually bought at low prices. Consequently, participants might have used their everyday experience with green products and assumed that green products were more expensive than their conventional counterparts (for evidence of such inference, see Rödiger, Plassmann, and Hamm, 2016), irrespective of which price-level condition they were shown. One way to overcome this problem would be to display the price levels in relation to the price levels of alternative goods rather than as absolute values. However, one may argue that the display of absolute (rather than relative) values is a more realistic approximation of real market conditions.

Another explanation for a positive main effect of green consumption on perceived social status is that participants included other types of costs usually associated with consumption of green products (e.g., search costs due to the low proportion of green products on the market, see UK Department for Business, Innovations and Skills, 2013). We think that such an explanation is plausible and should invite further investigation. In any case, our results show that the elevated price of green products may not be a precondition for consumers to perceive their consumption as a genuine signal of altruism. Likewise, at least some green products can be used to signal elevated social status, irrespective of their price.

Besides demonstrating that green consumption may be an effective way to signalize elevated social status, we have also seen (in Study 3) that adding a further signal of socially conscious consumption (the "Fairtrade" label) did not increase the perceived social status any further. One interpretation of this finding is that information about the prosocial attributes of consumption has a declining marginal effect. Another interpretation is that the "Fairtrade" label is less known than green labels and therefore it produced a smaller additional effect. Further investigation would be needed to explain why adding the "Fairtrade" label to the green label did not increase the perceived social status above the level brought about by the green label alone.

5.1. Limitations of the present study

One of the limitations of the present research is given by the fact that the preregistered indirect measure of social status used in Study 3 did not replicate the effects of green consumption seen in Studies 1 and 2 and also did not produce the theoretically expected effect of the explicit price of products on social status. This indirect measure of social status taken from (Anderson et al. 2001) is based on the assumption that people with higher status are treated more favourably (Bliege Bird and Smith, 2005). However, given the fact that we were able to replicate both the effect of green consumption and the price effect with the direct measure of social status in Study 3, and also given the low correlation between direct and indirect measures of social status in Study 3, we are convinced the replication problem was caused by the nature of the preregistered indirect measure rather than by the lack of substantial effects of green consumption and price on perceived social status. This measure may capture a different facet of perceived social status than measures based on ranking of social status. Future studies should address the generalizability of the effect of green consumption on perception of social status assessed with alternative measures and try to determine which facets of perceived social status are affected.

Another potential limitation of the present research consists in the fact that manipulation of the price levels might not have been sufficient to produce the expected interactive effect with green consumption (Studies 2 and 3) and perhaps not even sufficient to produce the main effect of price on perceived social status (Study 2). We acknowledge this limitation which was due to the fact that we have focused on the everyday-type of shopping for groceries. One can argue that with more costly goods, such as household appliances and cars, where absolute prices differences may be more noticeable, there may be also a larger price effect on social status and perhaps also the interactive effect between price and green consumption. However, if this were the case, it would mean that the costly signalling of altruism only occurs in the case of relatively infrequent consumption of costly durables and not everyday consumption.

6. Conclusion

Three experimental studies revealed that consumption of green products is perceived as a signal of a consumer's altruism and his or her elevated social status, consistent with the theory of costly signalling of altruism (Bliege Bird and Smith, 2005). However, we were not able to corroborate previous findings (Griskevicius et al., 2010) that green consumption has to be costly to be perceived as a genuine signal of altruism. On the contrary, we have observed that green consumption works as an efficient signal of altruism and elevated social status independently from explicit costs associated with such consumption.

Data availability:

The data associated with this research are available at:

Study 1: https://osf.io/jyr3u/?view_only=14114d35a83a4192ab4a88a8800908fd

Study 2: https://osf.io/n7jfm/?view_only=14114d35a83a4192ab4a88a8800908fd

Study 3: https://osf.io/zu9f6/?view_only=14114d35a83a4192ab4a88a8800908fd

Declaration of interest: none

Open Practices section:

Study 3 was preregistered: 2017-07-11 08:54 UTC.

The preregistration is available at:

https://osf.io/k56er/?view_only=d833df02d2774fb0bc45dbe16c5a0785

Supplemental materials:

https://osf.io/r9b84/?view_only=14114d35a83a4192ab4a88a8800908fd

References:

- Alexander, R. D. (1987). *The Biology of Moral Systems*. Hawthorne, New York: Aldine de Gruyter.
- Anderson C., Hildreth, J. A., & Howland L. (2015). Is the desire for status a fundamental human motive? A review of the empirical literature. *Psychol Bull*, *141*, 574-601. doi: 10.1037/a0038781
- Anderson, C., John, O. P., Keltner, D., & Kring, A. M. (2001). Who attains social status? Effects of personality and physical attractiveness in social groups. *Journal of Personality and Social Psychology*, *81*, 116-132. doi: 10.1037//0022-3514.81.1.116
- Barclay, P., & Willer, R. (2007). Partner choice creates competitive altruism in humans. *Proceedings of the Royal Society of London, Series B*, *274*, 749-753. doi: [10.1098/rspb.2006.0209](https://doi.org/10.1098/rspb.2006.0209)
- Belk, R. W., Bahn, K. D. & Mayer, R. N. (1982). Developmental Recognition of Consumption Symbolism, *Journal of Consumer Research*, *9*, 4–17.
doi:10.2307/2488933
- Berger, J. (2017) Are luxury brand labels and “green” labels costly signals of social status? An extended replication. *PLoS ONE*, *12*, 1-17. doi.org/10.1371/journal.pone.0170216
- Bliege Bird, R. L., Smith, E. A. & Bird, D. W. (2001). The Hunting Handicap: Costly Signaling in Human Foraging Strategies. *Behavioral Ecology and Sociobiology*, *50*, 9–19. Doi: 10.1007/s002650100338
- Bliege Bird, R., & Smith, E. A. (2005). Signaling theory, strategic interaction, and symbolic capital. *Current Anthropology*, *46*, 221–248.

Consumer reports 2015. (2015). The cost of organic food.

<https://www.consumerreports.org/cro/news/2015/03/cost-of-organic-food/index.htm> /

Accessed 18 August, 2017.

ČSÚ (2014). Zpráva o trhu s biopotravinami v ČR v roce 2014. Statistická šetření

ekologického zemědělství. (Report on organic food in the Czech Republic in 2014.

Statistical Surveys on organic agriculture.)

[http://eagri.cz/public/web/file/472954/Zprava_o_trhu_s_biopotravinami_v_CR_v_roce](http://eagri.cz/public/web/file/472954/Zprava_o_trhu_s_biopotravinami_v_CR_v_roce_2014.pdf)

[2014.pdf](http://eagri.cz/public/web/file/472954/Zprava_o_trhu_s_biopotravinami_v_CR_v_roce_2014.pdf). / Accessed 18 August, 2017.

Gintis, H., Smith, E.A., & Bowles, S. (2001). Costly signalling and cooperation. *Journal of*

Theoretical Biology, 213, 103-119. doi:10.1006/jtbi.2001.2406

Griskevicius, V., Tybur, J.M., & Van den Bergh, B. (2010). Going green to be seen: Status,

reputation, and conspicuous conservation. *Journal of personality and social*

psychology, 98, 392-404, doi: 10.1037/a0017346

Haire, M. (1950). Projective techniques in marketing research. *Journal of Marketing*, 14,

649-656.

Hardy, Ch., L., & Van Vugt, M. (2006). Nice guys finish first: the competitive altruism

hypothesis. *Personality and Social Psychology Bulletin*, 32, 1402 -13, doi:

[10.1177/0146167206291006](https://doi.org/10.1177/0146167206291006)

Iredale, W., & van Vugt, 2011. Altruism as showing off: A signalling perspective on

promoting green behaviour and acts of kindness. In S. Craig Roberts (Ed.), *Applied*

Evolutionary Psychology (pp. 173-185) Oxford Scholarship Online,

doi:10.1093/acprof:oso/9780199586073.003.0011

<http://www.oxfordscholarship.com/view/10.1093/acprof:oso/9780199586073.001.0001>

[/acprof-9780199586073-chapter-0011](http://www.oxfordscholarship.com/view/10.1093/acprof:oso/9780199586073.001.0001) / Accessed 22 June, 2017.

- Kaiser, F. G., Doka, G., Hofstetter, P., & Ranney, M. A. (2003). Ecological behavior and its environmental consequences: A life cycle assessment of a self-report measure. *Journal of Environmental Psychology*, 23, 11-20. doi: 10.1016/S0272-4944(02)00075-0
- Mandel, N., Petrova, P. K., & Cialdini, R. B. (2006). Images of Success and the Preference for Luxury Brands, *Journal of Consumer Psychology*, 16, 57–69.
- Milinski, M., D. Semmann, and H. Krambeck (2002a). Reputation Helps Solve the “Tragedy of the Commons.” *Nature*. 415. 424– 426.
- Milinski M., Semmann D., Krambeck, H. J. (2002b). Donors to charity gain in both indirect reciprocity and political reputation. *Proc. R. Soc. B*. 269, 881–883.
doi:10.1098/rspb.2002.1964
- Nelissen, R. M. A., & Meijers, M. H. C. (2011). Social benefits of luxury brands as costly signals of wealth and status. *Evolution and Human Behavior*. 32, 343-355. doi: 10.1016/j.evolhumbehav.2010.12.002
- Price, M., E. 2003. Pro-Community altruism and social status in a Shuar village. *Human Nature*, 14, 191–208.
- Rödiger, M., Plaßmann, S., & Hamm, U. (2016). Organic consumers’ price knowledge, willingness-to-pay and purchase decision, *British Food Journal*, 118, 2732-2743. doi: 10.1108/BFJ-04-2016-0164
- Roberts, G. (1998). Competitive altruism: From reciprocity to the handicap principle. *Proceedings of the Royal Society of London, Series B*, 265, 427-431.
- Rucker, D. D., & Galinsky, A. D. (2008). Desire to acquire: Powerlessness and compensatory consumption. *Journal of Consumer Research*, 35, 257–267. Doi: 10.1086/588569

- Sachdeva, S., Jordan, J., & Mazar, N. (2015). Green consumerism: moral motivations to a sustainable future. *Current Opinion in Psychology*, 6, 60–65.
doi:10.1016/j.copsyc.2015.03.029
- Sadalla, E.K., & Krull, J. L. (1995). Self-presentational barriers to resource conservation. *Environment and Behavior*, 27, 328 -353. doi:10.1177/0013916595273004
- Smith, E. A., & Bliege Bird, R. L. (2000). Turtle hunting and tombstone opening: Public competitive altruism generosity as costly signaling. *Evolution and Human Behavior*, 21, 245-261. doi: 10.1016/S1090-5138(00)00031-3
- Sosis, R. 2000 Costly Signaling and Torch Fishing on Ifaluk Atoll. *Evolution and Human Behavior*, 21, 223–244. Doi:10.1016/S1090-5138(00)00030-1
- UK Department for Business, Innovations and Skills, 2013. *Low carbon environmental goods and services (LCEGS). Report for 2011/2012.*
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/224068/bis-13-p143-low-carbon-and-environmental-goods-and-services-report-2011-12.pdf /
Accessed 22 June, 2017.
- Van Vugt, M. (2001). Community identification moderating the impact of financial incentives in a natural social dilemma. *Personality and Social Psychology Bulletin*, 27, 1440-1449. doi:10.1177/01461672012711005
- Van Vugt, M., Snyder, M., Tyler, T., & Biel A. (2000). *Cooperation in modern society: Promoting the welfare of communities, states, and organizations*. London, UK: Routledge.
- Veblen, T. (1899). The theory of the leisure class. Project Gutenberg.
<http://www.gutenberg.org/files/833/833-h/833-h.htm> / Accessed 22 June, 2017.

Zahavi, A. (1975). Mate selection: A selection for a handicap. *Journal of Theoretical Biology*, 53, 205-214.

Zahavi, A. & Zahavi, A. (1997). *The handicap principle: A missing piece of Darwin's puzzle*. New York: Oxford University Press.