

Understanding consumer plastic bag behaviour



This report aims to support conservation efforts to reduce the influx of single-use plastic bags into the environment by assessing consumer behaviour during incentive and disincentive treatments.

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Disclaimer

The project team takes full responsibility for the report's contents and conclusions produced in the report.

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1. Introduction

Single-use plastic carrier bags have various socio-economic and environmental impacts (Ritch et al. 2009; Poortinga et al. 2013). The properties that make it such a desirable user item (inexpensive, durable and light weight) are the same properties that sustained the influx of these bags into the environment. A single plastic bag can take up to 400 years to degrade on a landfill (Ritch et al. 2009). The environmental impacts are far ranging and include reducing soil output by affecting nutrient assimilation, polluting underground water, and causing harmful air pollution when burnt (Ritch et al. 2009; Zhu 2011). Furthermore, it can be ingested by both marine and terrestrial animals which can ultimately cause death. Domestic livestock in Africa are especially affected by mismanaged plastic bags in the environment leading to economic loss for farmers (Ritch et al. 2009; Dikgang et al. 2012; Mushonga et al. 2015). Plastic bag pollution has further economic impacts as resources have to be allocated to clean irresponsibly disposed of bags, affecting economic productivity of a country as valuable resources have to be reallocated for this purpose (Hasson et al 2007).

Plastic bags are emblematic of the modern linear economy and “throwaway” culture we’ve grown accustomed to (Ritch et al. 2009). Governments have implemented bag levies to modify consumer behaviour by discouraging plastic bag use and internalise the cost of environmental pollution (Ritch et al. 2009; Poortinga et al. 2013). In an attempt to reduce the flux of plastic bags into the environment, South Africa implemented a levy on plastic bags in 2003. Bags had a fixed nominal price of R0.46 per 24 litre plastic bag across all retailers (Dikgang et al. 2012). The reduction in sales was short-lived as the price of bags was soon lowered and consumers reverted to their original “throwaway” behaviour (Dikgang et al. 2012). Today, the price stands at R0.50 at most retailers and the impact of the levy is no longer felt as plastic bag consumption is on the rise (Dikgang et al 2012). The effectiveness of the bag levy strategy is largely based on pricing to include the external cost of pollution that consumers were not aware of previously (Poortinga et al. 2013). It seems that the price for a single-use carrier bag today in South Africa is not enough to deter consumers from purchasing bags. However, the levy did initiate a cognitive shift in consumer minds where

economic value (albeit small) is now attached to previously freely obtained bags (Hasson et al. 2007).

Understanding consumer plastic bag behaviour in grocery stores has various challenges. As humans are creatures of habit, and the fact that the plastic bag levies have had minimal effect in the long-run on reducing plastic bag consumption, it is clear that consumer psychology is an essential aspect that needs to be addressed. A cognitive shift from the “throwaway culture”, to that of a historic re-use economy is needed if we are to reduce the influx of plastic bags into the environment. As of date the plastic bag issue has only been addressed by disincentives (bag levy) to influence customer behaviour. Although nominal, this fee is perceived to discourage people from buying plastic bags and encourage them to bring their own re-usable bags or buy re-usable bag from the retailer. Using incentives to influence consumer behaviour is another mitigating method that could potentially aid in reducing plastic bag consumption (Ritch et al. 2009). This study will include and compare both incentives and disincentive treatments to assess the influence it has on customer behaviour. The results will be used to inform future mitigation strategies or policy making.

2. Methods

2.1 Study area

The Living Standards Measure (LSM) in South Africa is a tool used to group people according to their living standards (10 – highest; 1 – lowest) based on criteria such as degree of urbanisation and ownership of cars and major appliances. The two stores selected for this study had contrasting LSM indices. The Zevenwacht Mall Spar (Kuilsvier) customers generally have a lower LSM index whereas the Seapoint Spar customers generally have a higher LSM index. Therefore, these two stores were selected to investigate consumer behaviour towards plastic bags and if different LSM indices influenced behaviour.

2.2 Treatment 1 - Control

Data collection at Zevenwacht Mall Spar (Kuilsvier) occurred on 25 October 2017 (14h00-17h00) and on 16 November 2017 at Seapoint Spar (14h10-16h30). Three volunteers were

stationed at each till and observed customers without interacting with them. The following were recorded for each customer:

- Customer sex
- Did they bring their own bags?
- Did they purchase a plastic bag?
- Did they purchase a re-usable bag?
- Did they forgo a bag?

2.3 Treatment 2 - Incentive

Data collection occurred on 22 November 2017 at Zevenwacht (Kuilsriver) and Seapoint (14h00-17h30) Spar. Four volunteers were based at Kuilsriver and three at Seapoint. Observers were stationed at the till and observed shopper behaviour while recording the following:

- Customer sex

Observers engaged with the customer before bags were purchased by pointing to a poster (Fig. 1) and saying the following: *“As part of an effort to reduce plastic bags in the environment, we are rewarding customers who bring their own bags or buy reusable bags with R1 per plastic bag avoided, will this change your decision to take a bag?”* The observer then recorded the customer’s reaction as follows:

- Customer brought own bag and takes reward
- Customer buys re-usable bag and takes reward
- Customer forgoes bag and takes reward
- Customer buys plastic bag and receives no reward



Figure 1. The poster used to inform customers during Treatment 2 (*Incentive*).

Note: There was a difference in the degree of interaction with customers between the observers from Seapoint and Kuilsriver. Observers from Kuilsriver were more interactive by explaining the study and the signage to each customer while the observers at Seapoint mainly relied on the signage and did not engage with customers any further. This was due to miscommunication between observers at the start of the Treatment.

2.3 Treatment 3 - Disincentive

Data collection occurred on 30 November 2017 (14h00-16h50) at Zeevenwacht (Kuilsriver) and Seapoint Spar. Three observers were based at Kuilsriver and three at Seapoint Spar. Observers were stationed at the till and observed customer behaviour while recording the following:

- Customer sex

Interaction with customers was limited and three large posters were put up at the entrance to the store and in the queue section while A4 posters were displayed at each till (Fig 2). Observers waited until the cashier asked the customer if they wanted a plastic bag and at that point referred the customer to a poster (Fig 2a – Kuilsriver; Fig 2b – Seapoint). Customer response was recorded as follow:

- Does the customer buy a plastic bag?
- Does the customer buy a re-usable bag?
- Does the customer forgo a bag?



a)



b)

Figure 2. The two posters that were used as disincentives to discourage customers from buying a plastic bag at: **a) Kuilsriver; b) Seapoint.**

3. Results and discussion

3.1 Control

3.1.1 Kuilsriver

A total of 218 female and 142 male shoppers (360 in total) were observed at the Kuilsriver Spar (Table 1). Out of the 218 female shoppers, 186 (85,32%) purchased plastic bags, 13 (5,96%) brought their own bags, 1 (0,46%) purchased a re-usable bag and 18 (8,26%) did not use any (forgoes) bags (Table 1; Fig. 3). Out of the 142 male shoppers, 110 (77,46%) purchased plastic bags, 2 (1,41%) brought their own bags, none purchased re-usable bags and 30 (21,13%) did not use a bag (Table 1; Fig. 3). From these results it is observed that females at Kuilsriver Spar are slightly more inclined to buy plastic bags than males, however, they are also more inclined to bring their own re-usable bags than males, whereas males are more inclined to forgo a bag than to bring their own or purchase re-usable bags (Fig. 3).

Table 1. Summary of the observations made at Kuilsriver Spar during the control treatment indicating the number of female and male customers observed and their respective plastic bag shopping behaviours.

	No. of customers	Purchased plastic bag	Brought own bag	Purchased re-usable bag	Did not use any bags
Females	218	186	13	1	18
Males	142	110	2	0	30
Total	360	296	15	1	48

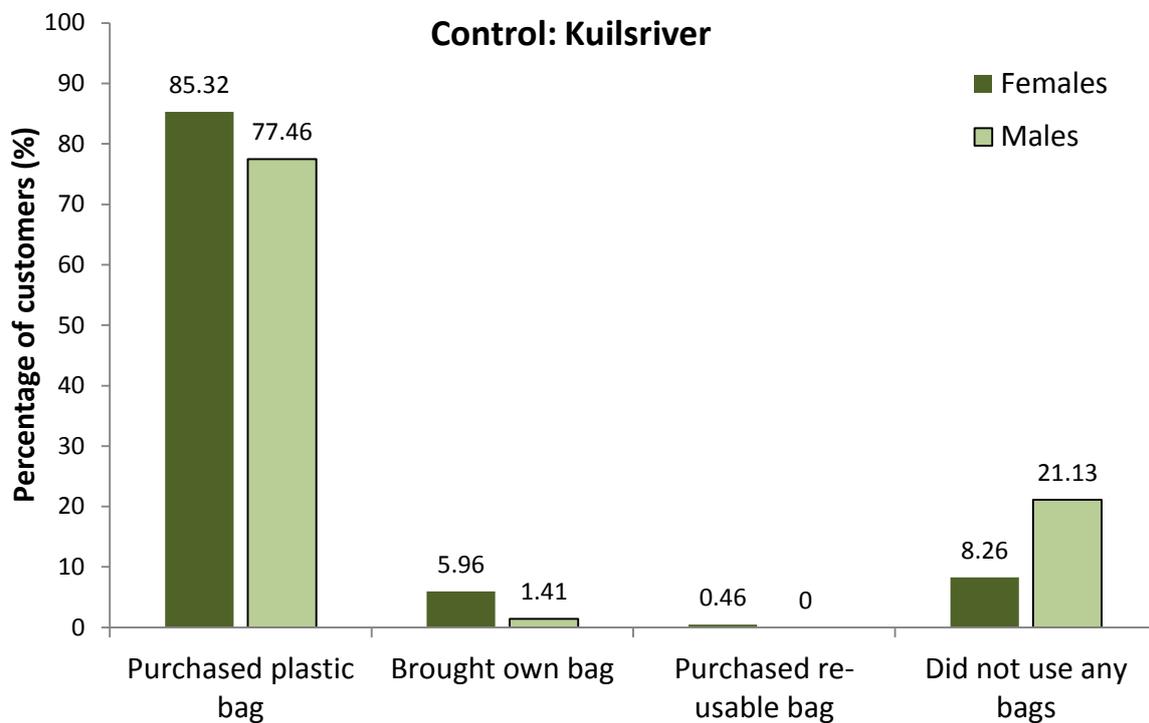


Figure 3. The results from the *Control* treatment at Kuilsriver Spar indicating the percentage of male and female customers either purchasing a plastic bag, bringing own bags, purchasing a re-usable bag or not using any bags.

3.1.2 Seapoint

A total of 219 female and 141 male customers were observed at Seapoint Spar. Out of the 219 female customers, 96 (43,84%) purchased plastic bags, 58 (26,48%) brought their own bags, 1 (0,46%) purchased a re-usable bag and 64 (29,22%) did not use a bag (Table 2; Fig. 4). Out of the 141 male shoppers, 66 (46,81%) purchased plastic bags, 13 (9,22%) brought their own bags, none purchased re-usable bags and 62 (43,97%) did not use a plastic bag (Table 2; Fig. 4). From the results it is observed that female customers at Seapoint Spar are

less inclined to buy plastic bags and more inclined to bring their own re-usable bags than males. Similar to Kuilsriver Spar, males are more inclined to not use a bag than females (Table 2; Fig 4). Overall, it was observed that customers at Seapoint Spar (female and male) were more committed to bringing their own re-usable bags than customers at Kuilsriver Spar (Fig 3. & Fig. 4). Furthermore, shoppers at Seapoint Spar were also more inclined to not use a bag than those at Kuilsriver Spar (Fig 3. & Fig. 4).

Table 2. Summary of the observations made at Seapoint Spar during the *Control* treatment indicating the number of female and male customers observed and their respective plastic bag shopping behaviours.

	No. of customers	Purchased plastic bag	Brought own bag	Purchased re-usable bag	Did not use any bags
Females	219	96	58	1	64
Males	141	66	13	0	62
Total	360	162	71	1	126



Figure 4. The results from the *Control* treatment at Seapoint Spar indicating the percentage of male and female customers either purchasing a plastic bag, bringing own bag, purchasing a re-usable bag or not using any bags.

3.2 Incentives

3.2.1 Kuilsriver Spar

A total of 208 female and 152 male customers were observed at Kuilsriver Spar during the *Incentive* treatment (Table 3). Out of the 208 female shoppers, 132 (63,46%) purchased plastic bags and received no reward. The remaining female customers qualified for a reward as 26 (12,50%) brought their own bags, 2 (0,96%) purchased re-usable bags and 53 (25,48%) did not use a bag (Table 3; Fig. 5). Out of the 152 male shoppers observed, 74 (48,68%) purchased plastic bags and received no reward. The remaining male customers qualified for a reward as 7 (4,61%) brought their own bags, 2 (1,32%) purchased re-usable bags and 50 (32,89%) did not use a bag (Table 3; Fig.5). The results indicate that men responded better to the *Incentive* treatment than females as fewer men bought plastic bags and were more likely to forgo a bag than female customers at Kuilsriver Spar. Females received more rewards for bringing their own bags from home than men whereas men were more inclined to purchase re-usable bags for a reward than females (Fig. 5).

Table 3. Summary of the observations made at Kuilsriver Spar indicating the number of female and male customers observed and their respective responses to plastic bag behaviour during the “Incentive” treatment.

	Total	Purchased plastic bag	Brought own bag	Purchased re-usable bag	Forgoes bag
Females	208	132	26	2	53
Males	152	74	7	2	50
Total	360	206	33	4	103

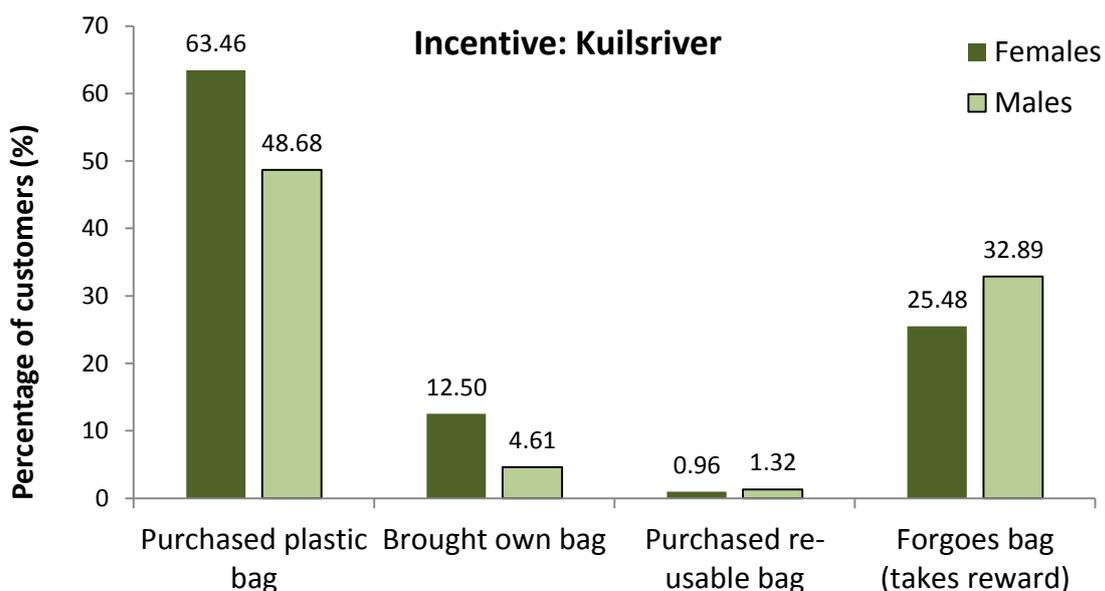


Figure 5. The results from Kuilsriver Spar indicating the percentage of male and female shoppers either purchasing a plastic bag, bringing own bag, purchasing a re-usable bag or forgoing bags during the *Incentive* treatment.

3.2.2 Seapoint Spar

A total of 212 female and 148 male shoppers were observed (Table 4). Out of the 212 female shoppers, 119 (56,13%) purchased plastic bags and did not receive a reward. The remaining female customers qualified for rewards as 50 (23,58%) brought their own bags and 22 (10,38%) did not use a bag (Table 4; Fig. 6). Out of the 148 male customers, 75 (50,68%) purchased plastic bags and did not receive a reward. The remaining male customers all qualified for rewards as 29 (19,59%) brought their own bags and 16 (10,81%) did not use a bag (Table 4; Fig. 6). The results indicated that males were slightly more open to *Incentives* as they purchased fewer plastic bags than females during this treatment. Females were more likely to bring their own bags than males, whereas a similar percentage (10,81% vs. 10,38%) of males and females did not use a bag (Fig. 6).

Table 4. Summary of the observations made at Seapoint Spar indicating the number of female and male customers observed and their respective responses to plastic bag behaviour during the “Incentive” treatment.

	Total	Purchased plastic bag	Brought own bag	Purchased re-usable bag	Forgoes bag
Females	212	119	50	0	22
Males	148	75	29	0	16
Total	360	194	79	0	38

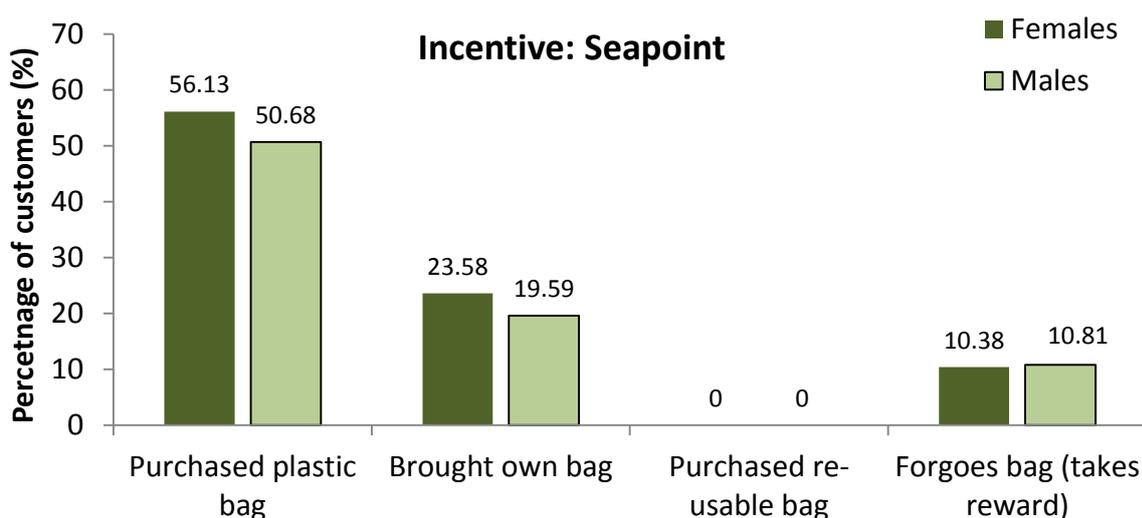


Figure 6. The results from Seapoint Spar indicating the percentage of male and female shoppers either purchasing a plastic bag, bringing own bag, purchasing a re-usable bag or forgoing bags during the *Incentive* treatment.

3.3 Disincentives

3.3.1 Kuilsriver

A total of 233 female and 127 male customers were observed (Table 5). Out of the 233 female shoppers, 173 (74,25%) purchased plastic bags, 20 (8,58%) brought their own bags, 1 (0,43%) purchased a re-usable bags and 46 (19,74%) did not use a bag (Table 5; Fig. 7). Out of the 127 male shoppers, 77 (60,63%) purchased plastic bags, 7 (5,51%) brought their own bags and 44 (34,65%) did not use a bag (Table 5; Fig. 7). The results indicate that the *Disincentive* treatment was more effective on male shoppers at Kuilsriver as they purchased fewer bags and forgo more bags than females. The *Disincentive* treatment convinced one female to purchase a re-usable bag. Once again the results indicate that females are more likely to bring their own bags from home.

Table 5. Summary of the observations made at Kuilsriver Spar indicating the number of female and male customers observed and their respective plastic bag behaviours during the “Disincentive” treatment.

	Total	Purchased plastic bag	Brought own bag	Purchased re-usable bag	Forgoes bag (takes reward)
Female	233	173	20	1	46
Male	127	77	7	0	44
Total	360	250	27	1	90

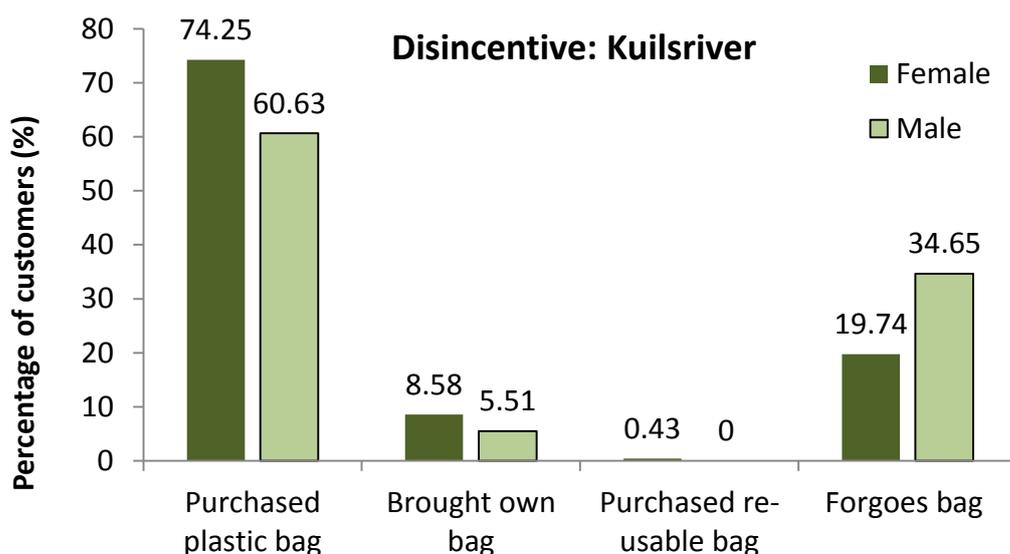


Figure 7. The results from Kuilsriver Spar indicating the percentage of male and female shoppers either purchasing a plastic bag, bringing own bag, purchasing a re-usable bag or forgoing bags during the *Disincentive* treatment.

3.3.2 Seapoint

A total of 188 female and 172 male customers were observed (Table 6). Out of the 188 female customers, 84 (44,68%) purchased plastic bags, 46 (24,47%) brought their own bags, 2 (1,06%) purchased re-usable bags and 62 (32,98%) did not use bags (Table 6; Fig 8). Out of the 172 male customers, 79 (45,93%) purchased plastic bags, 17 (9,88%) brought their own bags, none purchased a re-usable bag and 75 (43,60%) did not use a bag (Table 6; Fig. 8). The results indicate only a 1% difference between the number of females and males that purchased plastic bags during the *Disincentive* treatment at Seapoint Spar. The *Disincentive* treatment persuaded two females to purchase re-usable bags. In terms of forgoing a bag, the *Disincentive* treatment seemed to be the most effective treatment at the Seapoint Spar.

Table 6. Summary of the observations made at Seapoint Spar indicating the number of female and male customers observed and their respective responses to plastic bag behaviour during the “Disincentive” treatment.

	Total	Purchased plastic bag	Brought own bag	Purchased re-usable bag	Forgoes bag (takes reward)
Female	188	84	46	2	62
Male	172	79	17	0	75
Total	360	163	63	2	137

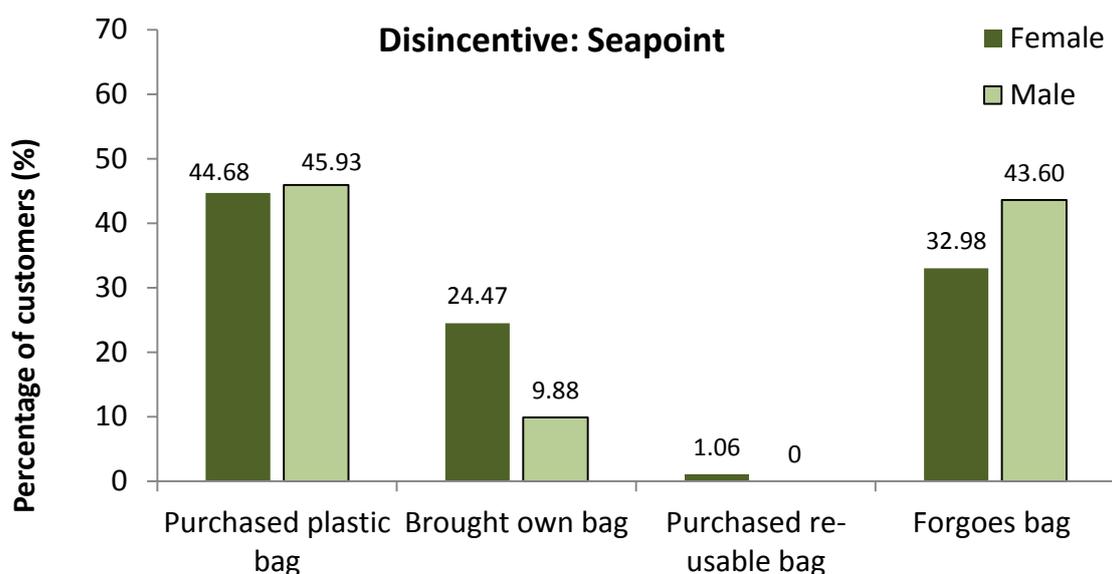


Figure 8. The results from Seapoint Spar indicating the percentage of male and female shoppers either purchasing a plastic bag, bringing own bag, purchasing a re-usable bag or not taking any bags during the *Disincentive* treatment.

3.4 Comparing across treatments

3.4.1 Kuilsriver

To compare across treatments, female and male responses were combined for each treatment at each store. The results indicate that both *Incentive* (57,22%) and *Disincentive* (69,44%) treatments resulted in a reduction in the percentage of customers that purchased plastic bags when compared to the control (82,22%) (Fig. 9). However, *Incentives* were more successful at Kuilsriver Spar in reducing the number of customers [206 (57,22%)] that purchase plastic bags compared to the number [250 (69,44%)] that purchased bags during *Disincentive* treatment. More customers [103 (28,61%)] also forgo plastic bags during the *Incentive* than the *Disincentive* treatment [90 (25%)]. *Incentives* were also marginally more successful at convincing customers to purchase re-usable bags (1,11%) than *Disincentives* (0,28%) (Fig. 9). On average across all three treatments, 75 customers (6,95%) at Kuilsriver Spar brought their own bags (which was not affected by treatments).

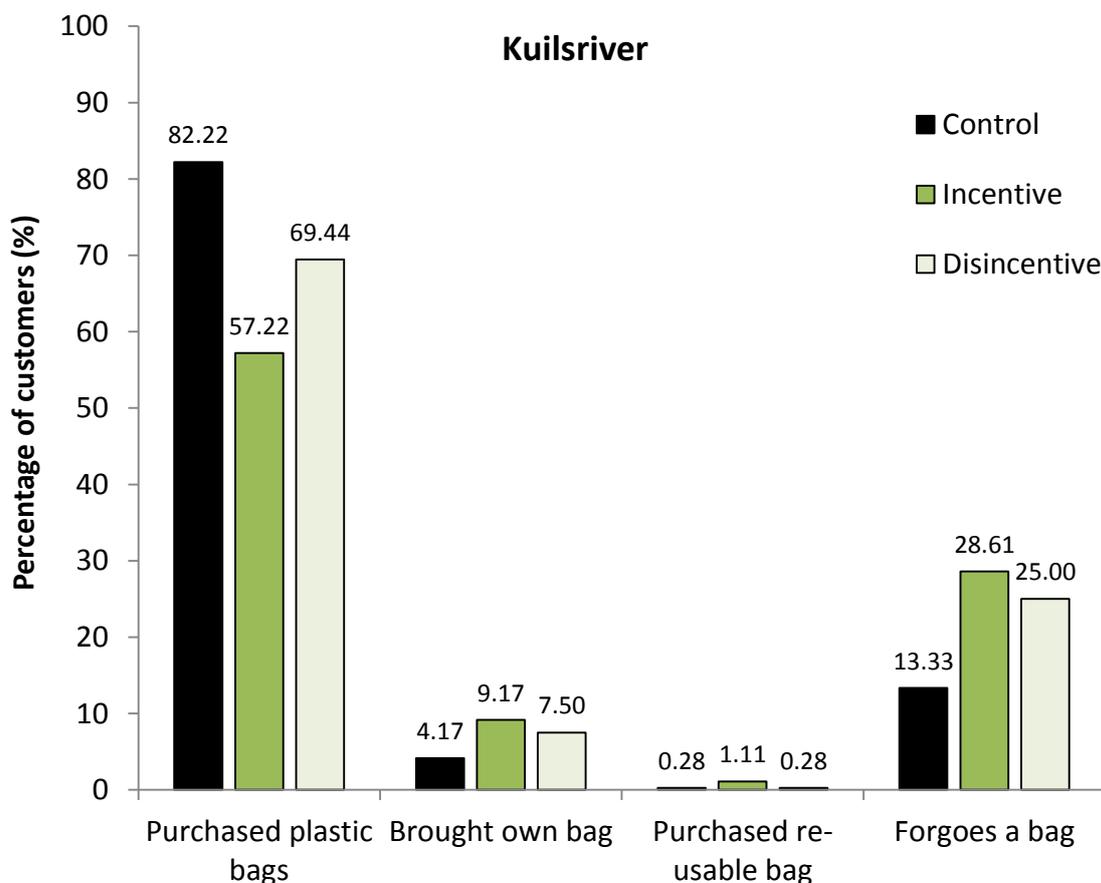


Figure 9. Comparing the results across all three treatments (*Control*, *Incentive* and *Disincentive*) at Kuilsriver Spar, indicating the percentage of shoppers (female and males combined) that purchased plastic bags, brought own bags, purchased re-usable bags and did not use a bag (forgoes bag).

3.4.2 Seapoint

The results indicate that the *Disincentive* treatment (45,28%) was more successful at reducing the percentage of shoppers that buy plastic bags than *Incentives* (53,89%) by 8,61% at Seapoint Spar. However, during the control treatment, fewer customers [162 (45%)] purchased plastic bags than during the *Incentive* [194 (53,89%)] and *Disincentive* [163 (45,28%)] treatments, making any sensible comparison difficult. *Disincentive* treatments were also more successful at increasing the number of customers [137 (38,06%)] that forgo a bag compared to *Incentives* [38 (10,56%)] by 27,5% (Fig. 10). On average, more customers at Seapoint Spar [213 (19,72%)] brought their own re-usable bags from home compared to Kuilsriver Spar [75 (6,95%), which was not influenced by the treatments.

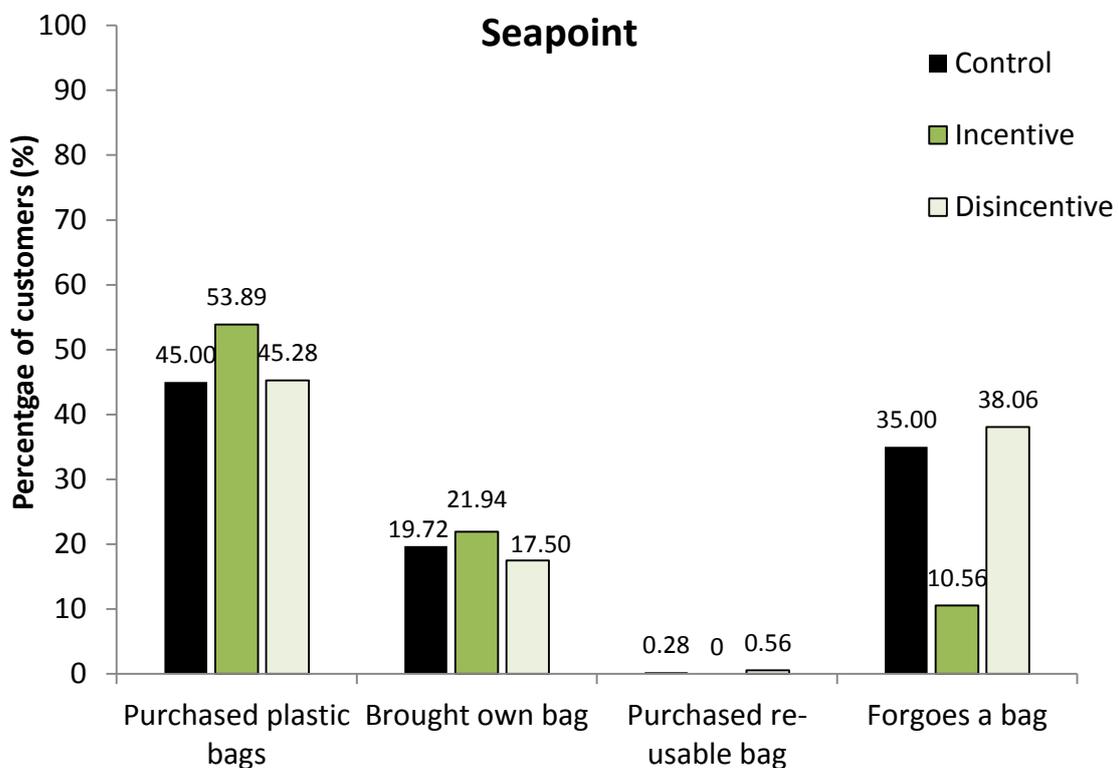


Figure 10. Comparing the results across all three treatments (Control, Incentive and Disincentive) at Seapoint Spar, indicating the percentage of shoppers (female and males combined) that purchased plastic bags, brought own bags, purchased re-usable bags and did not use a bag (forgoes bag).

3.4.3 Overall

Overall, both *Incentive* (55,56%) and *Disincentive* (57,36%) treatments reduced the percentage of customers that purchased plastic bags compared to the *Control* (63,61%) (Fig.

11). *Incentives* resulted in a 8,05% reduction while *Disincentives* resulted in a 6,25% reduction (Fig. 11). Although marginal, *Incentives* were more effective to persuade customers to purchase re-usable bags (0,56% of customers) than *Disincentives* (0,42% of customers purchased re-usable bags). The *Disincentive* treatment was more effective in increasing the percentage of customers that forgo a bag by 7,36% compared to the *Control* (Fig.11) than *Incentive* treatment that resulted in a 4,95% reduction in number of customers that forgo a bag (Fig. 11). These results could be explained by the contrasting effect of the treatments between the two stores, where *Incentives* were more effective at Kuilsriver and *Disincentives* more effective at Seapoint.

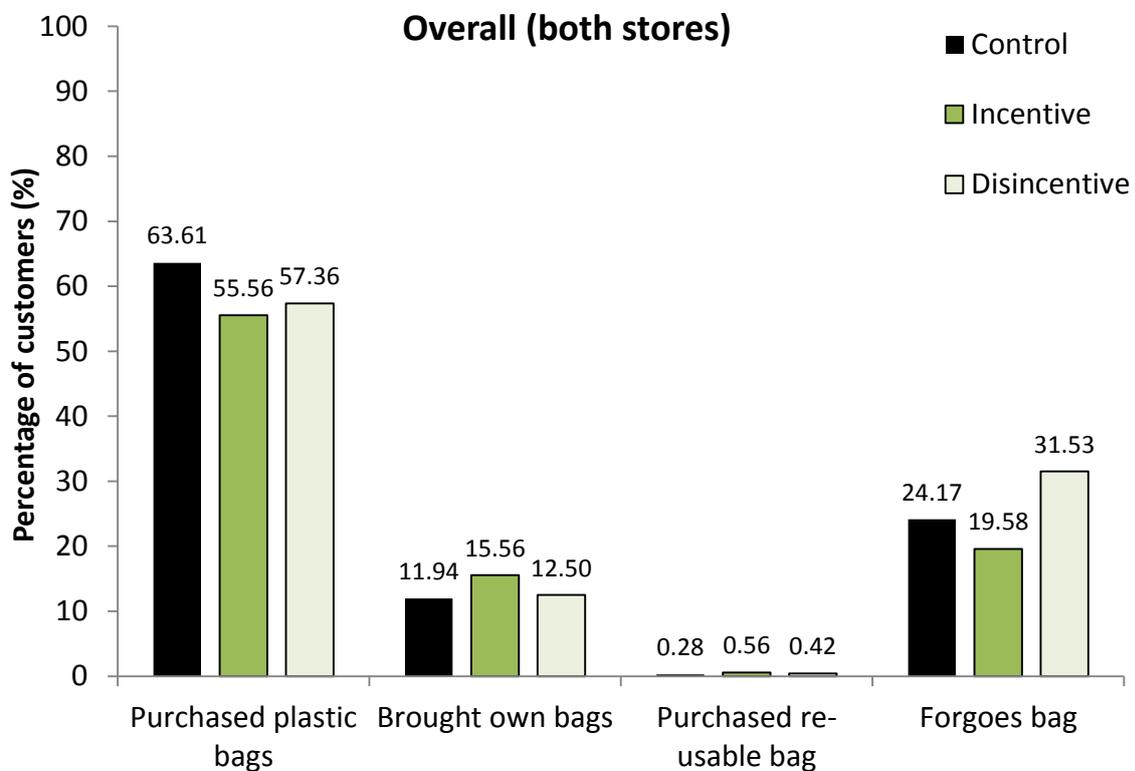


Figure 11. Comparing the combined results for females and males at both Kuilsriver and Seapoint Spar across all three treatments (Control, Incentive and Disincentive), indicating the percentage of shoppers that purchased plastic bags, brought own bags, purchased re-usable bags and did not use a bag (forgoes bag).

4. Summary and concluding remarks

- Overall across all treatments at both stores, females were more inclined to bring their own re-usable bags (213) than males (75). This could be explained by the fact that re-usable bags can be folded up to fit into a handbag and therefore women often have it at their disposal even in unplanned shopping trips. Men traditionally do not carry handbags and therefore do not always have re—usable bags at hand. Perhaps an innovative way to assist men in having re-usable bags at their disposal would be a worthwhile undertaking.
- When comparing the percentage of customers (female and male) that brought their own bags irrespective of the treatment, it was observed that Seapoint customers (19,72%) brought their own re-usable bag more often across all three treatments than Kuilsriver customers (6,94%). This observation is contrasting as one would expect customers from lower LSM areas (Kuilsriver) to purchase fewer plastic bags to save money than those from higher LSM areas (Seapoint). It could be that lower income households use the bags for other purposes around the house and are therefore seen as a commodity. This could also be indicative of the level of environmental awareness of the impacts of plastic bags between customers from the two areas which could be related to education and environmental awareness campaigns. If pursued intently, environmental campaigns aimed at informing the public from lower LSM areas about the dangers of plastic bag pollution could be a useful tool in combatting the crisis.
- Overall, males were generally more accepting of *Incentive* treatments (by purchasing 10% fewer plastic bags) than females. In general over all treatments, men purchased 7,2% less plastic bags than females. This could possibly be explained by the fact that men usually only buy a few items as females are traditionally responsible for bulk grocery shopping. Therefore it is easier for a male to forgo a single bag and carry his items out by hand than for a female that is busy with bulk-grocery shopping to forgo her bags.

- Males were also more open to the *Disincentive* treatment than females by purchasing 8,87% less plastic bags. This result could potentially be explained by the same logic applied above.
- The *Incentive* treatment was more successful at reducing the percentage of customers purchasing bags at Kuilsriver Spar by 12,22% than the *Disincentive* treatment. Note: During the *Incentive* treatment, the difference in degree of interaction with customers between observers from Seapoint and Kuilsriver, (where observers from Kuilsriver were more interactive by explaining the study and signage to each customer while observers at Seapoint mainly relied on signage and did not engage with customers any further), could have influenced these results.
- The *Disincentive* treatment was more successful at Seapoint Spar than *Incentives* by reducing the percentage of customers that purchased plastic bags by 8,61%. The lower impact of the *Disincentive* treatment at Kuilsriver could potentially have been influenced by the English language which the poster was displayed in and whether or not customers were able to read and understand the English signage. Displaying the poster in both English and Afrikaans may have been more optimal.
- Overall, both treatments reduced the number of plastic bags purchased, however, a high percentage of customers still purchased plastic bags (58,84%) irrespective of the treatments and therefore we conclude that more stringent measures should be put in place to reduce sale of plastic bags in South Africa. Research has found that customers are unlikely to voluntarily convert to anti-consumption behaviour especially for frequent habitual activities like grocery shopping (Sharp et al. 2010). And therefore we recommend more enticing incentives and tougher disincentives to try and reduce the purchasing of plastic bags. Ultimately an outright ban of single-use carrier bags will be the only certain way to stop the influx of plastic bags into the environment as consumers have exhibited a reluctance to try and reduce their plastic bag consumption in South Africa (Dikgang et al 2012). Banning plastic bags in South Africa will be a fundamental step in stimulating the development of a circular economy.

5. References

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