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SECURITY ECOSYSTEM AND ON-SHELF AVAILABILITY: *PRELIMINARY FEEDBACK AND TRIAL RESULTS OF SIFFRON'S SONR ECOSYSTEM*

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Contents

Introduction

Theft and shoplifting remain a prominent issue within the retail sector. In fact, results from the 2020 National Retail Security Survey show that shrink was at an all-time high in 2019, accounting for 1.62% of retailers' bottom line - a number estimated to cost the industry $61.7 billion annually (NRF, 2020). As a result, retailers have turned to evidence-based technological solutions in an attempt to reduce theft in their stores (Hayes, 2003; Johns, Hayes, Scicchitano, Grottini, 2017; Lab 2010).

Retailers must balance the need to secure high-theft products with the desire to keep items easily accessible for customers. In response to the need for open-merchandising solutions, Siffron developed and sought to test their *SONR Ecosystem*, a series of integrated technologies designed to keep products visible and accessible, while maintaining security and alerting store associates of potential theft.

The goals of the research were to:

- Understand the quantitative impact of implementing the *SONR Ecosystem* in-store by comparing shrink data *before* installation with the data collected *after* the technologies were installed.

- Understand offender perceptions and reactions toward the *SONR Ecosystem* technologies.

- Understand customer perceptions and reactions toward the *SONR Ecosystem* technologies.

- Understand associate perceptions and reactions toward the *SONR Ecosystem* technologies.

Project Background

Research Design

In 2020, the Loss Prevention Research Council worked with a large convenience store chain to better understand the impact of implementing Siffron's *SONR Ecosystem*. In June 2020, the technologies that make up the *SONR Ecosystem* were installed in two StoreLabs located in Orlando, Fl. A mixed-methods approach was used to assess the impact of the technologies.

First, the participating retailer provided us with their store-level sales and shrink data both *before* and *after* installation of the *SONR Ecosystem,* allowing us to estimate the quantitative impact of the technologies. Next, using qualitative interviewing methods, retail offenders were recruited to better understand their reactions to the technologies and to gather their feedback. Customer intercepts also took place within the stores, where they were asked to provide their own reactions to the technologies. Finally, store associates were asked to trial the technology suite and complete a survey about their experiences with the *SONR Ecosystem.*

Siffron's *SONR Ecosystem*

Siffron's *SONR Ecosystem* is designed to balance product security with open and accessible merchandising. It is comprised of five integrated technologies - each designed to notify store associates of suspicious activity and draw attention to potential shoplifters.

1. The *SONR Echo Box/Receiver*

The *SONR Echo Box* repeats the warning beeps and alarms for the other four technologies. Once deployed, the Echo Box receives notifications up to 25 feet away and is available in multiple RF frequencies for connecting a variety of property groups. The *Echo Box/Receiver* can be reset to halt the alarming box as well. While not applied in this study, the *SONR Echo Box* can also be linked to existing infrastructure, such as PVMs, radios, and call boxes.

SONR Echo Box: Installed In-Store (on ceiling)

SONR Echo Box: Promotional Image

2. The *SONR Pusher*

The *SONR Pusher* is a flexible and open security system, designed to notify store associates of activity at the shelf and store-level. For each item removed, the adjustable depth *SONR Pusher* chirps to alert associates to the activity, if too many products are removed in too short a time span, the system will alarm.

SONR Pusher: Installed In-Store

SONR Pusher: Promotional Image

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3. The *SONR Hook*

The *SONR Hook* is designed to prevent shelf-sweeps, alert associates, and detract shoplifters by emitting a warning beep when a product is removed, or alarm if the removal threshold is met.

SONR Hook: Installed In-Store

SONR Hook: Promotional Image

4. The SONR Crossbar

The *SONR Crossbar* prevents sweeps and theft for items on a row of facings. A product shield guards merchandise, and when lifted, emits a warning beep notifying store associates. If the shield is lifted for too long, the system will alarm.

SONR Crossbar: Installed In-Store

SONR Crossbar: Promotional Image

5. The LM Tag with SONR

The *LM Tag* is designed to prevent theft by means of a plunger that initiates an alarm if the solution is removed from the package; or active light and motion sensors that transition from pre-alarm to full-alarm when merchandise is concealed and moved through the store.

LM Tag: Installed In-Store

LM Tag: Promotional Image

Trial Results

The *SONR Ecosystem* was trialed in two convenience store locations in Orlando, FL (both locations belonged to the same chain). Baseline sales and shrink data was collected during the 40 days prior to installation, from May to June 2020. Following installation, data was collected again from June to August 2020 in order to assess any quantitative impacts of the technologies in-store.

Notably, data collection occurred during the COVID-19 pandemic, therefore, there were several variables within this study that could not be controlled for, including: state or city lockdowns, store closures, and changes in store foot traffic. Limitations within the data meant that a weaker statistical design was utilized to find any effects of the technologies. First, the data was divided into two time periods (prior to and after installation), allowing us to combine multiple cycle counts and have a sample size large enough to conduct the analyses. The products were further divided between those that were protected by a Siffron technology (1) and those that were not (0).

Audit results from Store #1 showed an overall **reduction in shrink of 28.22%** from February 2020 to July 2020 (measured in dollars lost per day). However, these are just general trends that could be attributed to any number of factors – including changes in foot traffic or impacts from COVID-19.

In order to better understand the impact of the Siffron technology specifically, we compared the shrink rates of protected items before and after deployment of the *SONR Ecosystem*. In Store #1, the retail value of cycle count adjustments for 130 protected products decreased from -121.5 to -25.5 for items that were protected, accounting for a **79.26% reduction in shrink**. Unfortunately, the sample size for the unprotected products was too small to make an accurate comparison between protected and unprotected items during the same period. Furthermore, the data did not allow for comparisons of changes in shrink between this select subset of *SONR*-protected products and the same, but unprotected, items in other store locations.

In Store #2, an overall increase in shrink was observed, however, the protected products saw an increase in shrink that was noticeably lower. The retail value of cycle counts for *unprotected* products increased 150.7% during the testing period, from -36.14 to -90.61. However, the value of cycle counts for *protected* items grew at a comparatively slower rate of 45.25%, from -68.67 to -99.94. Therefore, the protected products in Store #2 saw an increase in shrink that was **69.97% less than the unprotected items**.

Given these results, the *SONR Ecosytem* is a promising product protection solution. However, there are several limitations of the study that should be addressed in a more robust evaluation of the *SONR Ecosystem*. Future evaluations should examine the relative impact of the Ecosystem within stores (i.e., compare the effect of the over time) and between stores (i.e., compare the effect of the system on unprotected items in one store with protected products in another location). Preferably, this would be conducted with both a larger, random sample of store locations and products. Alternatively, the findings of this study could be corroborated from trials in other stores. This trial was conducted within two locations of one convenience store chain; therefore,

it is unclear whether retailers would find similar results in other types of retail settings. Nevertheless, as mentioned the results from this evaluation suggest the *SONR Ecosystem* is a promising product protection solution.

Interview Results: *SONR Echo Box*

Offender Interviews

The Siffron *SONR Echo Box* is designed to be integrated with the four previous technologies. It repeats the primary device notifications and alarms up to 25 feet away, increasing the ability for associates to respond to suspicious behavior or shoplifting.

Ten self-admitted shoplifting offenders were recruited and screened by an LPRC Research Scientist. They were asked to meet in one of the two StoreLabs, where they were escorted into an aisle protected by a *SONR* technology. In both StoreLabs, the *Echo Box* was installed near the front registers, one on the ceiling and the other on a pole about six feet up. When asked, none of the ten offenders spotted the *Echo Box* before prompted.

Next, we wanted to gauge whether the respondents understood the capabilities of the technology *before* it was explained to them. Two (20%) correctly guessed the mechanisms of the *Echo Box* (see Figure 1)*.* One *overestimated* the capabilities, believing it to be a tracking device of some sort. The remaining seven (70%) *underestimated* the technology. More specifically, four did not know that the *Echo Box* can connect to and mimic the other *SONR* technologies, two thought it only connected to the *LM Tags*, and one thought it could only connect to shelves that were close to the receiver.

Figure 1. **Do the offenders understand the mechanisms of the *Echo Box?* (N=10)**
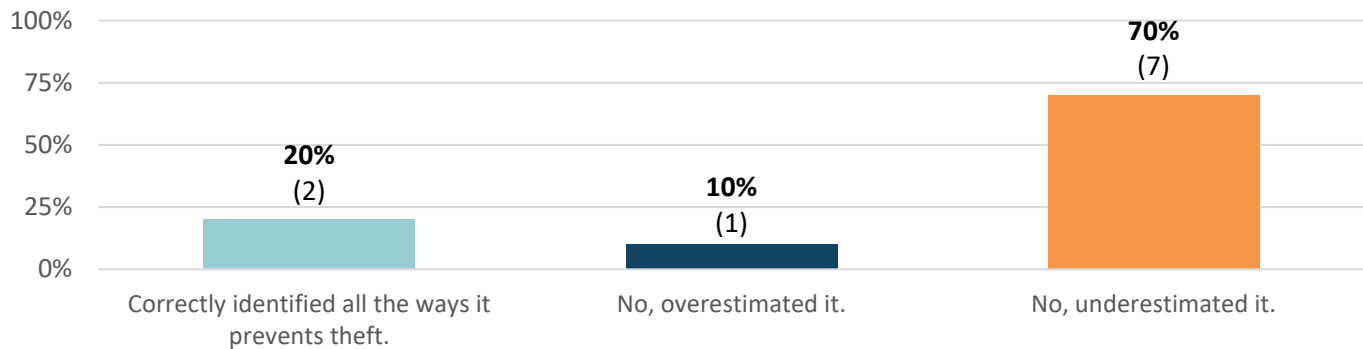
The retail offenders were then asked to evaluate the deterrent power of the Siffron *Echo Box.* Since it effectively connects all the previous *SONR* technologies, they were first asked if they would take an item protected by *any* of the technologies, knowing that it would activate the *Echo Box*[1]. With an average of 1.2 out of 5, offenders were "very unlikely" to attempt to steal products protected by the ecosystem. Notably, one offender expressed that she was impressed by the technology, stating: *"I wouldn't come to this store to steal*

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[1] The offenders were asked about the technologies in this order originally: *SONR Pusher, SONR Hook, SONR Crossbar, LM Tag with SONR, and the Echo Box. They understood the capabilities of the other technologies before being asked this question.*

anything. If every store had this theft would be nothing."

Next, they were asked to rate their likelihood of being caught if they attempted to take an item protected by the *SONR Ecosystem*. The average was a 3.9 out of 5, meaning that offenders rated their chance of being caught as "somewhat likely". Finally, we asked how likely they would be to attempt to defeat the technology. Offenders were "very" to "somewhat" unlikely to attempt to defeat the *SONR Echo Box* (1.5 out of 5).

They were also asked what their reaction would be if they entered a store using Siffron's *SONR Echo Box* (see Figure 2):

- Six offenders (60%) would not take anything from that store but would go to a different location.

- Three offenders (30%) would not steal *anything* that day.

- One offender (10%) said that his decision would depend on who is working that day, stating that the associates are an important factor in the effectiveness of the technology.

Figure 2. **Offender Reactions to the *Siffron Echo Box* (N=10)**
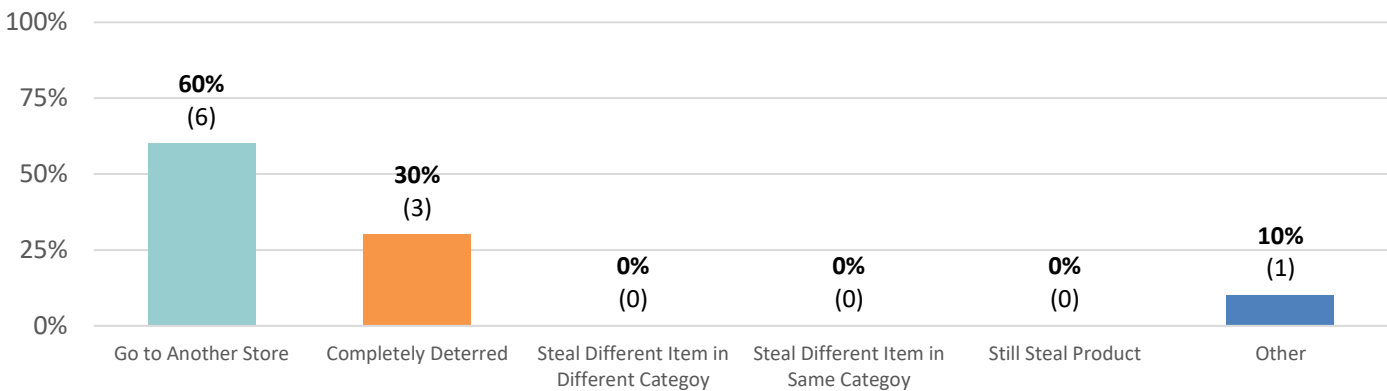
The participants were asked if they had any suggestions on how to make the *Echo Box* more *noticeable,* make the function *easier to understand,* and make it more of a *deterrent*. The responses included:

- **Improving Noticeability:**
  - Make it larger (10%)
  - Place it behind counter or register (20%)
  - Brighter flashing light (20%)
  - Brighter color (10%)
  - It should not be noticeable (40%)
    - *"No, it's not noticeable and that's a good thing."*
    - *"It would be more successful if it's not noticeable."*

- **Improving Understandability:**
  - Signage (40%)
    - *"Let them (the shoplifters) know what it does by saying "protected by" or something."*
    - *"Something like saying 'I (the technology) am here'."*
- **Improving Credibility:**
  - Associate training (10%)
    - *"Make sure the associates are trained to respond, but there is always an excuse to get you out of it."*

Associate Surveys

Associates in both StoreLabs were asked to trial Siffron's *SONR Ecosystem.* After two weeks, they filled out a survey designed by an LPRC Research Scientist to evaluate their experience with the technologies. Six employees from Store #1 and six from Store #2 participated in the survey, for a total of 12 associate respondents. 10 of the 12 of the respondents were front end cashiers, one was a General Manager, and one was an Assistant Manager. The respondents held their positions for an average of 7 months at the time of the survey.

Associates were asked to trial the *SONR Echo Box* over a period of two weeks, then answer a series of questions about the technology. The *Echo Box* has the ability to tie all of the other technologies together, therefore, additional questions were added to better gauge their reactions to the individual technology and the ecosystem as a whole. Ten associates chose to respond to the questions., and overall, their response to the *Echo Box* was fairly positive, with one employee commenting: *"I honestly love the technology because it helps us."*

1. Associates were "neutral" to "somewhat agreed" with the statement *"The technology positively impacts my ability to provide customer service."* (3.79 out of 5).

2. Associates "somewhat agreed" with the statement *"I have had a favorable experience with this technology."* (3.92 out of 5). Notably, 60% of respondents either "somewhat" or "strongly" agreed with the statement.

3. Associates were "neutral" to "somewhat agreed" with the statement *"This technology effectively deters shoplifting or theft."* (3.79 out of 5).

4. Associates "somewhat agreed" with the statement *"Having the Siffron technologies tied together with the Echo Box makes it easier to recognize shoplifting in-store."* Of the respondents, 70% either "somewhat" or "strongly" agreed with the statement. (4.09 out of 5)

5. Associates "somewhat" agreed, with the statement "*The Echo Box makes it easier to identify when*

another Siffron technology is alarmed." (3.88 out of 5)

6. When asked to assess the overall customer experience with the technology, the employees were "neutral" to "somewhat agreed" with the statement *"Customers have had a favorable experience with this technology."* (3.71 out of 5)

7. Finally, associates "somewhat" disagreed with the statement *"Customers often approach me with questions about this technology."* (2.67 out of 5)

Table 1. Associate Feedback on the *SONR Echo Box* (N=10)
(1=Strongly Disagree, 5=Strongly Agree)

Statement	Store #1 Average Rating	Store #2 Average Rating	Overall Average Rating
The technology positively impacts my ability to provide customer service.	4.33	3.25	3.79
I have had a favorable experience with this technology.	4.33	3.50	3.92
This technology effectively deters shoplifting or theft.	4.33	3.25	3.79
Having the Siffron technologies tied together with the *Echo Box* makes it easier to recognize shoplifting in-store.	4.17	4.00	4.09
The *Echo Box* makes it easier to identify when another Siffron technology is alarmed.	4.00	3.75	3.88
Customers have had a favorable experience with this technology.	4.17	3.25	3.71
Customers often approach me with questions about this technology.	2.84	2.5	2.67

Customer Intercepts

In the last part of the interviews, customers were asked to give their feedback on the *SONR Echo Box.* Similar to the reactions we saw from the offender interviews, customers did not readily notice the technology. In fact, only two customers had seen the technology in the StoreLab before. The remaining 29 customers (97%) had never noticed the technology before.
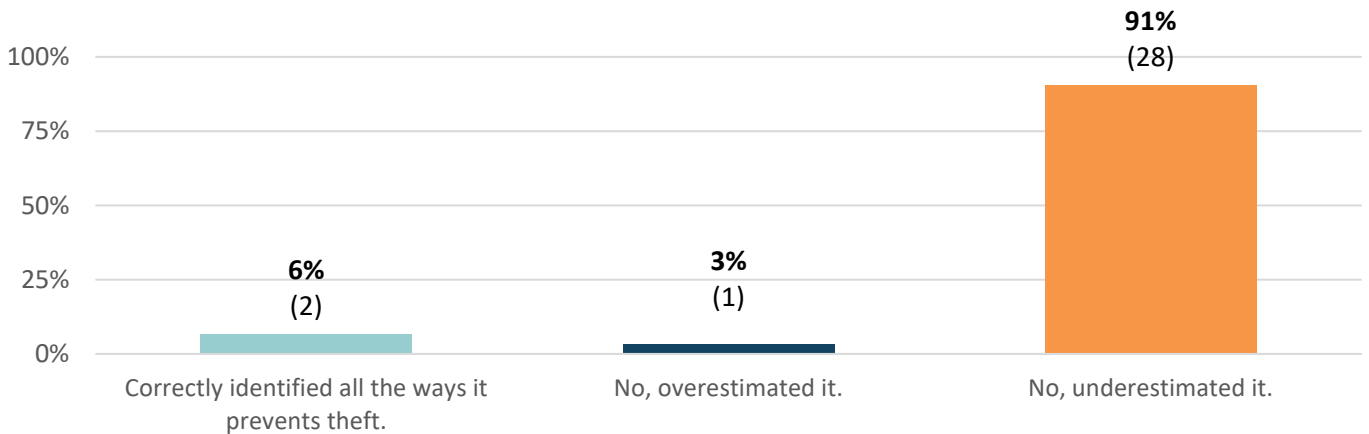
Figure 3. **Had the customers seen the *SONR Echo Box* before? (N=31)**

■ Yes, in this store
■ Yes, in another store
■ No, never

97%
(29)

3%
(2)

We also wanted to understand what customers thought of the technology *before* it was explained and demonstrated for them. Only two customers were able to guess what the *Echo Box* does. One customer *overestimated* its' capabilities, guessing it was some sort of tracking device for the products in-store. The remaining 28 customers (90%) *underestimated* the device:

- (10) did not know that the *Echo Box* connects the rest of the *SONR Ecosystem*
- (10) had no idea what the *Echo Box* is used for
- (3) thought it was video surveillance
- (2) thought it connected only to the *LM Tag with SONR*
- (1) thought it was a speaker
- (1) thought it connected only to the *SONR Hook*
- (1) thought it was a smoke detector

Figure 4. **Do customers understand the mechanisms of the *SONR Pusher*? (N=31)**

91%
(28)

6%
(2)

3%
(1)

Correctly identified all the ways it prevents theft.

No, overestimated it.

No, underestimated it.

Finally, the customers were asked to rate their agreement with a series of statements about the *SONR Echo*

System, where 1 means "strongly disagree" and 5 means "strongly agree":

- Customers "somewhat" to "strongly" agree that compared to locking away merchandise, the *Echo Box* makes for a more convenient shopping experience (4.6 out of 5)

- Finally, customers "somewhat" to "strongly" agree that the ability to tie the Siffron technologies together would be a stronger deterrent for offenders (4.6 out of 5).

- Customers "somewhat disagreed" when asked if the *SONR Echo Box* is noticeable (2.06 out of 5).

- After the technology was pointed out and explained to them, the customers "somewhat agreed" that its' capabilities are easy to understand (4.58 out of 5).

- When presented with the statement *"This technology gives me the impression that this store has a lot of theft",* customers were neutral, leaning towards "somewhat" agree (3.68 out of 5)

Figure 5. **Customer Feedback of the *SONR Pusher* (N=31)**
*(1=Strongly Disagree, 5=Strongly Agree)*
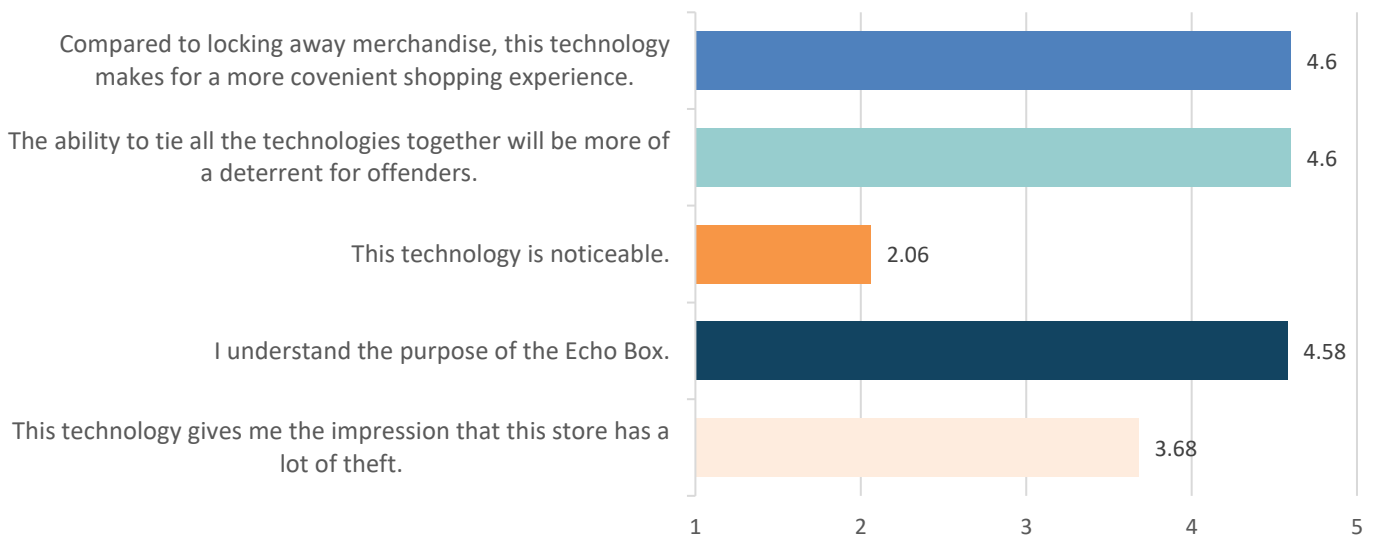
Interview Results: *SONR Pusher*

Offender Interviews

For this trial, the *SONR Pusher* was used by the retailer to protect an assortment of food products and health and beauty items. Once the offenders were prompted to begin looking for security devices, 50% were able to specifically identify the *SONR Pusher* (see Figure 1).

Figure 6. **Did offenders see the *SONR Pusher*? (N=10)**
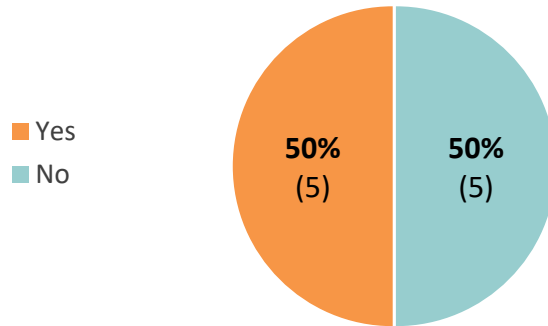
Before it was demonstrated, the offenders were asked to guess the mechanisms of the *SONR Pusher*, allowing us to better understand their initial perceptions of the technology. Four offenders (40%) were able to correctly identify all the ways the *Pusher* prevents theft. The remaining six (60%) *underestimated* the capabilities of the *SONR Pusher*. Of those, two thought it was used for stocking or inventory control, and four did not know that it would sound if an item was removed from the shelf.

Figure 7. **Do the offenders understand the mechanisms of the *SONR Pusher?* (N=10)**
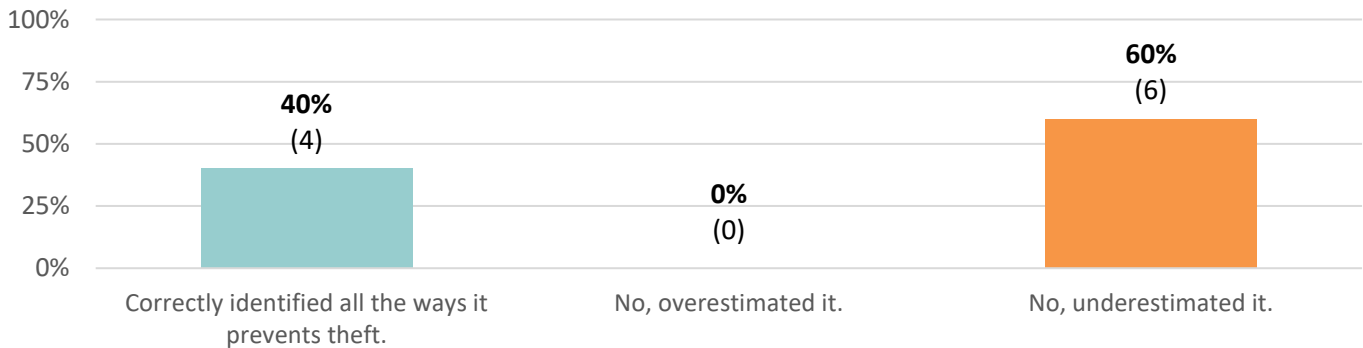
We also wanted to assess the deterrent power of the Siffron technology. First, the offenders were asked how likely they would be to steal an item protected by the *SONR Pusher*, where 1 is "very unlikely" and 5 is "very likely". The average response was 2.5 out of 5, meaning offenders were "somewhat unlikely" to attempt to steal a product protected by the technology. Furthermore, the offenders would not attempt to overcome or

defeat the *Pusher*. The respondents were "very" to "somewhat" unlikely to attempt to defeat the technology (1.7 out of 5). Notably, 80% of the respondents said they were "very unlikely" to try to defeat it.

Figure 8. **How Likely Would You Be to Attempt to Defeat the *SONR Pusher*? (N=10)**
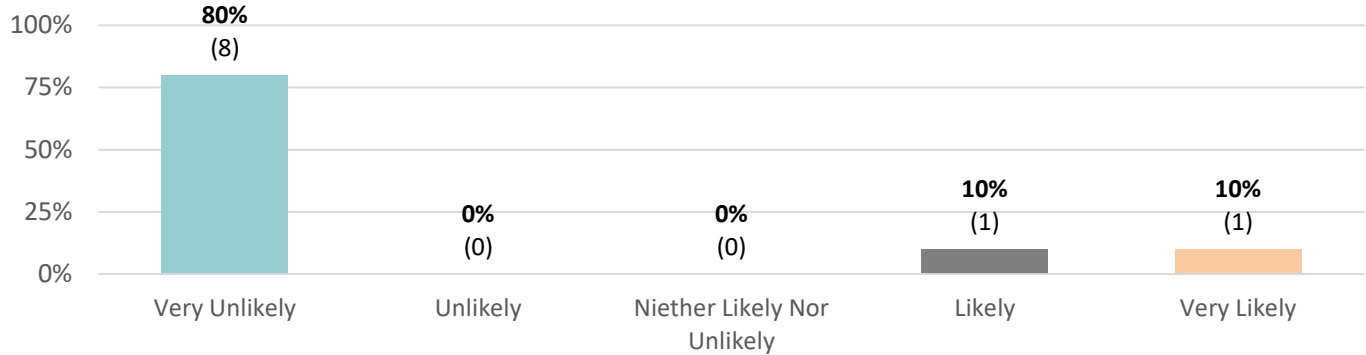
The offenders were also asked what their reaction would be if they entered a store using the *SONR Pusher*. The responses were open-ended and coded based on content; therefore, offenders could react in multiple different ways:

- Five offenders (50%) would not steal that day, indicating that the *SONR Pusher* is a specific deterrent[2] for those individuals.

- One offender (10%) would not take anything from that store but would go to a different store.

- One offender (10%) said that they would attempt to take an unprotected item in the *same* product category.

- Three offenders (30%) said they would be undeterred and would still attempt to take the protected item.

Figure 9. **Offender Reactions to the *SONR Pusher* (N=10)**

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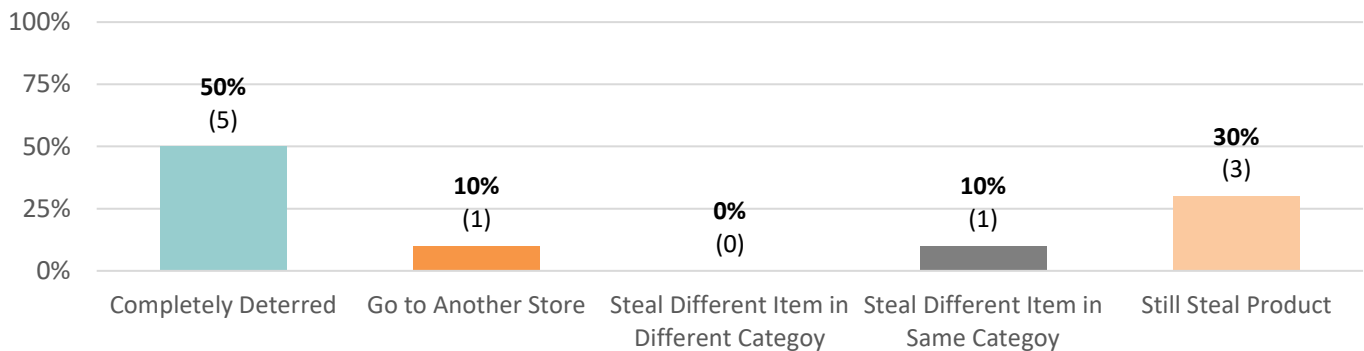
[2] A specific deterrent is one that dissuades an offender from committing a similar crime in the future (Smith & Gartin, 1989)

Finally, the offenders were asked if they had any suggestions on how to make the technology more *noticeable* (see it)*,* make the function *easier to understand* (get it)*,* and make it more of a *deterrent* (fear it). The responses included:

- **Improving Noticeability:**
    - Increase volume of the notifications[3] (40%)
    - Signage (20%)
        - *"Maybe add a sign, something like 'Protected by'…"*
    - Lights (20%)
        - *"Add maybe a light that flashes when something is removed."*
    - Make it bigger/taller (10%)
    - Limit visibility (10%)
        - *"You don't want it visible."*

- **Improving Understandability:**
    - Signage (20%)
        - *"Add a warning, i.e. 'device activates when tampered with'."*
        - *"Help people know what it is with some warning."*

- **Improving Credibility:**
    - Louder/longer sound (20%)
    - Signage (10%)
    - Improved staff training (10%)
        - *"Unless someone is paying attention, it probably won't work [to deter theft]".*

Associate Surveys

The associates were presented with a series of five statements about the *SONR Pusher* and were asked to rate their agreement from 1 (strongly disagree) to 5 (strongly agree). In general, Store #1 had a slightly more positive experience than Store #2. Overall, however, the associates' experience with the *SONR Pusher* was generally favorable (see Table 2 for more detail). One respondent went on to say that *"It's [shrink] improved so much because it helps us notice who's touching our products."*

- Generally, associates were "neutral" to "somewhat agreed" with the statement *"The technology*

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[3] These interviews occurred before explanation of the *Echo Box,* which can mimic chimes and alarms up to 25 feet away.

positively impacts my ability to provide customer service." (3.58 out of 5)

- Associates "somewhat agreed" with the statement *"I have had a favorable experience with this technology."* (4.09 out of 5). Notably, 66.7% of respondents "somewhat" or "strongly" agreed with the statement.

- Associates "somewhat agreed" with the statement *"This technology effectively deters shoplifting or theft."* (4.00 out of 5). 75% of respondents either "somewhat" or "strongly" agreed with this statement.

- When asked to assess the overall customer experience with the technology, associates "somewhat agreed" with the statement *"Customers have had a favorable experience with this technology."* (3.67 out of 5)

- Finally, it appears as though customers were somewhat perplexed by the *SONR Pusher.* Associates "somewhat agreed" with the statement *"Customers often approach me with questions about this technology."* (4.00 out of 5)

Table 2. Associate Feedback on the *SONR Pusher* (N=12)
(1=Strongly Disagree, 5=Strongly Agree)

Statement	Store #1 Average Rating	Store #2 Average Rating	Overall Average Rating
The technology positively impacts my ability to provide customer service.	4.00	3.16	3.58
I have had a favorable experience with this technology.	4.17	4.00	4.09
This technology effectively deters shoplifting or theft.	4.17	3.83	4.00
Customers have had a favorable experience with this technology.	4.00	3.33	3.67
Customers often approach me with questions about this technology.	4.33	3.67	4.00

Customer Intercepts

Finally, the LPRC Research Team travelled to the two StoreLabs and interviewed 31 customers who were intercepted while shopping in-store. They were asked questions about the different technologies, designed to gauge their reactions and opinions on Siffron's open-merchandising system. First, we were interested in whether or not customers had seen the *SONR Pusher* before. In general, the technology was novel for a majority of customers (see Figure 10).
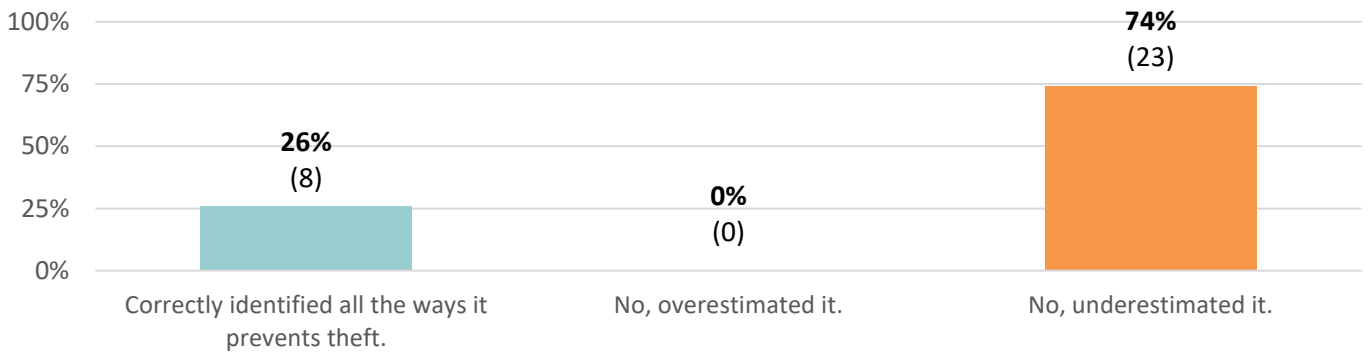
Figure 10. **Had the customers seen the *SONR Pusher* before? (N=31)**

- Yes, in this store
- Yes, in another store
- No, never

29%
(9)

52%
(16)

19%
(6)
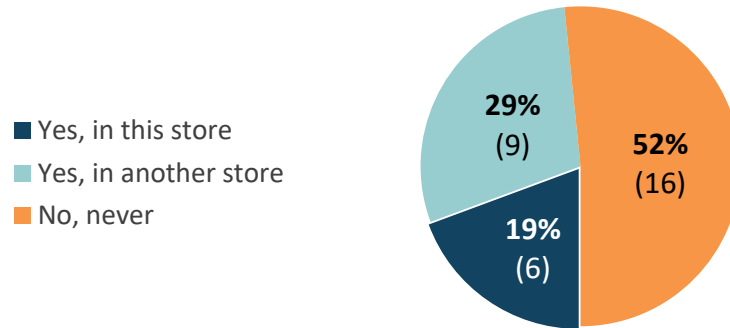
Similar to the methodology used for the offender interviews, we also wanted to understand whether customers understood the capabilities of the technologies *before* it was explained and demonstrated for them. Eight customers (25.8%) were able to correctly describe the mechanisms of the *SONR Pusher*. While none overestimated it, most (74.2%) underestimated it. More specifically:

- (3) did not know that it would chime if a product was taken

- (6) had no clear idea of how the *SONR Pusher* operates

- (14) thought it was used to facilitate stocking of the shelves

Figure 11. **Do customers understand the mechanisms of the *SONR Pusher*? (N=31)**


26%
(8)

Correctly identified all the ways it prevents theft.

0%
(0)

No, overestimated it.

74%
(23)

No, underestimated it.

Finally, the customers were asked to rate their agreement with a series of statements about the *SONR Pusher,* where 1 means "strongly disagree" and 5 means "strongly agree". In general, customer reactions to the *SONR Pusher* was favorable, in particular the availability of the product. One notable customer was quoted as saying *"I really like that things can actually be available with this."* In fact, compared with locking away merchandise, customers "somewhat" to "strongly" agreed that the *SONR Pusher* makes for a more convenient shopping experience (see Figure 12).

- Compared to closed-merchandising, customers "somewhat" to "strongly" agreed that the *SONR Pusher*

makes for a more convenient shopping experience (4.55 out of 5).

- After the technology was pointed out, the customers "somewhat agreed" that its' capabilities are easy to understand (4.06 out of 5).

- Customers showed some confidence in the ability of the *SONR Pusher* to deter theft. When presented with the statement *"I think this technology would effectively prevent theft",* customers "somewhat agreed" (3.94 out of 5).

- Customers were neutral when asked if the *SONR Pusher* is noticeable (3 out of 5).

- Finally, the average customer neither agreed nor disagreed that installation of the security technology gives the impression that the store has a lot of theft (3.19 out of 5).

Figure 12. **Customer Feedback of the *SONR Pusher* (N=31)**
*(1=Strongly Disagree, 5=Strongly Agree)*
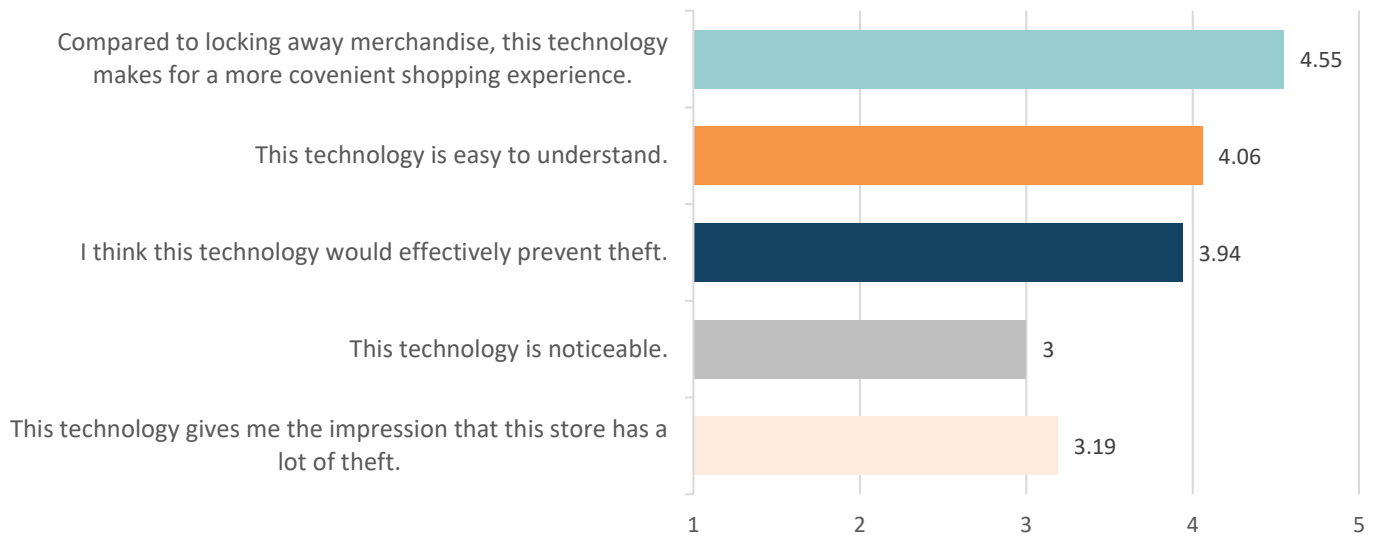
Interview Results: *SONR Hook*

Offender Interviews

Next, we wanted to assess how retail offenders would react to Siffron's *SONR Hook* technology. In the two StoreLabs, the technology was being used to protect an assortment of health and beauty items. Once the offenders began looking for devices, 50% of respondents were able to specifically point out the *SONR Hook* (see Figure 13).

Figure 13. Did offenders see the *SONR Hook*? (N=10)

- Yes
- No

50% (5)   50% (5)
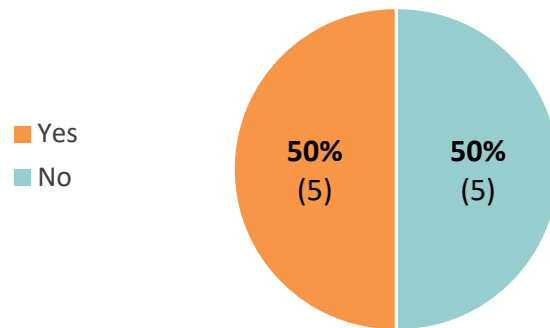
Next, they were asked to describe how they thought the *SONR Hook* works. Four offenders (40%) were able to correctly identify all the ways it prevents theft. Two offenders (20%) *overestimated* the capabilities of the technology, both stating that they believed the hook would need to be unlocked by an associate to retrieve a product. The remaining 40% *underestimated* the capabilities of the *SONR Hook*. Of those, three did not know that it would sound if an item was taken from the shelf, and three thought it was used to either track inventory or facilitate stocking.

Figure 15. Do the offenders understand the mechanisms of the *SONR Hook?* (N=10)

|		
40% (4)	20% (2)	40% (4)
Correctly identified all the ways it prevents theft.	No, overestimated it.	No, underestimated it.
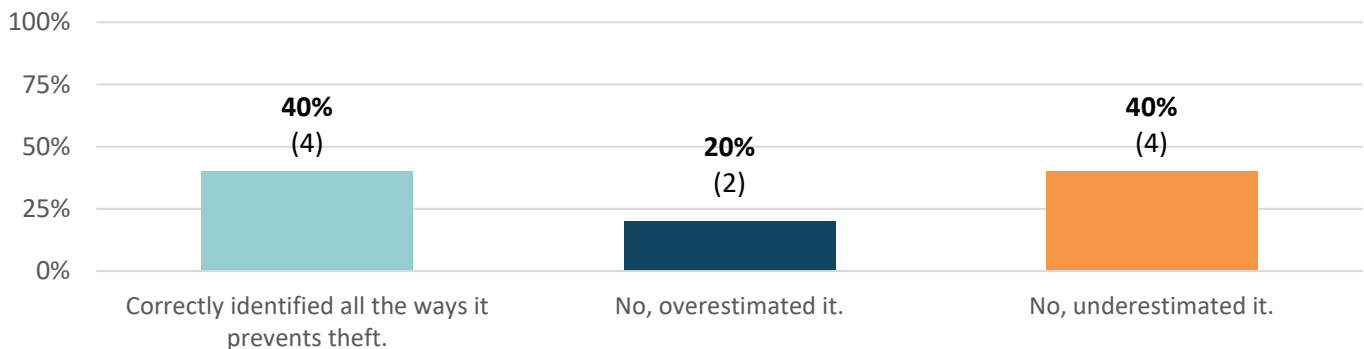
Next, we asked about the deterrent power of the Siffron *SONR Hook*. When asked how likely they would be to steal an item protected by the technology, the average response was 1.6 out of 5, indicating that offenders

were "very" to "somewhat" unlikely to steal a product protected by the technology. Next, we asked how likely they would be to try to defeat the technology. Again, the average was 1.6 out of 5, meaning they were "very" to "somewhat" unlikely to attempt to defeat the *SONR Hook.*

The retail offenders were then asked what their reaction would be if they entered a store using the *SONR Hook.* Their responses were open-ended and coded (see Figure 16):

- Five offenders (50%) would not take anything from that store but would go to a different store.

- Two offenders (20%) indicated that they would not steal that day.

- Two offenders (20%) said they would be undeterred and would still attempt to take the protected item.

- One offender (10%) stated that they would attempt to take an unprotected item in a *different* product category.

Figure 16. **Offender Reactions to the *SONR Hook* (N=10)**
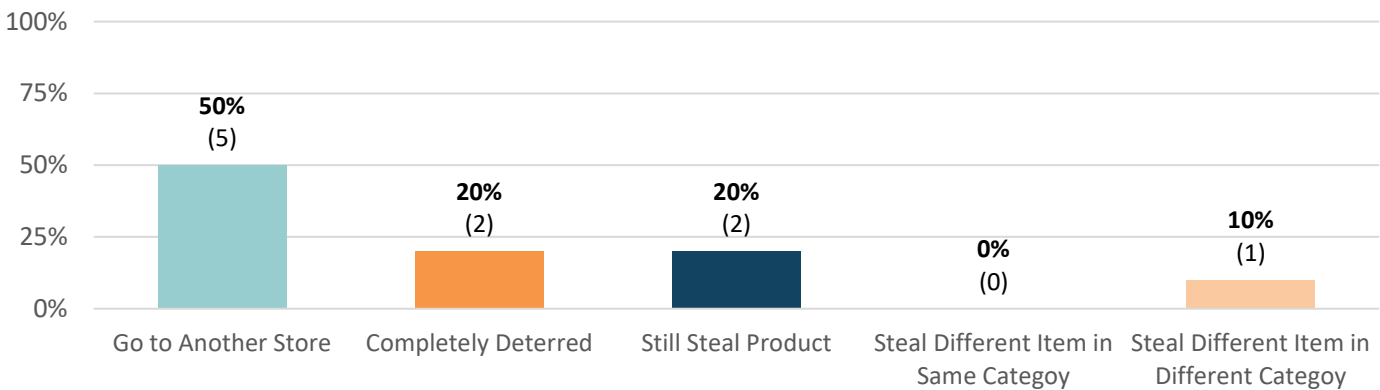
Finally, the offenders were asked if they had any suggestions on how to make the technology more *noticeable,* make the function *easier to understand,* and make it more of a *deterrent*. The responses included:

- **Improving Noticeability:**
    - Increase volume of the notifications (30%)
    - Flashing lights (10%)
    - Limit visibility (10%)
- **Improving Understandability:**
    - Labels (10%)
        - *"Add a 'lift here' label."*
- **Improving Credibility:**

o   Signage (20%)

▪   *"Write something like 'you can be prosecuted'".*

o   Increase volume of the notifications (10%)

▪   *"There's no way around this one. It just needs to be louder."*

Associate Surveys

Similar to the process used for the *SONR Pusher,* the same associates were presented with statements about the *SONR Hook,* where 1 is "strongly disagree" and 5 is "strongly agree". Again, Store #1 appeared to have a slightly more favorable experience with the technology than Store #2 (see Table #2). Overall, however, results indicated that:

1.   Associates "somewhat agreed" with the statement *"The technology positively impacts my ability to provide customer service."* (4.08 out of 5)

2.   Associates "somewhat agreed" with the statement *"I have had a favorable experience with this technology."* (4.08 out of 5). Notably, 66.7% of associates surveyed either "somewhat" or "strongly" agreed with this statement.

3.   Associates "somewhat agreed" with the statement *"This technology effectively deters shoplifting or theft."* (4.17 out of 5).

4.   Associates neither "agreed" nor "disagreed" with the statement *"Customers have had a favorable experience with this technology."* (3.34 out of 5)

5.   Finally, associates neither "agreed" nor "disagreed" with the statement *"Customers often approach me with questions about this technology."* (3.33 out of 5)

Table 3. Associate Feedback on the *SONR Hook*
***(1=Strongly Disagree, 5=Strongly Agree)***

Statement	Store #1 Average Rating	Store #2 Average Rating	Overall Average Rating
The technology positively impacts my ability to provide customer service.	4.33	3.83	4.08
I have had a favorable experience with this technology.	4.33	3.83	4.08
This technology effectively deters shoplifting or theft.	4.33	4.00	4.17
Customers have had a favorable experience with this technology.	4.5	2.17	3.34

Customers often approach me with questions about this technology.	3.83	2.83	3.33

Customer Intercepts

The LPRC Research Team also interviewed 31 customers about the *SONR Hook.* Specifically, we aimed to understand what their impressions were of the technology and better understand how it impacts the overall shopping experience. First, we were interested in whether customers had seen the *SONR Hook* before, either in the StoreLab or a different store. Only ten customers (32%) had encountered the technology before. A vast majority (68%), had never seen it before.

Figure 17. **Had the customers seen the *SONR Hook* before? (N=31)**
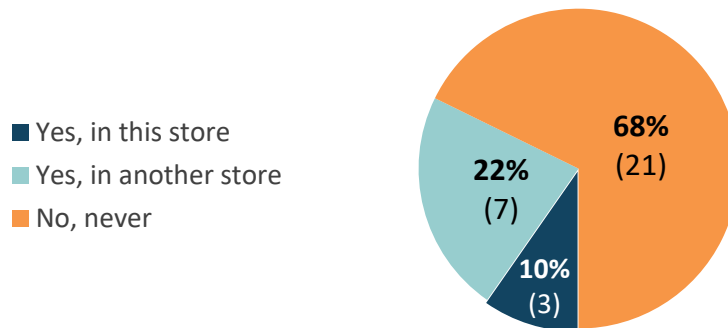
- Yes, in this store
- Yes, in another store
- No, never

68% (21)

22% (7)

10% (3)

Next, we wanted to understand whether customers understood the capabilities of the technologies *before* it was explained to them. In general, most customers were able to correctly identify the mechanisms of the technology (58%). Four of the customers (16%) *overestimated* the *SONR Hook*, believing that it needed to be unlocked by an associate. The remaining eight customers (26%) *underestimated* the technology:

- (4) stated that they did not know what the technology does
- (4) did not know that the *Hook* could chime when lifted

Figure 18. **Do customers understand the mechanisms of the *SONR Hook?* (N=31)**
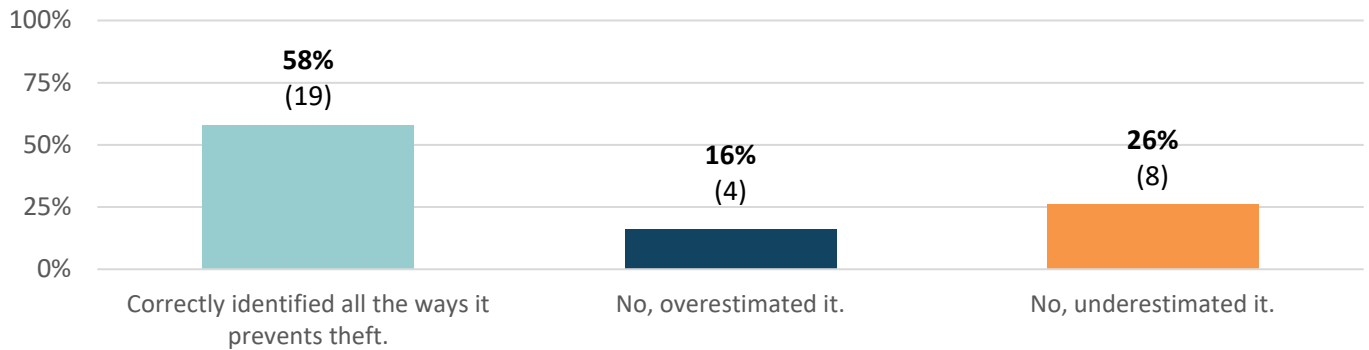
Finally, the customers were asked to rate their agreement with a series of statements about the *SONR Hook,* where 1 means "strongly disagree" and 5 means "strongly agree". Feedback on the *SONR Hook* was favorable. As compared to closed-merchandising, customers indicated that they strongly prefer having products visible and available for purchase.

- Again, compared to closed-merchandising, customers "somewhat" to "strongly" agreed that the *SONR Hook* makes for a more convenient shopping experience (4.77 out of 5).

- After the technology was pointed out, the customers "somewhat agreed" that its' capabilities are easy to understand (4.19 out of 5).

- Customers showed confidence in the ability of the *SONR Hook* to deter theft. When presented with the statement *"I think this technology would effectively prevent theft",* customers "somewhat agreed" (4.19 out of 5).

- When presented with the statement *"This technology is noticeable",* customers were generally neutral to "somewhat" agreed (3.39 out of 5).

- Finally, when presented with the statement *"This technology gives me the impression that this store has a lot of theft",* customers were generally held neutral beliefs (3.19 out of 5).

Figure 19. **Customer Feedback of the *SONR Hook*** (N=31)
(1=Strongly Disagree, 5=Strongly Agree)

Statement	Score
Compared to locking away merchandise, this technology makes for a more covenient shopping experience.	4.77
This technology is easy to understand.	4.19
I think this technology would effectively prevent theft.	4.19
This technology is noticeable.	3.39
This technology gives me the impression that this store has a lot of theft.	3.19
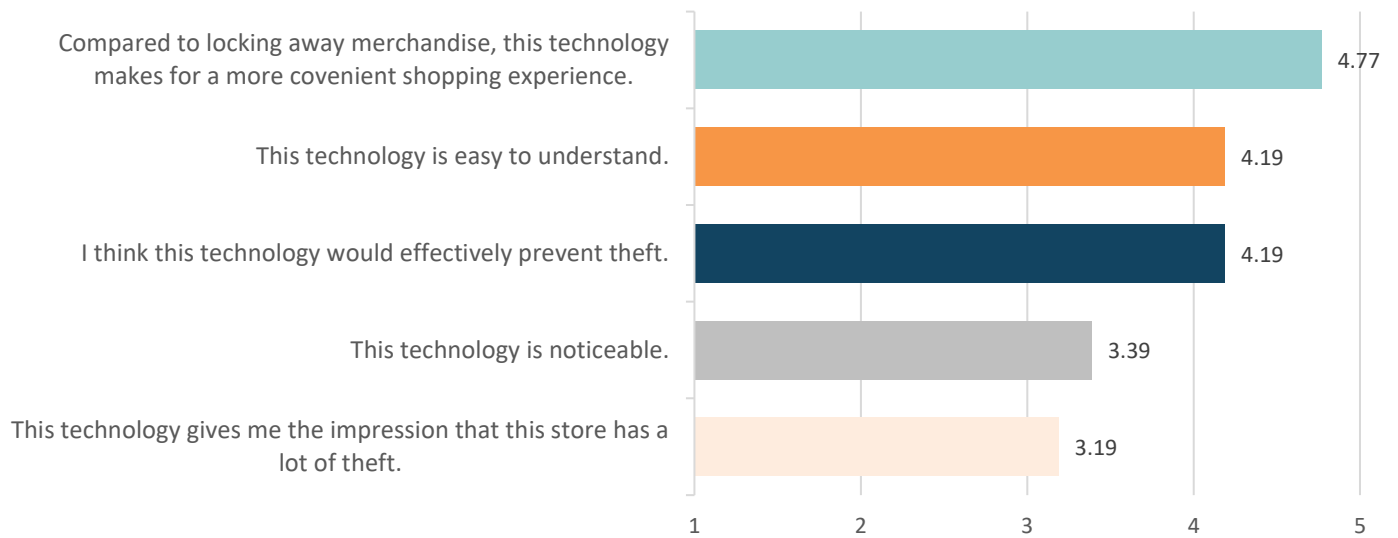
Interview Results: *SONR Crossbar*
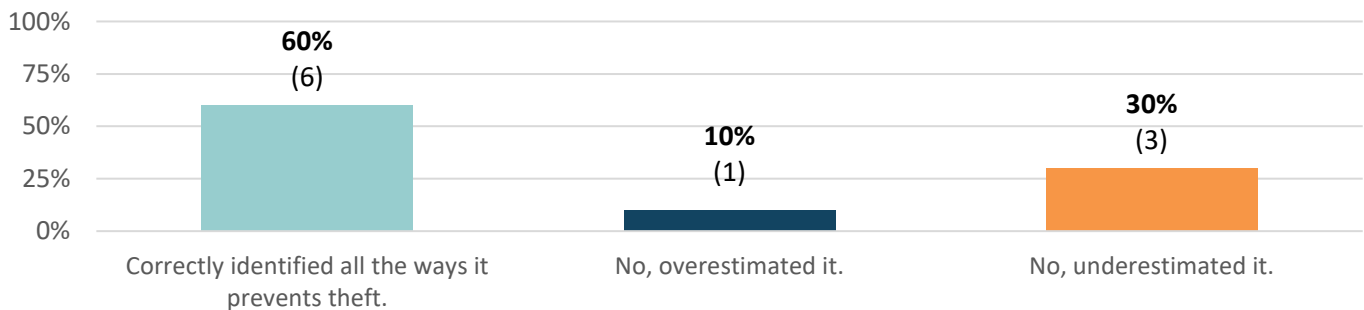
Offender Interviews

The *SONR Crossbar* was being used in the StoreLabs to protect soap, laundry, and other cleaning products. Again, retail offenders were escorted into the aisle where the technology installed and were asked if they noticed any security technology in that aisle. Of the ten respondents, six (60%) noticed the *SONR Crossbar* before it was pointed out.

Figure 20. **Did offenders see the *SONR Crossbar*? (N=10)**

- Yes
- No

60% (6)

40% (4)
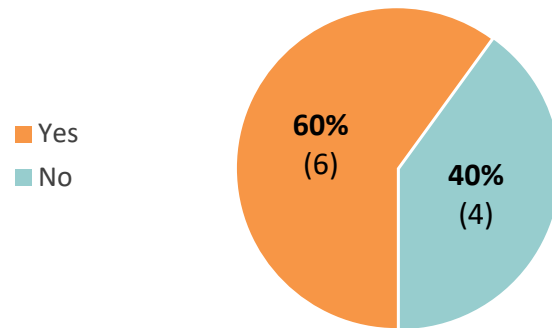
Before the technology was explained to them, the offenders were asked to guess the mechanisms of the technology. Six respondents (60%) were able to correctly describe the capabilities of the *SONR Crossbar.* One (10%) *overestimated* the capabilities of the technology, believing that it needed to be unlocked by a store associate. Finally, three offenders (30%) *underestimated* it, not knowing that it will sound when the shield is lifted, or alarm when it is lifted for too long (see Figure 14).

Figure 21. **Do the offenders understand the mechanisms of the *SONR Crossbar?* (N=10)**

60% (6) — Correctly identified all the ways it prevents theft.

10% (1) — No, overestimated it.

30% (3) — No, underestimated it.

Next, we asked the offenders about the deterrent power of the Siffron *SONR Crossbar*. When asked how likely they would be to steal an item protected by the technology, the average response was 3 out of 5, meaning offenders were neither more likely nor unlikely to attempt to steal a product protected by the *SONR Crossbar.*

Next, we asked how likely they would be to try to defeat the technology. The average was 3.1 out of 5, again indicating that they were not more or less likely to attempt to defeat the *Crossbar.* Notably, many respondents indicated that they shield itself was too small, and that items could be taken from the sides or bottom. However, the shield can be designed to fit any size shelf, so this criticism may not be applicable to different stores.

Finally, the offenders were asked what their reactions would be if they entered a store using the *SONR Crossbar* (see Figure 22)

- One offender (10%) would not steal anything that day.

- Two offenders (20%) would not take anything from that store but would go to a different store.

- One offender (10%) stated that they would attempt to take an unprotected item in a *similar* product category.

- Six offenders (60%) said they would be undeterred and would still attempt to take the item.

Figure 22. **Offender Reactions to the *SONR Crossbar* (N=10)**
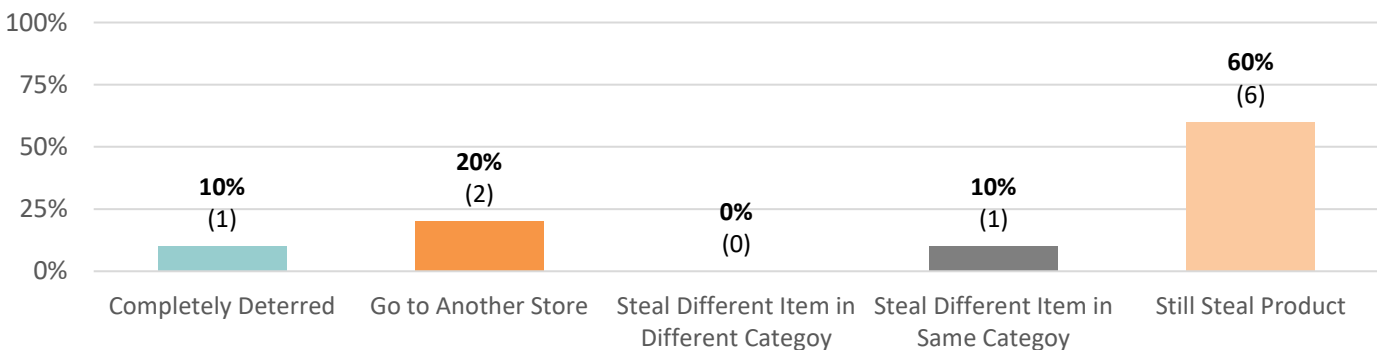
The participants were asked if they had any suggestions on how to make the technology more *noticeable,* make the function *easier to understand,* and make it more of a *deterrent*. The responses included:

- **Improving Noticeability:**
  - Make the shield larger (40%)
    - *"Make it larger, and make sure there's no gaps."*
  - Increase volume of the notifications (10%)
- **Improving Understandability:**
  - Signage advertising use of the technology (20%)
    - *"A sticker or something would help. Something like 'anti-theft'."*
- **Improving Credibility:**

- o Make the shield larger (60%)
    - ▪ *"You have to make it longer, see, I can just take it (the product) from the sides."*
    - ▪ *"It's too short, I can take the products from underneath it."*
- o Signage (10%)
    - ▪ *Add 'You can be prosecuted'."*

Associate Surveys

Next, we wanted to assess how associates felt about the *SONR Crossbar* and evaluate how it impacted their everyday job duties. Associates from both StoreLabs were presented a series statements about the *SONR Crossbar,* where 1 is strongly disagree and 5 is strongly agree. A total of eleven respondents answers the questions on the survey. Overall results were fairly positive:

1. Associates were "neutral" to "somewhat" agreed with the statement *"The technology positively impacts my ability to provide customer service."* (3.7 out of 5)

2. Associates were "neutral" to "somewhat" agreed with the statement *"I have had a favorable experience with this technology."* (3.5 out of 5).

3. Associates were "neutral" to "somewhat" agreed with the statement *"This technology effectively deters shoplifting or theft."* (3.5 out of 5).

4. When asked to assess the overall customer experience with the technology, the employees were "neutral" to "somewhat agreed" with the statement *"Customers have had a favorable experience with this technology."* (3.57 out of 5)

5. Finally, associates neither "agreed" nor "disagreed" with the statement *"Customers often approach me with questions about this technology."* (3.10 out of 5)

Table 4. Associate Feedback on the *SONR Crossbar* (N=11)
***(1=Strongly Disagree, 5=Strongly Agree)***

Statement	Store #1 Average Rating	Store #2 Average Rating	Overall Average Rating
The technology positively impacts my ability to provide customer service.	4.00	3.40	3.70
I have had a favorable experience with this technology.	4.00	3.00	3.50
This technology effectively deters shoplifting or	4.00	3.00	3.50

theft.			
Customers have had a favorable experience with this technology.	4.33	2.80	3.57
Customers often approach me with questions about this technology.	3.00	3.20	3.10

Customer Intercepts

Finally, we wanted to gather customer feedback on Siffron's *SONR Crossbar.* Most of the customers interviewed had never seen the *Crossbar* before (65%). Eight (26%) indicated that they have seen in in a different store, and three (10%) noticed it specifically in that StoreLab.

Figure 23. **Had the customers seen the *SONR Hook* before? (N=31)**
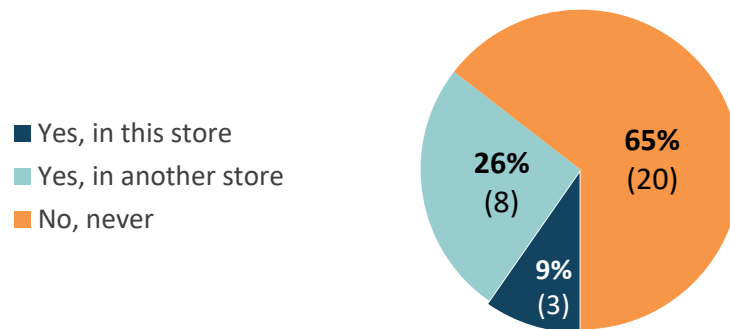
Next, we wanted to understand whether customers understood the capabilities of the technologies *before* it was explained to them. 11 of the 31 customers were able to describe all of the capabilities of the *SONR Crossbar* (35%). Only one customer *overestimated* the technology, believing it was weight sensitive and would sound and track whenever an item was removed. The remaining 19 customers (61%) *underestimated* the technology. Notably, these interviews were conducted in July 2020, during the COVID-19 pandemic. As a result, two of the participants believed the shield component of the *Crossbar* to be related to store sanitization.

- (13) did not know that the *Crossbar* would alarm if the shield was lifted for too long

- (3) stated that they did not know what the technology does

- (2) did not know that the *Crossbar* sounded when lifted

- (1) did not know that the *Crossbar* could be used for all shelving units, and only thought it was for products on the bottom shelf

Figure 24. **Do customers understand the mechanisms of the *SONR Crossbar?* (N=31)**
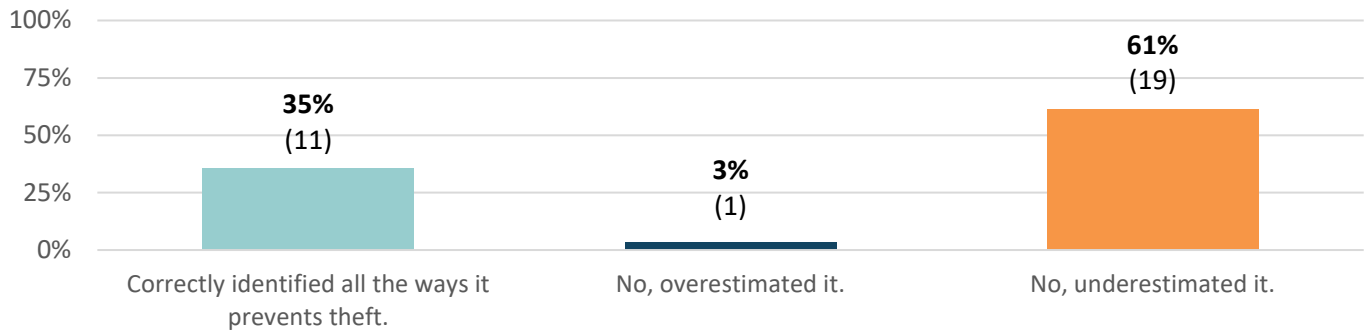
Finally, the customers were asked to rate their agreement with a series of statements about the *SONR Crossbar,* where 1 means "strongly disagree" and 5 means "strongly agree"(see Figure 25)

- Customers much preferred the open merchandising of the *Crossbar*, where they "somewhat" to "strongly" agreed that the *SONR Hook* makes for a more convenient shopping experience (4.55 out of 5).

- After the technology was pointed out, the customers "somewhat" to "strongly" agreed that its' capabilities are easy to understand (4.58 out of 5).

- When presented with the statement *"I think this technology would effectively prevent theft",* customers were neutral, leaning toward "somewhat" agree (3.65 out of 5).

- When presented with the statement *"This technology is noticeable",* customers were generally neutral, leaning toward "somewhat agree" (3.87 out of 5).

- Finally, when presented with the statement *"This technology gives me the impression that this store has a lot of theft",* customers were generally held neutral beliefs (3.35 out of 5).

Figure 25. **Customer Feedback of the *SONR Crossbar* (N=31)**
(1=Strongly Disagree, 5=Strongly Agree)

| Statement	Score
Compared to locking away merchandise, this technology makes for a more covenient shopping experience.	4.55
This technology is easy to understand.	4.58
I think this technology would effectively prevent theft.	3.65
This technology is noticeable.	3.87
This technology gives me the impression that this store has a lot of theft.	3.35
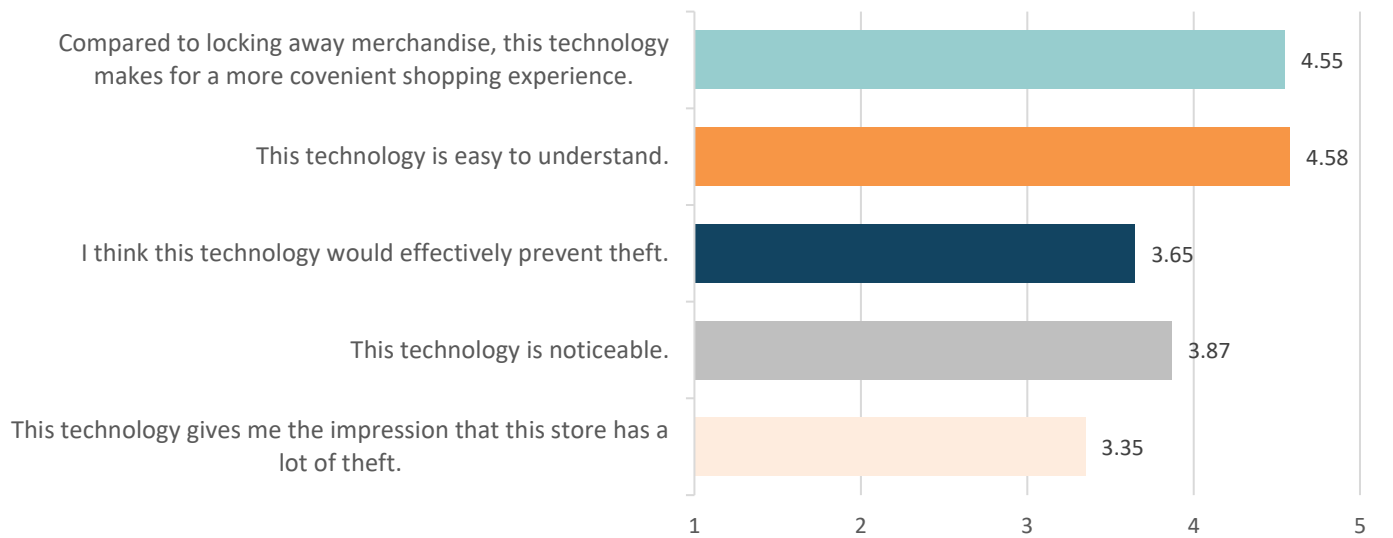
Interview Results: *LM Tag with SONR*
Offender Interviews

At the time of this study, Siffron's *LM Tag* was utilized in one StoreLab to protect over-the-counter products (i.e. Bayer, Claritin, Aleve, etc.). Six retail offenders were interviewed about the technology. When taken into the aisle, they were asked if they noticed any security technology. All six (100%) were able to point out the *LM Tag.*

However, none of the offenders fully understood the capabilities of the *LM Tag.* One offender (16.7%) *overestimated* the technology, believing that it would sound if it were touched or picked up. Five offenders (83.3%) *underestimated* the capabilities of the technology. Three did not know that the device is light-sensitive and will alarm if concealed, the other two did not know at all what the *LM Tag* does.

Figure 26. **Do the offenders understand the mechanisms of the *LM Tag?* (N=6)**
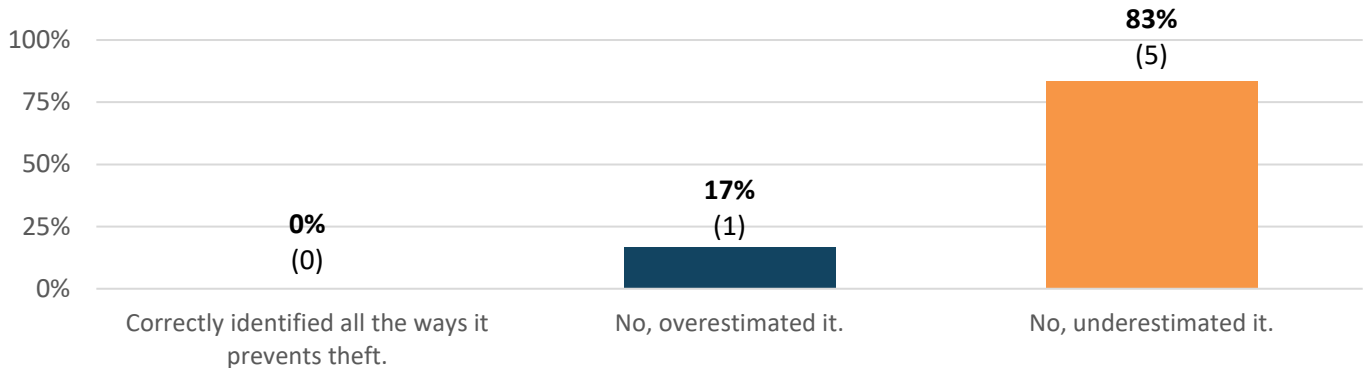
Next, the respondents were asked to assess the deterrent power of the *LM Tag.* They were first asked how likely they would be to steal an item protected by the technology, where 1 is "very unlikely" and 5 is "very likely". The average response was 1.5 out of 5, meaning that offenders were "somewhat" to "very" unlikely to attempt to steal a product protected by the *LM Tag.* Next, we asked how likely they would be to try to defeat the technology. The average was 1.83 out of 5, suggesting that, on average, the offenders were "somewhat unlikely" to try to overcome or defeat the technology.

Finally, the retail offenders were also asked what their reaction would be if they entered a store using the *LM Tag*:

- Four offenders (66.7%) would not steal anything that day.

- One offender (16.7%) would not take anything from that store but would go to a different store.

- One offender (16.7%) said they would be undeterred and would still attempt to take the item.

Figure 27. **Offender Reactions to the *LM Tag with SONR* (N=6)**
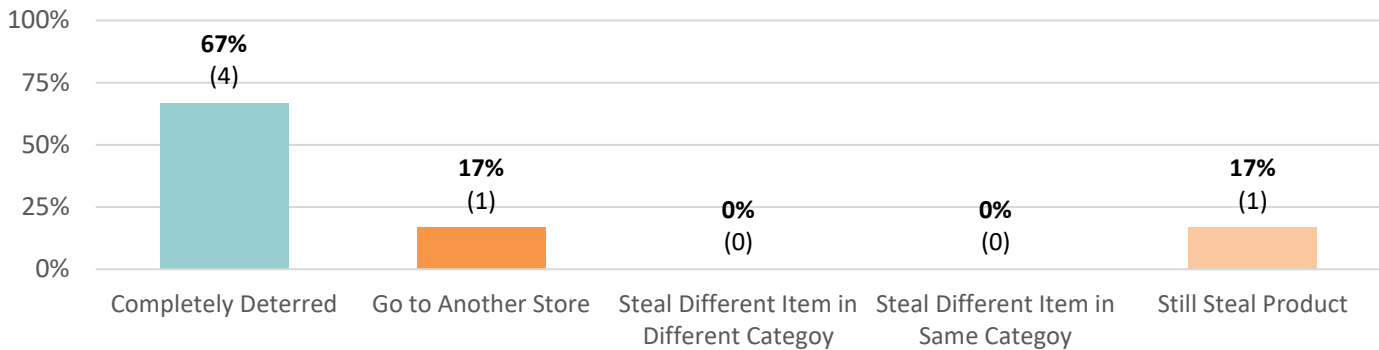
The participants were asked if they had any suggestions on how to make the technology more *noticeable,* make the function *easier to understand,* and make it more of a *deterrent*. The responses included:

- **Improving Noticeability:**
  - Change the color (16.7%)
- **Improving Understandability:**
  - Best if they do not understand (16.7%)
- **Improving Credibility:**
  - Wrap-around design (50%)
    - *"Something like they do where there is a band around it."*
  - Signage (33.3%)

Associate Surveys

Associates were asked to complete a survey designed to assess their experience with the *LM Tag.* A total of eleven participants completed the survey. Results indicated that:

1. Associates "somewhat agreed" with the statement *"The technology positively impacts my ability to provide customer service."* (3.97 out of 5). Of those, 63.6% "somewhat" or "strongly" agreed.

2. Associates also "somewhat agreed" with the statement *"I have had a favorable experience with this technology."* (3.97 out of 5). Notably, 73% of respondents either "somewhat" or "strongly" agreed with the statement.

3. Associates were neutral to "somewhat agreed" with the statement *"This technology effectively deters shoplifting or theft."* (3.85 out of 5).

4. When asked to assess the overall customer experience with the technology, the employees were

"neutral" to "somewhat agreed" with the statement *"Customers have had a favorable experience with this technology."* (3.75 out of 5)

5. Finally, associates neither "agreed" nor "disagreed" with the statement *"Customers often approach me with questions about this technology."* (3.22 out of 5)

Table 5. Associate Feedback on the *LM Tag with SONR* (N=11)
(1=Strongly Disagree, 5=Strongly Agree)

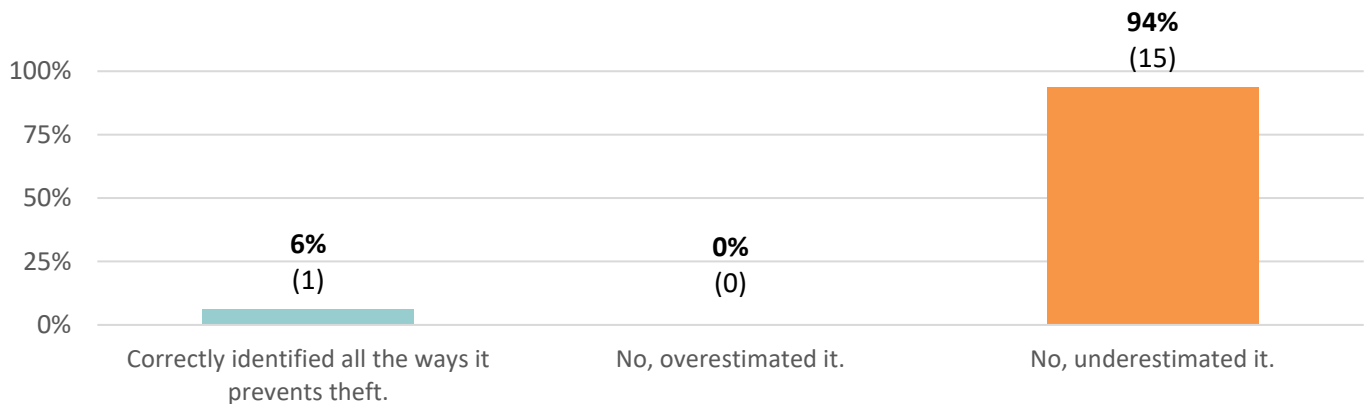| Statement	Store #1 Average Rating	Store #2 Average Rating	Overall Average Rating
The technology positively impacts my ability to provide customer service.	4.33	3.60	3.97
I have had a favorable experience with this technology.	4.33	3.60	3.97
This technology effectively deters shoplifting or theft.	4.50	3.20	3.85
Customers have had a favorable experience with this technology.	4.50	3.00	3.75
Customers often approach me with questions about this technology.	3.83	2.60	3.22

Customer Intercepts

The *LM Tag with SONR* was being actively used in one StoreLab. Therefore, sixteen customers were available and asked to provide feedback on it. A majority of customers (75%) had never seen the *LM Tag* in-store before. Some of the interviewed customers indicated that they have seen security tags, but not the specific Siffron technology. 12.5% of customers (2) had seen the technology in another store, and 12.5% have seen the technology specifically in that Storelab.

Figure 28. **Had the customers seen the *LM Tag* before? (N=16)**

- Yes, in this store
- Yes, in another store
- No, never

75% (12)

13% (2)

13% (2)
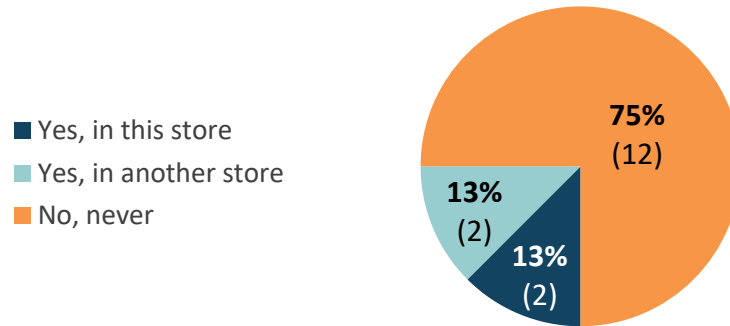
Before the *LM Tag* was described, we asked customers to guess what they believe the capabilities were. Only one customer was able to identify *all* the ways that the *LM Tag* operates. The remaining fifteen *underestimated* the capabilities (94%). While most understood that it would alarm if incorrectly removed or forced off, eleven of the sixteen customers did not know that it is also light-sensitive and can alarm if concealed. Three did not know at all what the technology did, and one guessed that it was an ink tag.

Figure 27. **Do customers understand the mechanisms of the *LM Tag?* (N=16)**

94% (15)

6% (1) — Correctly identified all the ways it prevents theft.

0% (0) — No, overestimated it.

No, underestimated it.

Finally, the customers were asked to rate their agreement with a series of statements about the *LM Tag*, where 1 means "strongly disagree" and 5 means "strongly agree". In general, customer reactions where favorable:

- Compared to closed-merchandising, customers "somewhat" to "strongly" agreed that the *SONR Pusher* makes for a more convenient shopping experience (4.56 out of 5).

- After the technology was pointed out, the customers "somewhat" to "strongly" agreed that its' capabilities are easy to understand (4.69 out of 5). Notably, most of the customers did not know that the *LM Tag* was light sensitive. So, while they understood the basics of an RF tag, they did not necessarily know about the extended capabilities of the *LM Tag.*

- Customers showed strong confidence in the ability of the *SONR Pusher* to deter theft. When presented with the statement *"I think this technology would effectively prevent theft",* customers "somewhat" to "strongly" agreed (4.69 out of 5).

- Customers "strongly agreed" that the *LM Tag with SONR* is noticeable (4.94 out of 5).

- Finally, customers were neutral, leaning towards "somewhat" agree that installation of the security technology gives the impression that the store has a lot of theft (3.56 out of 5).

Figure 28. **Customer Feedback of the *LM Tag* (N=16)**
(1=Strongly Disagree, 5=Strongly Agree)
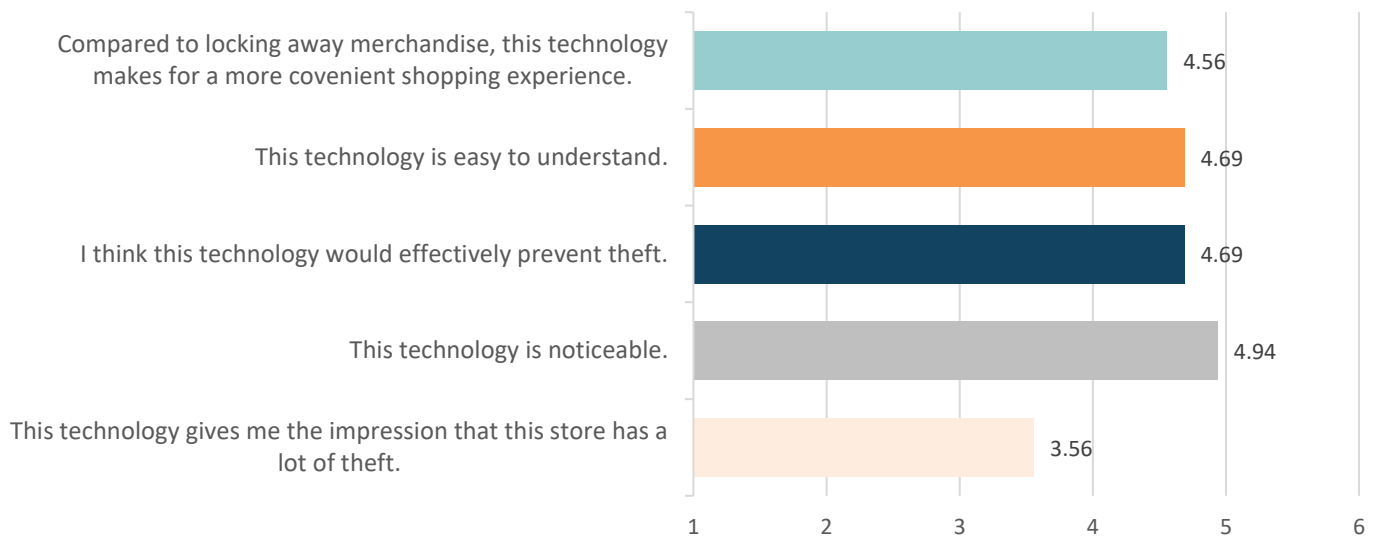
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