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An extended method to measure overall consumer satisfaction with
packaging

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Abstract

There are several reasons why people find it troublesome to use and handle consumer packages. A test method for evaluating the ease of opening of such packages was presented in the “Technical Specification” (TS) [1]. The present study has expanded the procedure by including consumer satisfaction measurements in two steps and engaging panels comprising two separate age groups. The expanded method, which used six different packages as test objects, engaged 75 panelists, 40 in the older group (65–80 years), and 35 in the younger group (25–40 years). The expanded method included the same operations as described in the TS, but also included panelists who graded each handling element separately on a “smiley” scale, along with feedback for their grades, and an overall judgment of the package handling.

The grading feedback differed between the two groups. The younger panelists mainly noted issues that were not connected to openability, while older panelists noted openability as the most influential factor. Further analysis revealed that openability was also a key issue for the younger panelists, despite their claims to the contrary. Satisfaction was the most critical TS element for describing a package as being easy to open.

Keywords: *Usability, ease of opening, standards, customer satisfaction.*

Introduction

Almost every product is distributed and sold to end-customers in packaging. Consumer packaging could be described as an “everyday product” since its contents are used in everyday life. In urban settings, this “use” could include packages being handled in a store, at home, at work, on-the-go, etc. The four main functions of packaging are containment, protection, convenience/utility, and communication [2]. A product’s usability occurs in its interface and interaction with a user during a usage period. The average person has approximately 30 such experiences each day, with approximately 30 packages [3]. This means that products, companies, and brand-owners interact heavily with their customers on a daily basis through consumer product packaging. Each of these interactions is an opportunity to create customer satisfaction and loyalty. A consumer who is dissatisfied is likely to buy another product or brand the next time. The competition is fierce; 40 to 60 percent of all new product launches fail in the market place [4], which leaves little for packaging that malfunctions or is difficult to understand and use.

An interesting but challenging aspect of packaged consumer products is that while the point of purchase and the point of consumption are usually separate, quality perceptions are evaluated and experienced at both of these points. Löfgren labeled these consumption process points as *the first and second moments of truth* [5]. The first moment of truth deals with the ability of packaging to grab a consumer’s attention in an environment such as a supermarket, prior to consumption. In order to attract a consumer’s attention, benefits or attributes such as the size and color of the package may be important. Other studies on the first moment of truth have included how consumers perceive and understand different aspects of labels on drugs [6, 7].

The second moment of truth occurs when the consumer uses and consumes the product. This moment can consist of a series of uses and re-uses. During usage, key benefits are the actual handling of the product and information about it [8]. These benefits are referred to here as usability and are the focus of our investigation.

The European Committee for Standardization recently suggested a technical specification (TS) regarding packaging and ease of opening. The TS included criteria and test methods for evaluating consumer packages. The measures that are generally used in the test protocol are usability, efficiency, effectiveness, and satisfaction. Although the TS addresses specific openability issues, customers’ satisfaction scores are not just related to openability, but instead generate an overall evaluation; that is, all aspects, of the package. This can create confusion regarding which entities of the package are being evaluated in terms of satisfaction.

The purpose of the present study is to describe, test, and suggest modifications to the TS’s satisfaction evaluation. The study involved using identical packages, as well as two different age groups and two sets of test protocols, to investigate whether the test would show the same result regarding effectiveness, efficiency, and satisfaction. The extended test protocol is identical to the TS regarding efficiency and effectiveness except that, with respect to satisfaction, it involved separate package handling elements that were evaluated individually *before* making an overall judgment. The control group of younger panelists was included to complement the group of older panelists suggested in the TS. This set-up allowed comparisons between test protocols and user groups. Previous research has shown that 10 % of an entire population has

some sort of disability in their hands that affect their ability to handle packages [9]. Consequently, the issues of ease of opening and usability are not limited to the older population.

Previous work

Package handling is not a new topic. In an early article on the subject, Short and Stovell (1966, p. 307) described the phenomenon as follows: “*The package must not only function efficiently, it must clearly communicate its method of operation to people of widely varying backgrounds. Differences in response due to sex, age, socio-economic background, mental ability, and manual dexterity must all be taken into account by the designer. For this aspect of design the package may be thought of as a product in its own right*” [10]. In the early 1980s, Berns described consumer package handling, outlining the physical design of the package and its entities, as well as the demands of disabled and able-bodied users [11]. With an ageing population, physical strength has become an issue in handling packages; many consumers know how to open certain packages, but lack the force to do so [12]. In the late 1990s, the Department of Trade and Industry (DTI) in the United Kingdom noted that the Home Accident Surveillance System showed a high rate of injuries related to opening packages. The DTI suggested that designers needed to know about the limits of force for handling packages and other everyday products. The most important hand strength measurements were related to two-handed grip and twisting strength, vertical and horizontal one-handed lifting, finger grasp and pull strength, and ring-pull strength. The maximum strength regarding these typical package-opening grips was collected, both for non-disabled and disabled groups [13, 14]. Packages with child resistant closures (CRC) are tested for opening according to ISO-CEN. The test method includes both children and elderly and follows a sequential procedure [15].

Winder *et al.* investigated injuries related to opening packages by presenting 200 consumers with nine different problems that they might encounter when opening food and beverage packages. The problems were related to individual physical ability, as well as the design of and information on packages. Nearly 55 percent of the study participants had injured themselves opening packages during the last few years, which indicated that openability was a serious issue. Winder *et al.* concluded that the injuries were related not only to poor package design, but also to personal characteristics and attitudes [16].

Openability has been the subject of extensive previous research. Topics have included optimal sizes of jars [17, 18], hand sizes and openability [19, 20], and the frictional properties of packaging material [21]. All of these studies have focused on instrument-based measurements, which provide data such as tensile testing and torque measurements. Another type of study was that of Duizer *et al.*, who conducted a focus group investigating elderly consumers’ package requirements. The results showed that elderly consumers use tools such as spoons, knives, and scissors to open packages or else ask someone to help them. Similar to previous research by DTI on package injuries, Duizer *et al.* suggested that individual factors should be taken into account as a complement to gender and age factors [22].

Openability is just one part of why some people find it troublesome to handle packages. Other reasons may be physical and/or cognitive. In addition, some users

may have special needs, such as children or people with impairments including reduced dexterity, vision, physical strength, mobility, or language skills. A cumulative assessment of these physical and cognitive aspects shows that usability can be a helpful construct for understanding how packages are experienced. This is explored in the research areas of universal design as well as in research on sustainability for the packaging sector. Both areas address demands on ease of opening and ease of use without losing packaging performance. However the following section specifically explores usability and standards.

Packaging usability and standards

Usability (that is, the ability to use a product) is determined by the interaction between a product and its user. In turn, this interaction is dependent on the use context. User characteristics are age; gender and body size; visual, auditory, and biomechanical abilities; knowledge of comparable products; and language. According to ISO 20282-1, product use-context examples include location, temperature, illumination, noise, and individual, group, or public use [23].

The definition of usability has been established in a human-computer interaction context as “*the extent to which a specific user is able to use a product in order to reach specific goals with effectiveness, efficiency and satisfaction, in a particular context of use*” [24]. This definition and its interpretation have been adapted into other areas, such as in the ISO 20282-1 standard. This standard focuses on the quality of the user-product interface and notes that effectiveness is the most important measure of quality for products with low complexity, such as everyday commodities. The ISO 20282-1 standard also provides requirements and recommendations for the design of easy-to-operate everyday products.

Standards are often referred to as documents for mutual reference and can be developed by experts on various levels, including global (ISO), European (CEN), or national levels (such as SIS in Sweden). While neither TSs nor technical reports (TRs) have the status of a standard, they are available for use and ISO/CEN invites all users to provide feedback on their experience of the document; for example, on the use of a suggested test method. An example of this is ISO 20282-2, *Ease of operation of everyday products: Part 2: Test method for walk-up-and-use products* [25].

Although there is no specific standard on packaging usability, an initiative has been created to develop a European standard on test methods for evaluating package opening ease. Since the method presented in the draft was not tested, the work was presented as a “Technical Specification” in 2011. This TS will have a three-year timeframe that will make it possible to collect use experiences of the suggested test method and other test methods.

ISO 11156, *Packaging–Accessible design–General requirements* [26], has guidelines for increasing accessibility when designing packages and packaged products. The two main aspects of the standard are information and marking, and handling and manipulation. The standard also suggests that the evaluation process include all phases, including manufacturing, distribution, usage, and disposal. The process includes the package’s life cycle, from the identification, purchase, and use of the product, to the separation and disposal of the package.

Customer satisfaction

Customer satisfaction reflects a customer's evaluation of his or her purchase and consumption experience with a product, service, brand, or company [27]. Oliver described customer satisfaction as the feeling that a product or service feature, or the product or service itself, has provided a *pleasurable* level of consumption-related fulfillment, including levels of under- or over-fulfillment [28]. Within the area of customer satisfaction, the two main research paths that can be identified are transaction-specific satisfaction and cumulative satisfaction [29]. Transaction-specific satisfaction is a customer's evaluation of his or her experience with and reactions to a particular product transaction, episode, or service encounter. Over the last few decades, satisfaction research has increasingly emphasized cumulative satisfaction, which is defined as a customer's overall experience with a product or service provider to date [30].

The transaction-specific and cumulative streams of satisfaction research are complementary rather than competing. Transaction-specific research focuses on satisfaction with a product or service on a given occasion or over a limited period of time. With cumulative satisfaction, the period of evaluation is left open since customers can evaluate a product or offering's quality when they purchase it or when they consume or use it [31]. The idea is that the sum of benefits or quality aspects will generate an attitude of satisfaction, which will result in a certain type of future behavior. Single-quality attributes, such as how easy something is to open, are used as cues or indications of overall quality; if one important attribute fails, it will have an impact on the attitude towards the used or evaluated product. The present study has emphasized transaction-specific satisfaction, as the event being investigated and measured – the satisfaction with the tested package – is a single isolated event. However, the fact that consumers sometimes use cumulative evaluations that influence their transaction-specific evaluations reflects a combination of transaction-specific and cumulative experiences.

Methods and materials

This section describes the employed method, performed tests, and measures. In order to provide some context for our study, the section starts with descriptions of the two test methods ISO 20282 and SIS-CEN/TS 15945.

The ISO 20282 test methods for everyday products include primary product goal setting, specification of tasks to be performed in a given environment, and measurements to reach the goal. For this standard, the method suggests selecting user groups that reflect the intended user groups; if the task should be easy for the general public to handle, the product should be tested by individuals with special requirements [32]. For products with low complexity, effectiveness is the most important evaluation factor. Satisfaction can be graded using a five-point smiley scale [33], which is likely to be interpreted in the same way across different cultures. In some cultures, 1 represents the highest grade, while 5 is the highest grade in other cultures. In the German customer satisfaction barometer, the highest satisfaction score a company could receive was 1, while 10 was the highest grade in the Swedish equivalent. The main disadvantage of the smiley scale is that it does not lend itself to statistical analysis unless it is assumed that there is an equal space between all levels. Also, all interval scales are usually heavily skewed in one direction, particularly scales with

fewer scale steps; in other words, a five-point scale is more skewed than a seven-point scale. The only way to remedy this problem is to add more respondents to the tests.

Test method from SIS-CEN/TS 15945

The purpose of SIS-CEN/TS 15945, *Packaging–Ease of opening–Criteria and test methods for evaluating consumer packaging*, is to specify test methods that evaluate the ease of opening of consumer packages. This specification applies to all packaging that does not require an opening tool and also applies to packaging purchased with an integrated opening tool.

The evaluation process described in the TS follows the usability definition and includes the following three measures:

1. Effectiveness (including the ability to carry out the task and the quality of the result)
2. Efficiency (time taken and other resources used to reach the goal)
3. Satisfaction (comfort, acceptance, and attitude to the product).

In the present TS, effectiveness is measured by testing each test panelist's ability to open the package within five minutes. The test is stopped when the panelist gives up or fails to open the package within five minutes. Efficiency is measured by testing the ability to open a second sample of the package within one minute. Finally, satisfaction is measured using subjects' smiley scale responses (see Figure 1).

---Take in Figure 1 here---

The self-stated satisfaction rating is made after the panelist performs the following steps:

1. Opens the package successfully
2. Takes out an intended quantity of the contents
3. Closes the package (if applicable).

The TS employs sequential testing, starting with a group of 20 panelists who tested the package. If anyone in this group is unable to open the package based on the criteria for effectiveness and efficiency, or considers the package to be below the acceptable level of satisfaction, the test continues with another 20 panelists. Here, an acceptable level of satisfaction is represented by the three smileys on the right-hand side of Figure 1, corresponding to 0, 1, and 2. The number of allowed failures is specified for each sequence and displayed in Table I.

---Take in Table I here---

The TS also stipulates how the panel should be composed regarding age and gender (see Table II).

---Take in Table II here---

An extended method

The extended test method is exactly the same as the TS regarding effectiveness and efficiency. However, satisfaction is measured in two steps. Firstly, panelists are asked to rate their satisfaction with the following handling elements:

- a) Opening the outer package the first time
- b) Opening the inner package (if applicable)
- c) Taking an intended quantity of the contents
- d) Closing/resealing the package (if applicable)
- e) Opening the package the second time.

Satisfaction in operations (a) through (e) is rated on the same smiley scale as in the TS. For the purpose of clarity, values 1–5 are used instead of -2–2. Secondly, panelists are asked to use the smiley scale to make an overall judgment of the tested package.

Performed test

The test was performed in two groups. The first group was composed as suggested in the TS (see Table II) and the second was a control group with participants aged between 25 and 40; these groups are referred to here as “the older panelists” and “the younger panelists,” respectively. The younger control group was included based on Duizer *et al.*'s suggestion that individual factors should be taken into account in order to complement gender and age factors. Although this division of panelists was clearly based on age factors, the aim was to cover more individual factors by including panelists of different ages. The test included a total of 75 panelists (40 in the older group and 35 in the younger group). The latter group was composed of 26 women and nine men.

Six packages were tested and randomized. The first three packages were tested according to the TS method, while the other three packages were tested according to the extended test method for satisfaction. The test packages, described in Table III, were all everyday commodities and represented a variety of materials, designs, and closure principles.

---Take in Table III here---

Each test session started with the TS method for three randomized packages. After testing the first three packages, panelists were asked to grade their satisfaction with each package. When testing the next three packages, the extended test method for satisfaction was used. All respondents followed this procedure; that is, all respondents performed the test according to the TS's specification followed by the extended test method for satisfaction. The test leader met each panelist individually, introduced the test, presented a package, and gave a use scenario, before the panelist opened the package. During the session, the test leader filled out the test protocol, noted the time and deviations, such as spillage and whether the package was torn, while the panelist graded the package's handling.

The test continued with the extended method for the next three packages. The same handling elements were repeated. The expanded test protocol was used, in which the panelist graded each handling element separately on a smiley scale and, at the end, gave an overall judgment of the handling. The test sessions lasted between 30 and 50 minutes.

Results

Tables IV and V display the extent to which a package has reached the defined level of acceptance according to the TS for the older panelists and the younger panelists. (For levels of acceptance, see Table I.)

---Take in Table IV here---

In Tables IV and V, (*) indicates that the levels of acceptance for effectiveness, efficiency, or satisfaction have not been reached; that is, the number of failures exceeds the TS's allowed number of failures, which is two.

---Take in Table V here---

Some of the panelists were not able to open a specific package at all. There were a total of 20 such cases among the older panelists (see Table VI); 17 of these cases involved female panelists. All of the younger panelists were able to open all packages.

---Take in Table VI here---

Analysis and discussion

The main difference between the two test groups was the ability to open packages. The younger panelists reached 100 percent for all investigated packages in terms of both effectiveness and efficiency. For the older panelists, two packages failed the test: package F – the plastic bottle with the CRC cap – failed in the effectiveness category; and package B – the paper and plastic bag – failed in terms of efficiency. These packages are fairly hard to open, which meant that the inability of the older panelists to open them was expected. Overall, there were no major surprises regarding the effectiveness and efficiency results for the two test groups, both separately and in comparison. In short, the younger panelists had no problems, but the older panelists did experience some troubles opening the packages effectively and efficiently. Averages and standard deviations for effectiveness and efficiency are displayed below in Table VII.

---Take in Table VII here---

All differences regarding effectiveness and efficiency between the older- and younger panelists are significant ($p < 0.05$) with the exceptions of packages A (efficiency) and C (effectiveness).

As Figure 2 shows, satisfaction level differences between the two groups were small. Here, satisfaction is measured as the total percentage of people who have given one of the three most favorable evaluations on the smiley scale to each package, in accordance with the stipulations given in the TS. Based on the younger panelists' evaluations, packages E (carton + foil capsule) and A (plastic bottle) pass the test. For the older panelists, packages D (plastic capsule), E (carton + foil capsule), and A (plastic bottle) nearly passed, but not quite. Based on the evaluation of the older panelists, no package passed the test.

---Take in Figure 2 here---

As Figure 2 shows, one problem with measuring satisfaction is that the neutral smiley, the happy smiley, and the very happy smiley all had the same weight. Therefore, the mean values for satisfaction were calculated (see Figure 3). For the purpose of clarity the scale used ranged from 1 to 5 (not from -2 to 2 as in Figure 1).

---Take in Figure 3 here---

No package in this analysis reached the satisfaction level stipulated in the TS, although four packages did have relatively high satisfaction scores, with means above 3.5 on the five-point scale. However, no major pattern changes can be identified when comparing Figures 2 and 3.

It is not completely clear what the satisfaction composite in the TS measures. While it could be interpreted as measuring satisfaction with openability, the TS states: *“The panelist should be asked to mark the smiley best representing their satisfaction with the packaging tested.”* This statement implies that a variety of product attributes and package features could form the basis for how the panelists evaluate the tested packages in terms of satisfaction. Furthermore, because completely new packaging is rare, there is no way of knowing whether a panelist might also be taking past experiences of opening similar packages into account. The packages simply share certain common traits on something that has existed somewhere before. Therefore, questions regarding motives for the satisfaction scores were included. As noted above, this was done by asking panelists to rate their satisfaction with the following activities:

- a) Opening the outer package the first time
- b) Opening the inner package (if applicable)
- c) Removing an intended quantity of the contents
- d) Closing/resealing the package (if applicable)
- e) Opening the package the second time.

The satisfaction scores differed between the two panels. The younger panelists rarely mentioned openability, while resealability dominated the comments regarding packages that were non-resealable. In the best cases, openability was only a secondary influence on satisfaction scores.

Openability was the most important issue for the older panelists, since grip strength and the physical ability to handle packages decreases with age. In addition, poor instructions and opening devices were problems, which shows that openability is not only a physical issue. It is important to bear in mind that these issues can cause both satisfaction and dissatisfaction. The elderly panelists appreciated packaging that performs well on openability and awarded high satisfaction scores to such packaging; poor openability, on the other hand, led to outspoken dissatisfaction.

The above discussion shows that although package satisfaction is the same for both groups of panelists, their respective reasons may be very different. This leads to the question of what it is that the satisfaction score in the TS really measures.

To address this question, a statistical analysis of the satisfaction scores was performed. Although such a test is limited by sample size and scale to prevent large differences from being reported, an ordinary least squares linear regression was

performed to investigate how much of the satisfaction variation could be explained by the variation in the satisfaction of the two age groups. Both models turned out to be significant at $p < 0.01$. As Martilla and James [34] suggested, results were plotted in two different strategic satisfaction grids, with importance on the x-axis and the performance for each attribute on the y-axis. The importance scores originate from the above-mentioned regression. The performance measures are the respondents' evaluation for each of the various dimensions. For the older panelists, analyses (displayed in Figure 4) showed similar results; in other words, openability is decisive for satisfaction.

---Take in Figure 4 here---

Opening the package the first time and closing/resealing are the strongest explanations of the variation in the older panelists' satisfaction scores. Therefore, improving these two attributes would have the largest impact on overall satisfaction.

As stated, the younger panelists did not cite openability-related issues as a major factor in satisfaction scores. However, in contradiction to these statements, our analysis shows that openability is also a key issue for the younger panelists' satisfaction scores (see Figure 5).

---Take in Figure 5 here---

Three of the five factors (opening a second time, closing/resealing, and opening the first time) have a definite impact on overall satisfaction. This result contradicts the qualitative analysis.

If the study had strictly followed the TS regarding the sequential test, the number of panelists should have had another 20 panelists performing the same task. However, because the packages in this study were means of evaluating two test methods, rather than the openability of the packages, they are not considered a problem.

Conclusions

A range of factors influence the success or failure of a product. This paper has investigated the openability of packaged consumer goods. It is easier to evaluate openability when judgment of the handling elements is segmented. The extended method for satisfaction offers a broader understanding of the handling elements' impact on customer satisfaction. For instance, the present study shows that both older- and younger panelists were dissatisfied with the plastic bottle with a CRC-cap (package F). But the reasons for being dissatisfied differed between the two groups. Some of the older panelists could not even open the package and were therefore obviously dissatisfied. All of the younger panelist were able to open the CRC-cap but were dissatisfied with the package anyway due to issues regarding, e.g., resealability. With the extended method these differences are displayed and therefore the extended method presents a more nuanced picture of the investigated panelists' evaluations.

Packaging that is difficult to open may not always seem like a serious problem, it can be crucial for the usage of the product. The present study has also shown that openability issues have a strong influence on the satisfaction evaluations of older consumers. With the ageing world population, this could be a crucial issue in product

development. In the year 2060, 29.5% of the population in the European Union will be 65 years or over [35]. This group is analogue with the group of older panelists in this study. Based on present research results, openability issues need to be addressed to avoid dissatisfying a big part of today's market and an even bigger part of tomorrow's market.

The results also show that openability issues are decisive for younger consumers. However, when the younger panelists were asked what drives their satisfaction, they cited other factors. The present study emphasizes the need for a more distinct satisfaction evaluation. We have noticed that a shortcoming of the smiley scale is that the neutral smiley, the happy smiley, and the very happy smiley are all given the same weight. Even though a package can receive a relatively high satisfaction score, it can be considered a failure in the test. The TS places high demands on the package tested when the base for approval is not the mean value, but the number of failures; that is, results -2 and -1 on the smiley scale, respectively.

A number of product attributes and package features could potentially form the basis for a panelist's satisfaction in the TS. Satisfaction is the most critical TS element for judging a package as being easy to open. By using the extended method with several handling elements to evaluate package satisfaction, it is possible to distinguish the part of the handling the panelist is not satisfied with. This makes it possible to provide more distinct feedback to producers.

Concluding remarks and directions for future research

We suggest expanding the satisfaction evaluation in the TS in order to clarify what it measures. This extension can also confirm the success or failure of a given opening principle. We also suggest that an expanded protocol, as well as a systematic mode of gathering information, data analysis, and the observation of an experienced test leader, might provide product developers with vital information. From this perspective, it would be interesting for a study to combine the test panel with an expanded test protocol and product developer interviews on selected package usability. We have identified the three following themes for future research, which could be investigated separately or in combination:

1. Comparisons of different modified test protocols
2. Usage of different age groups in the tests
3. Studies on openability vs. usability.

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Tables and Figures



Figure 1: Smiley scale for satisfaction ratings corresponding to -2, -1, 0, 1, and 2.

Number of panelists	Number of successes recorded	Number of failures recorded
20	20	0
40	38	2
60	56	4
80	75	5
100	94	6

Table I: Sequential test method showing the number of allowed successes and failures in FprCEN/TS 15945.

Age range (years)	Male %	Female %	Total %
65–69	10	25	35
70–74	10	25	35
75–80	10	20	30
Total	30	70	100

Table II: Composition of the test group in FprCEN/TS 15945, shown as the percentage of men and women.

Package	Package type (materials)	Principle of closure	Package detail
A	Bottle (plastic)	Screw cap	Food
B	Bag (paper and plastic)	Peel-opening	Food
C	Jar (metal)	Plastic lid, Pull-ring	Food
D	Capsule (plastic)	Outer/inner lid	Food
E	Capsule (carton) blister (foil)	Perforated lid/blister	OTC
F	Bottle (plastic)	CRC cap	Health care product

Table III: Test packages. Those were selected to reflect a variety of packaging types, as stipulated by FprCEN/TS 15945.

Package	Effectiveness %	Efficiency %	Satisfaction %
A (Plastic bottle)	98	95	92*
B (Paper and plastic bag)	95	90*	62
C (Metal jar)	100	100	75*
D (Plastic capsule)	100	95	92*
E (Carton capsule + blister)	100	100	92*
F (Plastic bottle CRC)	90*	68	35

Table IV: Results in percent of achieved effectiveness, efficiency, and satisfaction for the older panelists (N=40). Levels of acceptance as defined by FprCEN/TS 15945.

Package	Effectiveness %	Efficiency %	Satisfaction %
A (Plastic bottle)	100	100	94
B (Paper and plastic bag)	100	100	69*
C (Metal jar)	100	100	83*
D (Plastic capsule)	100	100	83*
E (Carton capsule + blister)	100	100	97
F (Plastic bottle CRC)	100	100	71*

Table V: Results in percent of achieved effectiveness, efficiency, and satisfaction for the younger panelists (N=35). Levels of acceptance as defined by FprCEN/TS 15945.

Package/age group	65–69	70–74	75–80
A (Plastic bottle)	0	1	0
B (Paper and plastic bag)	1	1	2
C (Metal jar)	0	0	0
D (Plastic capsule)	1	0	0
E (Carton capsule + blister)	0	0	0
F (Plastic bottle CRC)	4	2	8

Table VI: Number of older panelists unable to open packages.

Package	Effectiveness (seconds)			Efficiency (seconds)		
	Older panelists	Younger panelists	p	Older panelists	Younger panelists	p
A	10,15	7,51	0,01	8,54	6,71	0,08
B	39,58	29,23	0,01	27,14	18,11	0
C	17,8	15,63	0,12	16,95	11,66	0
D	33,6	24,14	0	26,59	19,43	0
E	18,88	12,03	0	11,53	9,29	0,04
F	76,75	28,86	0	34	21,54	0

Table VII: Statistical analysis of effectiveness and efficiency for older and younger panelists.

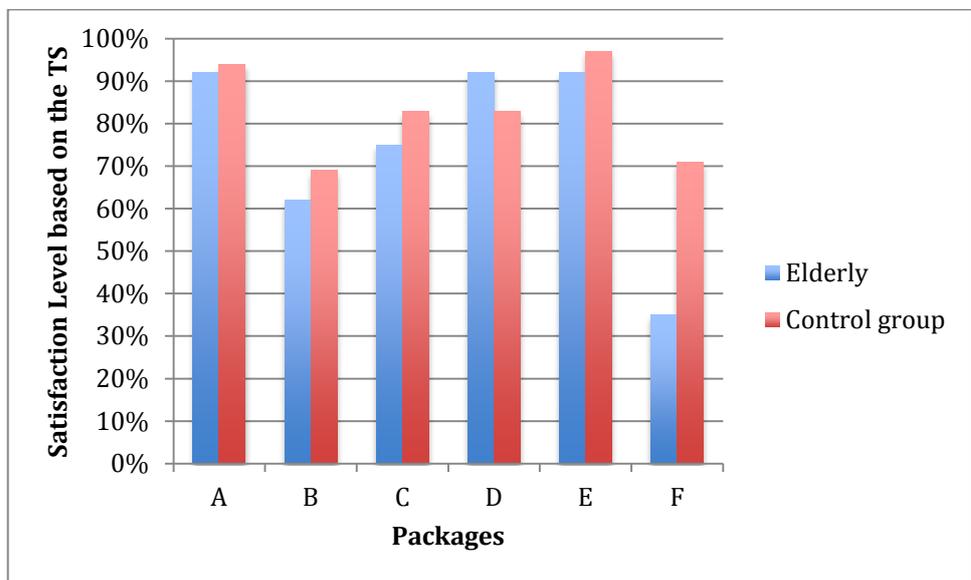


Figure 2: Satisfaction levels based on the TS. The scores should reach 95 percent or higher in order to pass the test.

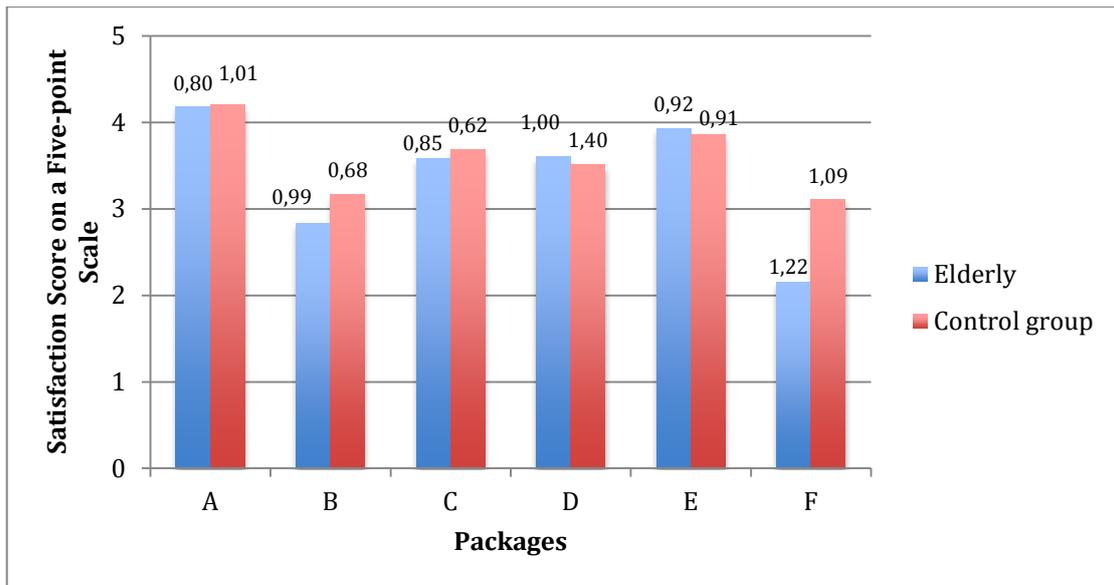


Figure 3: Mean satisfaction scores on a five-point scale. Standard deviations are shown above each bar.

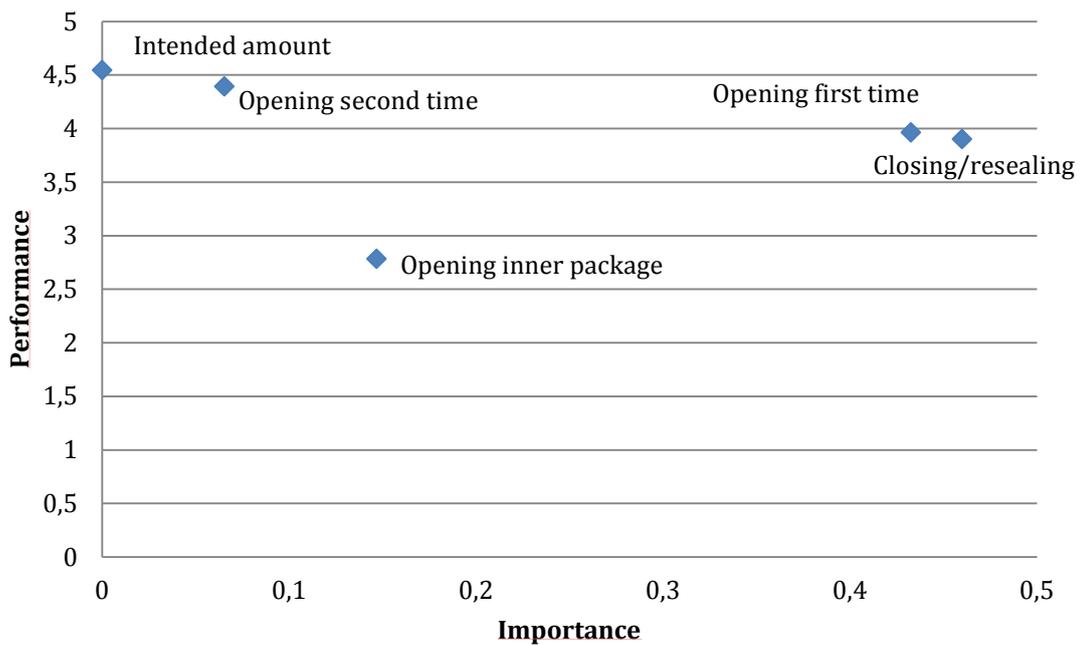


Figure 4: Importance–performance analysis of older panelists’ satisfaction.

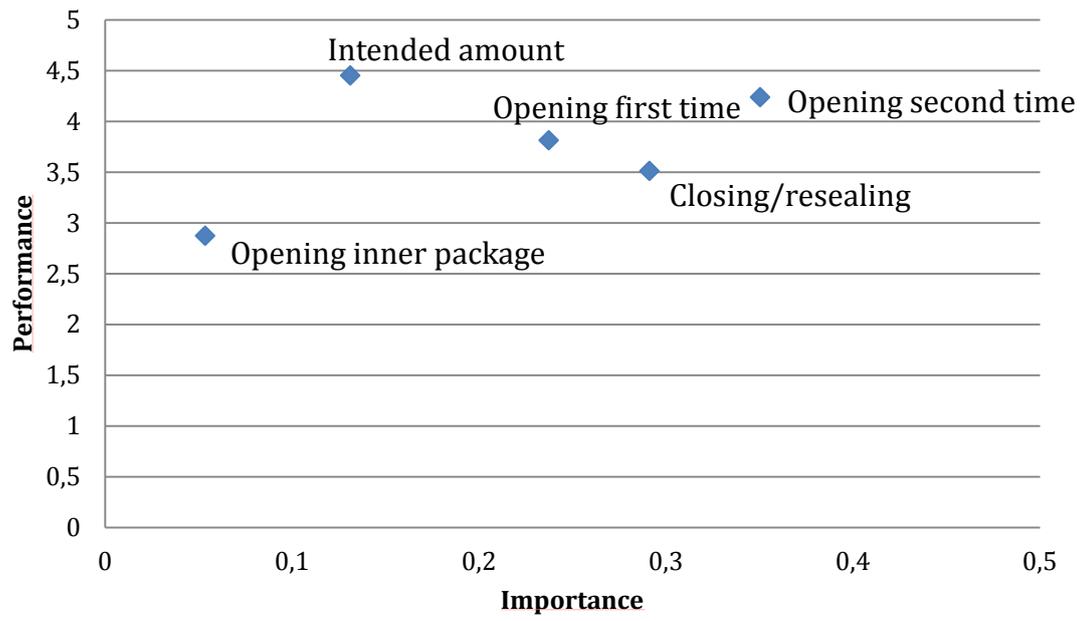


Figure 5: *Importance–performance analysis of younger panelists' satisfaction.*