# Evaluation of existing opening performance on TWA 200S

- a qualitative research on children's opening performance

Sofia Henstrand

# Preface

This Master's thesis is the final task of my Master of Science in Mechanical Engineering at Lund Institute of Technology (LTH). It was carried out in collaboration with the Division of Packaging Logistics and Tetra Pak Carton Ambient in Lund.

My work has been a challenge since I did not have much experience in this area before I started. Now at the end of my thesis, I have gained a new interest and experience and I would gladly be working with similar questions in the future. During my work have I made contact with many people and some of them would I like to thank in particular.

Annika Olsson, Ph D student at the Division of Packaging Logistic, LTH for being a supportive and helpful supervisor even though this has been a new area to her.

Hanna Mårtensson, supervisor at Tetra Pak Carton Ambient, for always having a happy face and willingness to help me in my work. For this, I am very grateful. I also want to thank all the persons within TPCA for showing me which lovely working environment there is and taking your time to answer all my questions that came up during the working process.

My final thanks go to all those lovely children that have been participating in my research, without you, this work could not have been done.

Lund, May 2005

Sofia Henstrand

# Abstract

Tetra Pak Carton Ambient has developed a package called Tetra Wedge Aseptic (TWA) for their emerging segment. The package is a V-shaped package that has a straw attached to one of its front panels, which makes it ideal for the on-the-go consumption. It immediately attracted young people but unfortunately has the package not motivated their parents in the same way. Lately, several market companies have given feedback that the opening performance of the package needs to be improved since many complaints from consumers has been received.

The purpose of this master thesis has therefore been to understand and define the three most common problems that children are having when they are opening and consuming a TWA 200S package. Furthermore, should these demands be translated into technical terms.

To define the most common problems a qualitative observation method called usability testing will be used and it will take place in a usability lab at LTH. Usability testing is a method for establishing the ease with which products are learned and used. The underlying model for all usability tests is that real users carry out real work with a product.

There were 14 children in the age of 5-10 years old who participated in the research. The children opened several packages both when they were sitting at the table and when they were standing on the floor. For making the analysis easier, each child was videotaped and asked what they thought about the opening performance.

When analysing the video material the concentration lay in three areas:
- Where on the package were the children holding their hand?
- Where on the straw were the children holding their hand?
- Where did the leakage come from?

These areas were chosen since they strongly affect the opening performance.

When the analysis was made, it clearly showed that the three most common problems that children were having with the opening performance were:
- It was hard to perforate through the pre-punched hole.
- It was leaking from the straw hole when they tried to penetrate the straw into the package.
- It was leaking from the straw. It either poured or dripped from the straw.

To prevent these problems that the children were having, investigations regarding a new straw solution and the under filling volume needs to be done.

# Table of contents

# 1   Introduction

*This first chapter will introduce the packaging industry and the benefits that packages give us as consumers. Furthermore, the company Tetra Pak is presented and its organisation explained. Finally, is the problem statement, the purpose and the delimitations of this thesis presented.*

## 1.1   Packaging Industry

Packaging is an important trade in the industrialised part of the world. It is normally one of the ten largest lines of industry in each country but surprisingly anonymous. One reason for this is its great breadth; you will find everything from sweet papers to load pallets and steel drums. The total value of the packaging market in the world is estimated at roughly USD 500 billion and is divided like figure 1.1 shows.[1]
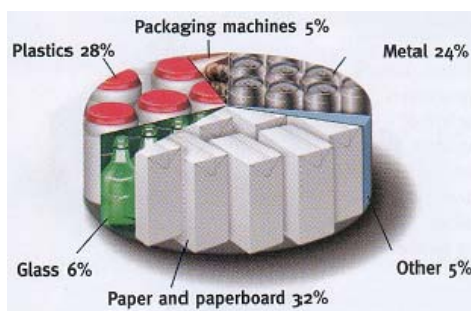


**Figure 1.1** The global packaging market

Packaging consumption is between different regions unequally distributed (see figure 1.2). Obviously, the consumption per capita in industrial countries is considerably higher than in developing countries and there is potential for further growth due to increased global trades, new life-styles, smaller households and the quest for convenience. However, the real potential is in the developing countries, where the main part of the world's population is living and where the increase in population is high.[2]
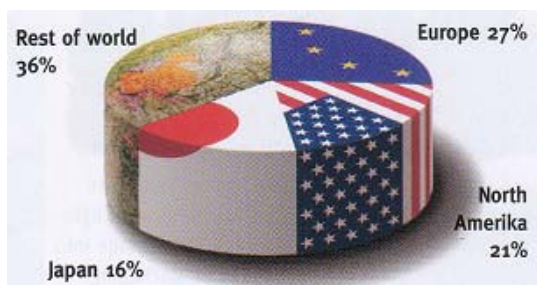


**Figure 1.2** The global packaging consumption

---

[1]   Thorén Anders & Vinberg Björn. *Pocket book of Packaging*. Sörmlands Grafiska AB. 2000

[2]   Ibid.

## 1.2 Packages

Packaging has today an important function, which is to protect our food safely and efficiently from where they are made to where they will be consumed. The basic demands on the packages are protection, preservation, communication and convenience.

- Protection: Packages protect the contents from light, microorganisms and air.
- Preservation: Good packages can help preserve food and prolong its shelf life during storage, transport retailing and consumption.
- Communication: Packages carry important product information about ingredients, quantities, nutritional value, use, sell-by dates and much more.
- Convenience: Packages provide convenience for the consumer, enabling the food to be handled, served and stored without getting it all over our hands.

A good package must meet all of these requirements to attract the consumer. The package should also be convenient, that is, easy to carry, easy to open and pour from and reseal, it also has to be attractive to the eye and make the content look appetising. It must furthermore use minimum of resources such as packaging material, transport fuel and energy for storage for example cooling.[3]

Carton packages have radically changed distribution systems for milk, juice and other liquid foods, and are in close connection to the emergence of the supermarket in the 1950's. Since the introduction of the first carton package, packages of different shapes, sizes, materials and openings have seen the light of day in order to meet the consumers' demands. Furthermore, are designs in terms of print and colours constantly being developed. Design plays an important role in the image of a package and, thereby, in its contents as well.[4]

One of the leading carton packaging companies in the world is Tetra Pak. They operate in more than 165 markets and have about 20.000 employees.[5]

## 1.3 About Tetra Pak

Tetra Pak was in the early 1950's established in Lund by Ruben Rausing and Erik Wallenberg. The idea to the company was as early as 1920 formed by Ruben Rausing when he was studying in USA. There he received his first exposure to "self-service" stores and understood that the demand for pre-packed goods would increase. Back in Sweden, he started the packaging company Åkerlund & Rausing with Erik Åkerlund. The company's primary objective was to replace bulk selling of unpacked goods with consumer

---

[3] www.tetrapak.com
[4] Ibid.
[5] Ibid.

adapted packaging for flour, sugar and salt. However, Ruben Rausing also had a vision to make packages for milk, so in 1951 he established Tetra Pak with its main purpose to deliver packaging for liquid milk.[6]

Today Tetra Pak not only makes packages for liquid dairy products but also for ice-crème, dry food, fruits, vegetables and animal food. In order to look after these new packages, Tetra Pak is organized into four sub-companies, Tetra Pak Market Operation (TPMO), Tetra Pak Carton Chilled (TPCC), Tetra Pak Processing Systems (TPPS) and Tetra Pak Carton Ambient (TPCA).[7]

```
                    ┌─────────────────┐
                    │ Tetra Pak Group │
                    └─────────────────┘
```

| Tetra Pak Market Operation | Tetra Pak Carton Chilled | Tetra Pak Processing Systems | Tetra Pak Carton Ambient |
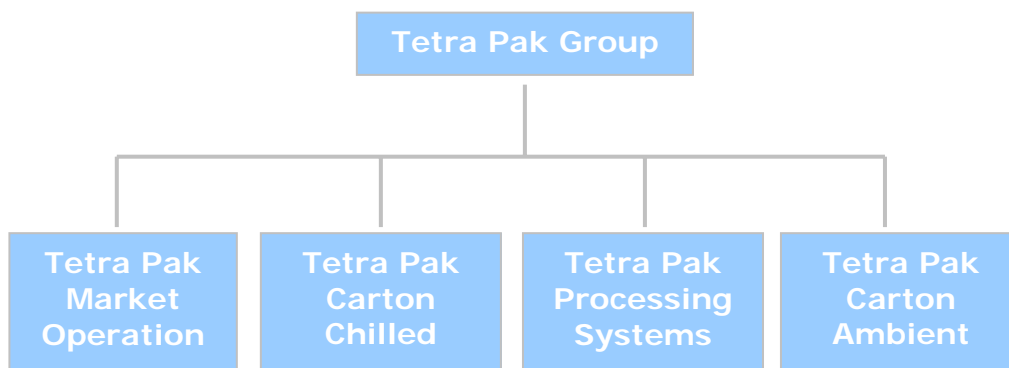
**Figure 1.3** Tetra Pak's organization chart

TPMO contains of several sub-companies. The majority of them are Global Market/Sales organisations.

TPCC works with packages that must be kept in a refrigerated environment. Their mission is to offer the consumer chilled packaging systems, superior to other carton and plastic competitors.

TPPS is responsible for development and production of processing equipment for the food industry. They operate within the market segments dairy, cheese, ice crème, beverage and prepared food.

### 1.3.1   Tetra Pak Carton Ambient

TPCA's main responsibility is to develop and handle packages implemented with the aseptic technology. This means that their products are rapidly heated and chilled by Ultra High Temperature treatment in order to exclude unwanted microorganisms. With this technology, the products will have a shelf life for about six month at ambient temperature.

TPCA contains of three business segments, Premium, Value and Emerging segment, where each segment focuses on different packages and different target groups.[8]

---

[6]   www.tetrapak.com

[7]   Ibid.

[8]   Information gathered from Tetra Pak's internal homepage

*Emerging Segment*

The emerging segment focuses on developing and delivering products that expresses simplicity and affordability.

The aseptic technology that TPCA is working with provides a myriad of benefits to consumers all over the world and especially for the consumers in the emerging segment. In impoverished, underdeveloped areas, for example, it provides access to healthy, nutritious food products they could not have otherwise. If the refrigerated distribution and storage facilities required to provide fresh dairy products are not available in a particular region, for example, aseptic packaging might be the best way to ensure availability of milk or other dairy products. In other socio-economic environments, the convenience of aseptically packaged food products might be the prime advantage. Aseptic packaging allows consumers to store drinks for months without worry of spoilage.[9]

Tetra Pak's main concern in the emerging segment is to make packages that suit the "pocket money" price point. With "pocket money" price point, they mean the types of coins that mainly exist in the countries were the packages are sold. For example, in India the "pocket money" price point is 1, 2, 5, 10 Rs. When Tetra Pak has decided which price the product will have they then decide the size of the package.

The problems that Tetra Pak is facing when they are developing new packages for the emerging segment are that they cannot make any expensive solutions. Even if they have the knowledge and the technology to make other solutions, it is impossible because they have to make a package with a low price.

The emerging segment's focus is within the street drink segment containing juice, nectar and still drinks and milk. Their core products are the Tetra Classic Aseptic (TCA), Tetra Wedge Aseptic (TWA) and Tetra Fino Aseptic (TFA).[10]
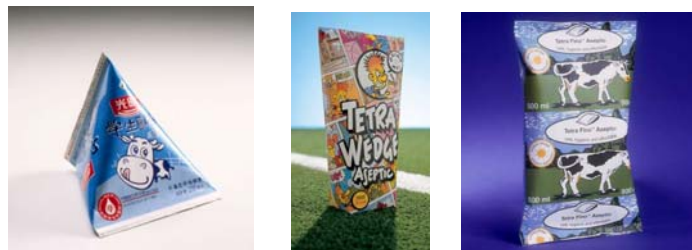


**Figure 1.4** The Tetra Classic Aseptic packaging, the Tetra Wedge Aseptic packaging and the Tetra Fino Aseptic packaging

---

[9]  www.tetrapak.com
[10]  Information gathered from Tetra Pak's internal homepage

*Emerging Market*

The emerging market cover those parts of the world that consists of developing countries e.g. India and "economies in transition" e.g. Russia. The market situation that is characteristic for the emerging market is:[11]

- More than 94 percent of all liquid food is sold unpacked
- Poor hygiene
- "Pocket money" economy
- Hot and humid climate
- Long and rough distribution routes
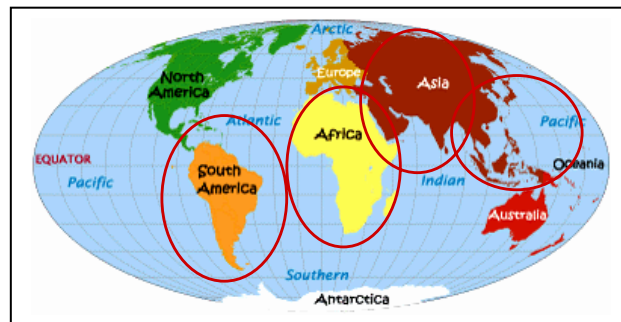


**Figure 1.5** World atlas covering the main emerging markets

*Emerging consumer*

A typical consumer in the emerging market is price-sensitive and need to consider the advantages associated with alternative packaging solutions. The affordability is a crucial factor and the cost and the convenience of the package are the most important factors for the consumer.

The emerging consumer lives different lives; some of them live in big cities with a good standard of living while others just live above subsistence of poverty level.

The emerging consumer purchases their products planned or by impulse. This is done either by the traditional or by the modern trade i.e. on the street in small shacks or in the supermarket. In Indonesia, these kind of small shacks are called Warung and are a shop on wheels that is about two to three square meters big, which the vendor pulls out every morning to his chosen spot in the street. The vendor sells the products in ice buckets among with many other brands and packages.[12]



**Figure 1.6** The emerging consumer

---

[11] Information gathered from Tetra Pak's internal homepage
[12] Ibid.

## 1.4 Tetra Wedge Aseptic package

In 1997 was the Tetra Wedge Aseptic package introduced on the market. Initially, it was thought of as a low-cost package that would extend the consumer base to low-income consumers. However, the trendy features of the package, with its large display surface and modern look, attracted young, trendy teenagers instead. With a drinking straw attached to one of the package main panels combined with the V-shape that makes it easy to hold, the package was ideal for the on-the-go consumption.[13]

Today the Wedge package is produced in two different volumes, 125 and 200 ml.

### 1.4.1 Package data, TWA 200S
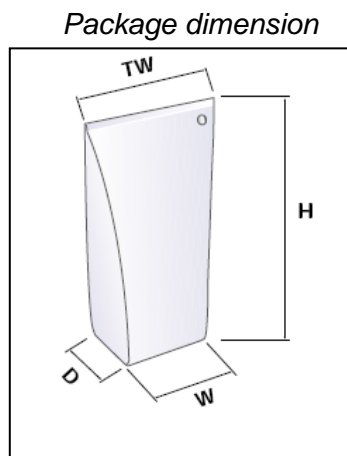
*Package dimension*          *Pre-punched hole dimension*
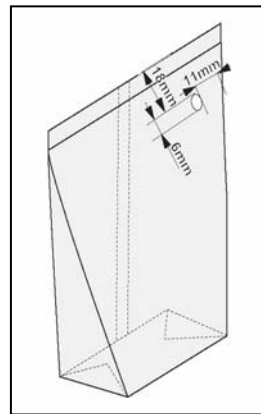


**Figure 1.7**



**Figure 1.8**

|  | W Width (mm) | D Depth (mm) | TW Top Width (mm) | H Height (mm) |
|---|---|---|---|---|
| Crease measurements | 47.0 | 38.0 | 84.0 | 145.0 |

**Table 1.1**

*Package volume*

| Nominal volume (ml) | 200.0 |
|---|---|
| Theoretical crease volume (ml) | 217.0 |
| Under filling (ml) | 17.0 |
| Under filling (%) | 7.8 |

**Table 1.2**

---

[13]  Information gathered from Tetra Pak's internal homepage

## 1.5  Problem Statement

Tetra Pak has, as mentioned above, developed a new package called TWA that has been out on the market for a couple of years. The package immediately attracted young people with its fun design and bright colours. Unfortunately, the package has not motivated the children's parents in the same way. When children are looking for something fun and unusual the parents wants something that is safe, healthy and easy to handle. That last thing, easy to handle, have been one of the reasons why the parents have not bought the package. Several market companies have lately given feedback that the opening performance of the package needs to be improved.
In 2001, TPCA Italy performed three panel tests with the aim to find a better solution for the opening performance. In the panel test, they evaluated different positions of the Pre Punch Hole (PPH) in combination with different straws. A consumer study have also been performed by Coca Cola Thailand were different straw types were evaluated.[14]
The information from the panel test and the consumer study has not given any clear solution to the improvements and therefore is it important to make a deep analysis of the problem and understand why the consumer experience the TWA 200S difficult to open.

## 1.6  Purpose

The purpose of this master thesis has therefore been to understand and define the three most common problems that children are having when they perforate the package straw hole and consumes the content of the TWA 200S package. Furthermore, the purpose is to translate their demands into technical terms.

## 1.7  Delimitations

The limitations in this thesis will affect the package volume, the straw selection, the stiffness of the package material and the target group for the research.

*Package volume*. Today the mainly used package volume on the market is 200 ml therefore will the focus be on the TWA 200S.

*Straw selection*. The recommended straws for the TWA package are today the Telescopic straw and the U-straw. The most commonly used straw on the market is the U-straw and therefore is it selected for this research. The U-straw comes in two different diameters and in two different lengths. In this research, the 5 mm in diameter and the 180 mm in length will be used.

*Stiffness in the package material*. Today there exist two different kinds of material stiffness, 30 or 80 mN. In the future will the 30 mN be used on the TWA 200S and therefore is that weight chosen in this thesis.

---

[14]  Information gathered from Tetra Pak's internal homepage

*Target group for the research.* Children in the age from 5 to 10 years old are going to participate in this study since they are the primary target group.

In this thesis, children in the age of 5-10 years old have been participating. The package that the children have been testing is a TWA 200S with a 30 mN paperboard stiffness and a U-straw with the length of 180 mm and a diameter of 5 mm.

## 1.8 Target group

The main target group for this thesis is first of all managers and employees at Tetra Pak that have an interest in qualitative consumer research. Secondly focuses the thesis on engineering students who are in their final phase at LTH.

# 2  Methodology

*The purpose of this chapter is to describe the different research methodologies that exist and to explain the chosen method and in which way the information for this thesis was gathered. Finally, the rules and guidelines of marketing research are presented.*

## 2.1  Methodology approach

A method is a tool to reach those objectives that you have with the analyses and with the research. Methodology is according to Andersen (1998 pg 13) "the science of those approaches that we could use when we should collect, work and conclude information so the result becomes knowledge. Method is a systematic way of investigating the reality."

When writing a scientific report it is important to have a specific methodology approach in the work. The methodology shall guide you through how to gather information, to carry out the research and to write the analysis. In the theory of science, there are two different methodological approaches, the quantitative methods and the qualitative methods.

### 2.1.1  Quantitative method

In natural science are the quantitative methods often used since they are very formalized and structured. This expresses in applications like statistics, mathematic or arithmetical formulas.[15] A researcher that is using quantitative methods tries to obtain a me-it relationship with the participant. The researcher observes the results from the outside and never contacts the participant in person. When using quantitative methods you try to standardize the procedure. As soon as the approach to the problem is set, the plan for the investigation is also set. This standardization often expresses in forms of a survey.[16]

The strength with the quantitative method is that
- All participants gets the same information and questions,
- Upon the information that comes out of the research is it possible to do statistic generalizations.

The weakness is that
- The researcher doesn't have any guarantee that the information that is collected is relevant for the problem,
- If new knowledge comes up during the accomplishment phase, the researcher cannot make any changes in the investigation plan or in the procedure.

---

[15] Andersen Ib. *Den uppenbara verkligheten, Val av samhällsvetenskaplig metod*. Lund. Studentlitteratur. 1998

[16] Holme Idar M. & Solvang Bernt K. *Forskningsmetodik, Om kvalitativa och kvantitativa metoder*. Second edition, Lund. Studentlitteratur. 1997

To minimize those problems a pre-study is very useful. The researcher could here test the survey questions and see if the test group understands them and that the result that was looking for comes out of it.[17]

### 2.1.2 Qualitative method

When a deeper understanding of the problem that is studied needed, qualitative methods are used. The researcher tries to obtain a me-you relationship with the participant and the observation of the problem is done from the inside were the researcher often is present and sometimes part of the observation. When a researcher is using qualitative methods the study of the participant is often very intense and takes a lot of time. In qualitative investigations, the approach must be able to change during the accomplishment of the investigation. This flexibility concerns above all two different things. First, if some issues are forgotten or falsely formulated the researcher has the possibility to correct it during the investigation. Secondly, is the researcher able to ask any question he/she likes in any order he/she likes.[18]

The strength with the qualitative method is that
- The researcher gets a deeper understanding and sees the problem from a total view,
- The researcher can constantly improve the investigation, i.e. change interview question or change the procedure.

The weakness is that
- The deeper interviews or observations are time consuming,
- Only a few participants can be investigated,
- The flexibility makes it harder to compare the information from different participants.

Some common tools when working with qualitative methods are observation or interviews that could be in different shapes like, standard interviews, focus groups or panel tests.

---

[17] Holme Idar M. & Solvang Bernt K. *Forskningsmetodik, Om kvalitativa och kvantitativa metoder*. Second edition, Lund. Studentlitteratur. 1997
[18] Ibid.

Table 2.1 give a brief comparison between qualitative and quantitative methods.

| A Brief Comparison of Qualitative and Quantitative Methods[19] | | |
|---|---|---|
| | *Qualitative* | *Quantitative* |
| Focus of Research | Qualitative (nature, essence) | Quantity (how much, how many) |
| Key Concepts | Meaning, understanding, description | Statistical relationships, prediction control, hypothesis testing |
| Sampling | Non-representative, small, purposeful | Representative , large, random, stratified |
| Date | Field notes, people's own words | Measures, counts, numbers |
| Methods | Observations, interviews, reviewing documents | Experiments, surveys, instruments |
| Instruments | Researcher, tape recorder, camera, computer | Inventories, questionnaires |
| Findings | Comprehensive, holistic, richly descriptive | Precise, numerical |
| Advantages | Flexibility, emphasis on understanding large groups, hard to explain deviations | Controlling intervening variables, oversimplification |

**Table 2.1** A brief comparison of qualitative and quantitative methods.

## 2.2 Choice of method and data collection

Since this thesis has the deeper understanding of the opening performance in view, the best method approach is the qualitative method because qualitative methods support the concept of understanding. In order to receive the information, observations and interviews are going to be made.

To define the most common problems when children are perforating and consuming the content of a TWA 200S package the observation will take place in a usability lab.

### 2.2.1 Gathering of information

When writing a scientific report the sources used to gather information could be divided into two groups, primary and secondary sources. The primary sources are sources that are gathered by the researcher e.g. interviews or observations and the secondary sources are sources that are gathered by someone else e.g. documents or other literature.[20]

---

[19] www.mnsu.edu

[20] Bell Judith. *Introduktion till Forskningsmetodik.* Third edition, Lund. Studentlitteratur. 2000

All the information that is gathered, must always be critically examined. Decisions whether it is reliable and valid must be made, no matter what methods that are used. Reliability is the measure of in which extension a method will give the same result at different occasions during same conditions.[21] Validity deals with whether a method really measures the properties that you refer to measure. The difficulties with the validity are that it is almost impossible to know that a method is valid or not.[22]

### 2.2.1.1 Primary sources

The primary sources in this thesis have been interviews and observations. Tetra Pak staff have mainly been interviewed to get background information to some of the problems that were discovered during the working process. Interviews have also been made with the children that have participated in the test but since they are not very reliable, due to low age and limited experience, they have more been observed than interviewed. The observations have been made in a natural environment and in a usability lab.

*Observation*
Interviews give important information but it only reflects what different persons think has happened not what actually happened, because of that, observations are better.[23]
The observation that has been made in this research has manly been done by watching own recorded videotape showing the children opening packages. The information that has been gathered by this observation is; where the package is leaking from, what causes the leakage and if there are any differences in children's behaviour between different age groups and gender.

*Usability Test*
Usability testing is a method for assessing the ease with which products are being learned and used. The underlying model for all usability tests is that real users carry out real work with a product. The important concept is that in usability testing, users are to do something realistic with a product, and to do enough of it to approximate the experience they would have with the real product in the real world. This is a key difference between usability testing and other forms of user input.[24]

*Videotaping*
Making the observation in the usability lab easier the researcher has videotaped the whole session.

---

[21] Bell Judith. *Introduktion till Forskningsmetodik.* Third edition, Lund. Studentlitteratur. 2000

[22] Lekvall Per & Wahlbin Clas. *Information för marknadsföringsbeslut.* Fourth edition, Göteborg. IHM Publishing. 2001

[23] Andersen Ib. *Den uppenbara verkligheten, Val av samhällsvetenskaplig metod*. Lund. Studentlitteratur. 1998

[24] www.ergolabs.com

*2.2.1.2 Secondary sources*

The secondary sources in this thesis have been articles, books and information gathered from the Internet.

## 2.3    Codes and Guidelines in market research

The industries and the research business have for a long time worked to develop voluntary rules and regulations too guarantee a high ethical level in marketing research. ESOMAR (European Society for Opinion and Marketing Research) and ICC (International Chamber of Commerce) have mainly driven this work. These two have together drafted the codes and guidelines that exist on the European market today, the ICC/ESOMAR International Code of Marketing and Social Research Practice.[25] Through the codes and guidelines, ESOMAR pioneers for the protection of research respondent's privacy, irrespective of the techniques or technology used to carry out the research.[26]
ICC/ESOMAR International Code of Marketing and Social Research Practice consist of 29 rules and a couple of intensifying guidelines. Two of these guidelines have been used in this thesis, *ESOMAR Guidelines on Interviewing children and young people* and *ESOMAR Guidelines on Tape and Video-recording and Client Observation of Interviews and Group Discussions.*

### 2.3.1    ESOMAR Guidelines on Interviewing children and young people[27]

In Rule 6 of the International Code, you can read that,
> *The Researcher must take special care when interviewing children and young people. The informed consent of the parent or responsible adult must first be obtained for interviews with children.*[28]

This rule specially points out the ethical issues involved i.e,

- The welfare of the children and young people themselves is the overriding consideration - they must not be disturbed or harmed by the experience of being interviewed,
- The parents or anyone acting as the guardian of any child or young person taking part in a research project must be confident that the latter's safety, rights and interests are being fully safeguarded,
- The interviewers and other researchers involved in the project must be protected against any misunderstandings or possible allegations of misconduct arising from their dealings with the children or young people taking part in that project,

---

[25]   Lekvall Per & Wahlbin Clas. *Information för marknadsföringsbeslut.* Fourth edition, Göteborg. IHM Publishing. 2001
[26]   www.esomar.nl
[27]   Ibid.
[28]   Ibid.

- The authorities and the public generally, must be confidant that all research carried out with children and young people are conducted to the highest ethical standards, and that there can be no question of any possible abuse of the children or young people involved.

When interviews with children are made special requirements regarding the approached must be set, i.e. the parent, the guardian or other persons that the parent has conferred responsibility for the child must be obtained before approaching the child for the interview. A child must not under any circumstances be approached for an interview unless an adult accompanies him or her.

When requesting permission to carry out an interview, sufficient information must be given to the person responsible for the child so they know what is going to happen. Where it is not practicable for that person to see or hear the actual questions to be asked, the subject and general nature of the interview must be explained.

If children are asked to test any products, the responsible person must be allowed to see this and if they wish to, they can try it themselves. In those cases, the researcher must take special care to check:

- That these are safe to consume (e.g. foods, confectionery) or to handle (e.g. toys).
- That children or young people does not suffer from any relevant allergy (e.g. to products containing nuts).
- That children and young people do not become involved in any illegal action (e.g. the under-age consumption of alcoholic products).

## 2.3.2 ESOMAR Guidelines on Tape and Video-recording and Client Observation of Interviews and Group Discussions[29]

When video recording is to be used the participant must be told, normally at the beginning of the interview or group discussion, so he or she can object to it.

The recordings must not be allowed out of the hands of the researcher unless explicit permission has been obtained from all the participants included in the recording. Where such permission is to be obtained, the researcher must ensure that the participants are given as much relevant information as possible about the future use of the recording, in particular:

- To whom the recording is to be given,
- To whom it is likely to be shown,
- For what purposes it is likely to be used.

---

[29] www.esomar.nl

# 3 Theoretical Framework

*The first part of this chapter presents the marketing issues: consumer's needs, wants, demands and purchase behaviour. Furthermore is the product development and product life cycle explained. The second part deals with the term usability and the ways which usability in a product is tested. At last is package technology and portion packs described.*

## 3.1 Marketing

Marketing more than any other business function, deals with customers. Creating customer value and satisfaction is at the very heart of modern marketing thinking and practice. The simplest definition of marketing is:

> *Marketing is the delivery of customer satisfaction at a profit. The twofold goal of marketing is to attract new customers by promising superior value and to keep and grow current customers by delivering satisfaction.*

Today marketing must be understood not in the old sense of making a sale – "telling and selling" – but in the new sense of satisfying customers needs. If the marketer does a good job of understanding customer needs; develop products that provide superior value; and prices, distributes, and promotes them effectively, these products will sell very easily. Thus, selling and advertising are only part of a larger "marketing mix" – a set of marketing tools that work together to affect the marketplace.[30]

The idea of marketing is to identify, attract, keep and develop profitable costumers by offering products that has a value for the costumer.[31]

To explain this definition, following important terms will be examined: needs, wants and demands; products, services and experience; value, satisfaction and quality; exchange, transactions and relationships; and markets. Figure 3.1 shows that these core-marketing concepts are linked, with each concept building on the one before it.[32]

---

[30] Armstrong, Gary / Kotler, Philip. *Marketing an introduction, Sixth edition*. Prentice Hall. Upper Saddler River, New Jersey, USA. 2002

[31] Olsson, Jan / Skärvad, Per-Hugo. *Företagsekonomi 99*. Liber AB. 2000

[32] Armstrong, Gary / Kotler, Philip. *Marketing an introduction, Sixth edition*. Prentice Hall. Upper Saddler River, New Jersey, USA. 2002
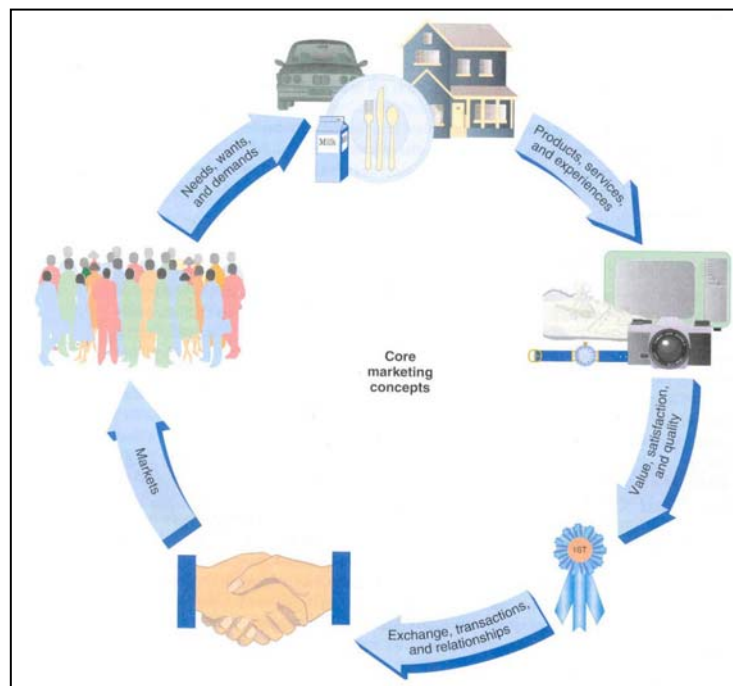
**Figure 3.1** Core marketing concepts

*Needs, wants and demands*

The most basic concept underlying marketing is that of human needs. Human needs are state of felt deprivation. They include basic physical needs for food, clothing, warmth and safety; social needs for belonging and affection and individual needs for knowledge and self-expression.

Wants are the form human needs take as they are shaped by culture and individual personality. Wants are shaped by one's society and are described in terms of objects that will satisfy needs.

People have almost unlimited wants but limited resources. Thus, they want to choose products that provide the most value and satisfaction for their money. When backed by buying power, wants become demands. Consumers view products as bundles of benefits and choose products that give them the best bundle for their money.

*Products, services and experience*

People satisfy their needs and wants with products and services. A product is anything that can be offered to a market for attention, acquisition, use or consumption that might satisfy a want or need. It includes physical objects, services, persons, places, organisations and ideas.[33]

---

[33] Armstrong, Gary / Kotler, Philip. *Marketing an introduction, Sixth edition*. Prentice Hall. Upper Saddler River, New Jersey, USA. 2002

*Value, satisfaction and quality*

Consumers usually face a broad array of products and services that might satisfy a given need. Consumers make buying choices based on their perceptions of the value that various products and services deliver.

Costumer value is the difference between the value the customer gains from owning and using a product and the costs of obtaining the product.

Customer satisfaction depends on a product's perceived performance in delivering value relative to a buyer's expectations. If the product's performance falls short of the customer's expectations, the buyer is dissatisfied. If performance matches expectations, the buyer is satisfied. If performance exceeds expectations, the buyer is delighted. Satisfied costumers make repeat purchases, and they tell others about their good experience with the product. The key is to match customer expectations with company performance.

Customer expectations are based on past buying experience, the opinions of friends, marketer, competitor information, and promises. Marketers must be careful to set the right level of expectations. If they set expectations too low, they may satisfy those who buy but fail to attract enough buyers. If they raise expectations too high, buyers will be disappointed.

Quality has a direct impact on product or service performance. Thus, it is closely linked to consumer value and satisfaction.

*Exchange, transactions and relationships*

Marketing occurs when people decide to satisfy needs and wants through exchange. Exchange is the act of obtaining a desired object from someone by offering something in return.

Whereas exchange is the core concept of marketing, a transaction in turn is marketing's unit of measurement. A transaction consists of a trade between two parties that involves at least two things of value, agreed upon conditions, a time of agreement and a place of agreement.

*Markets*

The concepts of exchange and relationships lead to the concept of a market. A market is the set of actual and potential buyers of a product or service. These buyers share a particular need or want that can be satisfied through exchanges and relationships.[34]

---

[34] Armstrong, Gary / Kotler, Philip. *Marketing an introduction, Sixth edition*. Prentice Hall. Upper Saddler River, New Jersey, USA. 2002

### 3.1.1 Consumer's purchase behaviour

Consumer purchases are influenced strongly by cultural, social, personal and psychological characteristics shown in figure 3.2. For the most part, marketers cannot control such factors, but they must consider them.[35]
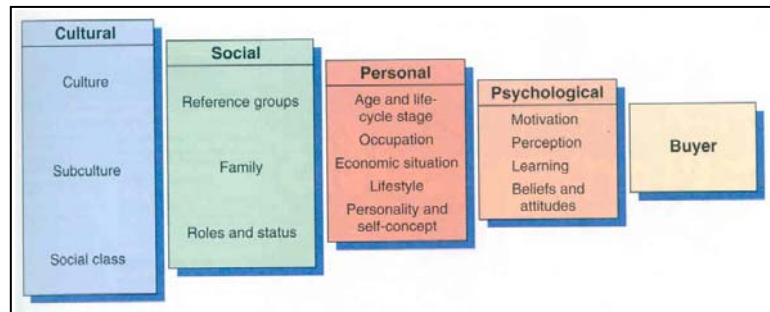


**Figure 3.2** Consumer behaviour

*Cultural factors*
Cultural factors exert a broad and deep influence on consumer behaviour. The marketer needs to understand the role played by the buyer's culture, subculture and social class.

*Social factors*
A consumer's behaviour influences also by social factors, such as the consumer's small groups, family and social roles and status.

*Personal factors*
A buyer's decisions influences also by personal characteristics such as the buyer's age and life-cycle stage, occupation, economic situation, lifestyle and personality and self-concept.

*Psychological factors*
A person's buying choices are further influenced by four major psychological factors; motivation, perception, learning and beliefs and attitude. What motivates us as consumers can be arranged in Maslow's hierarchy of needs that express the most pressing at the bottom to the least pressing in the top.[36]

For understanding how demand will change in emerging market, Maslow proposed the hierarchy to look like this:[37]
- Basic Sustenance, which is food, shelter and clothing,
- Safety, which is to feel secure and comfortable,
- Love, which is felt for one's self, others and family,
- Esteem, which is recognition or status, a feeling of importance,
- Independence, which is self-realisation and a feeling of accomplishment.

---

[35] Armstrong, Gary / Kotler, Philip. *Marketing an introduction, Sixth edition*. Prentice Hall. Upper Saddler River, New Jersey, USA. 2002

[36] Ibid.

[37] www.sticky-marketing.net

## 3.2 Product Development

Given the rapid changes in consumers taste, technology and competition, companies must develop a steady stream of new products and services. The company's own research and development department makes the new-product development. New-products means original products, product improvements, product modifications and new brands that the firm develops through its own research and development efforts. In figure 3.3 are the major stages in new-product development presented.[38]
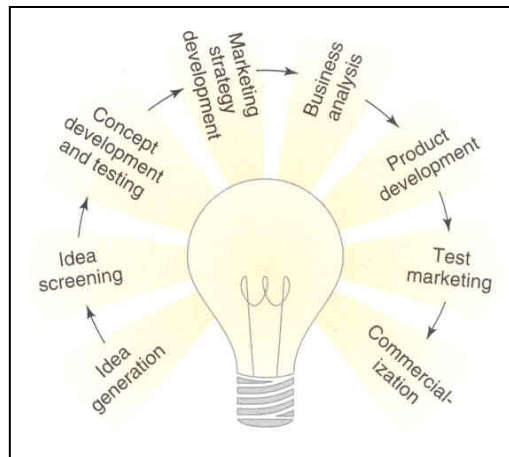


**Figure 3.3** Major stages in new-product development

---

[38] Armstrong, Gary / Kotler, Philip. *Marketing an introduction, Sixth edition*. Prentice Hall. Upper Saddler River, New Jersey, USA. 2002

### 3.2.1 Product life-cycle

After launching a new product, management wants the product to enjoy a long and happy life. Although it does not expect the product to sell forever, the company wants to earn a decent profit to cover all the effort and risk that went into launching it. Management is aware that each product will have a life cycle, although its exact shape and length is not known in advance. Figure 3.4 shows a typical product life cycle (PLC), the course that a product's sales take over its lifetime. [39]
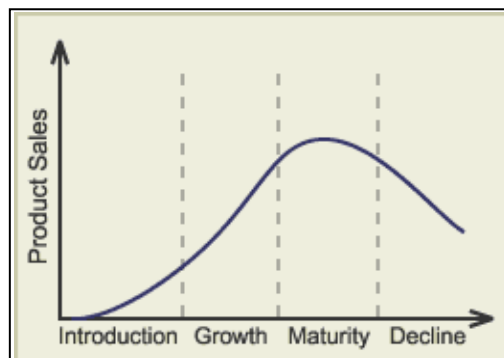


**Figure 3.4** Product Life Cycle

The product life cycle has four distinctive stages:[40, 41]

1. Introduction
   In the introduction stage, the company seeks to build product awareness and develop a market for the product. This stage is a period of slow sales growth as the product is introduced on the market.
2. Growth
   In the growth stage, the company seeks to build brand preference and increase market share.
3. Maturity
   Maturity is a stage of slowdown in sales growth because the product has achieved acceptance by most potential buyers. The primary objective at this point is to defend market share while maximizing profit.
4. Decline
   Decline is a stage when sales fall off and profits drop.

Not all products follow this product life cycle. Some products are introduced and die quickly; others stay in the mature stage for a long, long time. Some enter the decline stage and are then cycled back into the growth stage through strong promotion or repositioning.[42]

---

[39] Armstrong, Gary / Kotler, Philip. *Marketing an introduction, Sixth edition*. Prentice Hall. Upper Saddler River, New Jersey, USA. 2002

[40] www.quickmba.com

[41] Armstrong, Gary / Kotler, Philip. *Marketing an introduction, Sixth edition*. Prentice Hall. Upper Saddler River, New Jersey, USA. 2002

[42] Ibid.

Table 3.1 shows a summary of the characteristics of the product life cycle.

| Summary of Product Life Cycle Characteristics[43] | | | | |
|---|---|---|---|---|
| | *Introduction* | *Growth* | *Maturity* | *Decline* |
| Sales | Low sales | Rapidly rising sales | Peak sales | Declining sales |
| Profits | Negative | Rising profits | High profits | Declining profits |
| Customers | Innovators | Early adopters | Middle majority | Laggards |
| Competitors | Few | Growing number | Stable number beginning to decline | Declining number |

**Table 3.1** Summary of product life cycle characteristics

---

[43] Armstrong, Gary / Kotler, Philip. *Marketing an introduction, Sixth edition*. Prentice Hall. Upper Saddler River, New Jersey, USA. 2002

## 3.3 Designing packages for young people

*Package designers are facing a tricky assignment when they are designing a package that is marketed at young people. Many different aspects need to be taking into consideration before the product can be released onto the market.*

In the past, when selling products to children, the route to success was via their mothers, who were in charge of the shopping and the family budget. Today children in the age of 4 to 14 have more control over the shopping decisions. The children have more choices, money and opportunities nowadays and different factors motivate their purchase decisions. The priorities shift depending on their age, gender, social trends. This is one of the reasons why it is important for package designers and product developers to understand what motivates children as consumers. Although children are motivated by different factors from those motivating adults, it is never safe to dismiss the adult's role, especially when it comes to products that the children do not buy by themselves. Arguments about nutritional value and health are therefore as important as vivid colours and fun designs. It is a balancing act to keep the fun side up for the children, whilst persuading their parents that the product content is healthy.[44]

Since children are so different at the age of 4 and 14, it is hard for the package designer to communicate the right message to the right age group. The divided line between them is flexible and some elements may work for children of all ages, but there are some significant guidelines.
Warm, cute designs work best for children up to the age of five. More exciting and active designs with humorous elements can be used for 6 to 10 year olds. Up to 13, a more trendy "cool" design is recommended, although it should not be too weird and obscure. Teenagers are a hard target group to please and to convince. The marketing and design aimed specifically towards them must therefore display precisely the right "attitude". Like many adults, teenagers often are drawn towards healthy products. If the package design succeeds in communicating the right attitude and at the same time, the product content is correct; its appeal is automatically doubled.[45]

One of the most important influences on brand decisions of today's youth is the package. Studies have shown that most children recognise and identify brand logos before they can even read their own names; knowing which packaging features will capture children's attention from the shelf and encourage repeat product use are ongoing challenges for packaging professionals.[46]

---

[44] Information gathered from Tetra Pak's internal homepage
[45] Ibid.
[46] Sensback, Paul R. (2000): Don't kid around with kid packaging. *Marketing News,* Nov 20, pg. 14

## 3.4 Package Processing and Technology

After listening to the marketing company and the costumers demands, the company will need to take there own demands on the product into consideration. This concerns package material, package processing and package technology.

### 3.4.1 Portion pack in combination material

Today there exist a myriad of packaging materials – paper, wood, plastic, metal and glass – where each material has their own unique property. By combining different materials, it is possible to create "customized" protective packaging with the least possible material consumption, above all for dairy products. The most common combination is paper, plastic and aluminium foil. These materials are all good on their own, but the combination is even better.[47]

*Tetra Pak aseptic packaging material*
Tetra Pak's aseptic cartons are made of three basic materials that together result in an efficient, safe and lightweight package. Each material provides a specific function that are listed below,[48]

- Paper: to provide strength and stiffness
- Polyethylene: to make the package liquid tight and to provide a barrier to microorganisms
- Aluminium foil: to keep out air, light, and off-flavours - all the things that can cause food to deteriorate.
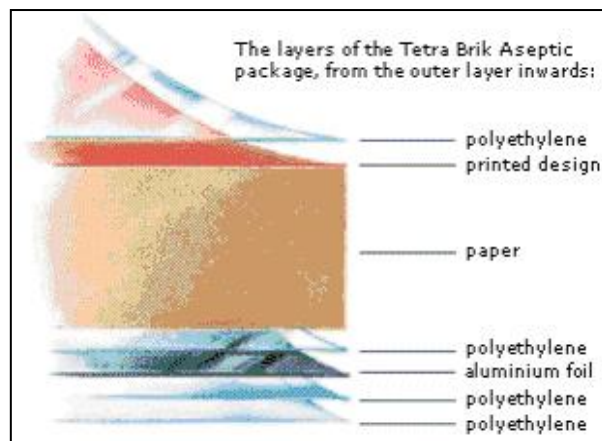


**Figure 3.5** The layers of Tetra Pak's aseptic package

---

[47] Thorén, Anders / Vinberg, Björn. *Pocket book of Packaging.* Sörmlands Grafiska AB. 2000
[48] www.tetrapak.com

### 3.4.2 Package technology

When a Tetra Pak package is made, rolls of packaging material is sterilised and shaped into a tube. The tube is filled with the specific product and the package is shaped and sealed below the surface of liquid. With this technology, no air space exists in the package.[49]
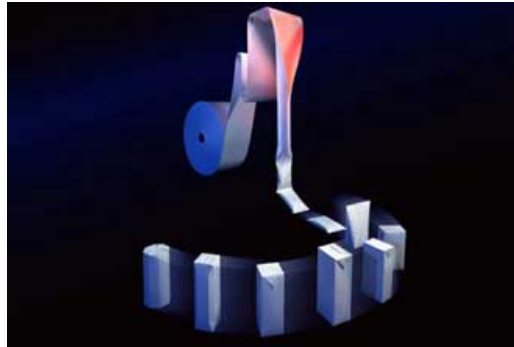


**Figure 3.6** The principle of packaging

Since the packages are sealed below the surface of liquid, a certain degree of under filling needs to be done to simplify the opening performance. For the TWA 200S package the degree of under filling is 7.8 % (see table 1.2). This means that when a small hole occurs in the PPH, the pressure inside the package levels with the ambient pressure and the surface of the liquid is lowered with 7.8 %.

For some products and packages the under filling volume needs to be larger and you then talk about a certain degree of headspace. This can be made by using, headspace by gas injection or headspace by lower level filling. Their each degree of under filling is given in table 3.2

|  | Standard under filling | Headspace by gas injection | Headspace by lower level of filling |
|---|---|---|---|
| Degree of under filling | 7.8 % | 0-10 % | 5-20 % |

**Table 3.2** Different under fillings techniques for TWA 200S

---

49   www.tetrapak.com

### 3.4.3   Aseptic Processing

To improve a dairy products durability without worsen the quality the food is preserved. The method that today is mainly used is preservation by heat treatment.[50] The effect that is wished for when heat treatment of dairy products is made is to eliminate the harmful microorganisms that contaminate our food. Food preservation involves controlling or eliminating bacteria, if this is not made the food will change in consistency, colour, content of vitamin etc.[51]

Today the most commonly used method of heat treatment is aseptic processing.

Aseptic processing means that the product and its package are sterilized separately. After which the package is rapidly sealed by a way that prevent the content from being re-infected. The sterilization of the product is made by Ultra High Temperature treatment meaning that the product is rapidly heated and chilled. The heat treatment is performed in a temperature of approximately 135-140°C for 5-10 seconds. The aseptic processing technique gives high product quality and is energy saving. It also gives a more flexible choice regarding the package shape and material.[52]
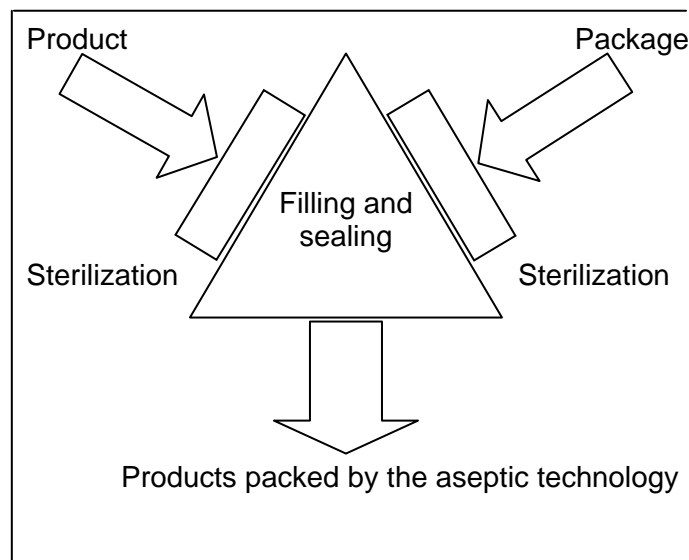


**Figure 3.7** The aseptic processing technique

---

50   *Nationalencyklopedin*. Bra Böcker AB. Höganäs. 1990
51   Andersen, Poul Erner / Risum, Jørgen. *Livsmedelsteknologi 1*. Studentlitteratur, Lund. 1991
52   *Nationalencyklopedin*. Bra Böcker AB. Höganäs. 1990

In contrast to other methods, aseptic packaging is based on the principle of ensuring that both food and packaging materials are free of harmful bacteria the moment the food is packaged. The result is a packaged food product that can be preserved safely at ambient temperature virtually forever.

Taste, flavour, colour and nutritional value, however, deteriorate at different rates depending on climate and storage conditions. The shelf life of an aseptic package, therefore, ranges typically from six months to one year or more.[53]

### 3.4.4 Portion packages, on-the-go consumption

The traditional streetfood in the emerging markets has influenced the western fast food market. Increasing time pressure on consumers has been the main force behind a shift away from traditional mealtimes. Meal consumption is now fragmented into more frequent and smaller "meals", taken in locations that are more diverse.[54]

The drinks on-the-go phenomenon has been driven by trend towards a "just-in-time" society, and the constant flow of new product designs and an increase in outlets has further helped develop this market segment. On-the-go consumption is accounting for an increasing share of the food and drink market and is showing no signs of slowing down.[55]

In the emerging markets on the other hand, the on-the-go consumption is not something new and trendy it's something vital. The inhabitants' need to buy food and drinks on the streets to prevent themselves from illness, for instant in the Latin American cities street vendors accounts for 20-30 percent of the household expenses. This is due to that the inhibitors rarely have access to storage- and refrigerating opportunities, which is needed to keep the food safe for consuming.[56]

---

[53] www.tetrapak.com

[54] Singh Sonoo (2001): Fast food, spreading rapidly. *Marketing Week*, Dec 06, pg. 38-39

[55] Singh Sonoo / Broome Neil (2001): No stopping to eat or drink. *Marketing Week*, Jul 5, pg. 38

[56] Information gathered from Tetra Pak's internal homepage

The United Nations Population Division estimated that the world population will increase from today's 6.4 billion to approximately 9 billion in 2050. Ninety-six percent of the projected growth will be in developing countries (see figure 3.8).[57] Tetra Pak sees here a big growth potential and opportunity to increase their market shares in the portion packs industry and therefore puts extra care to develop packages that appeals these consumers.
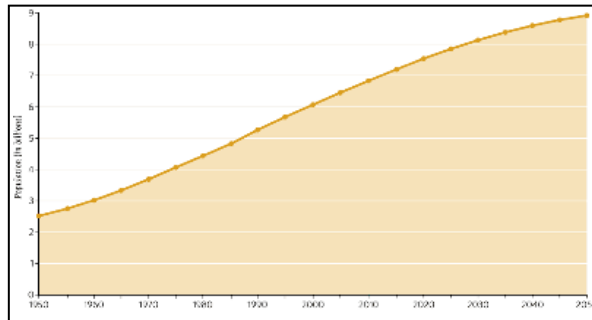


**Figure 3.8** World population 1950-2050

### 3.4.5   Portion pack with straw

Today many of the portion packs are equipped with a straw. The straws are perhaps not always a good solution but since straws are a low-cost solution for the company, they are mainly used. Some problems are in close connection when a company is using a straw, for example, the siphon effect.

*Siphon*
A siphon is a length of a tubing that allows to transfer fluid from an upper location to a lower one; the key feature of a siphon is that the fluid is moved upwards from its start point before it turns down towards its exit point (see figure 3.9).[58]
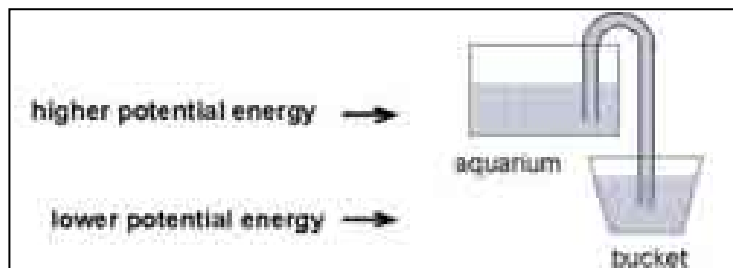


**Figure 3.9** The siphon effect

The physics behind water's tendency to flow until all of it is at the same level is related to potential energy. The higher the water is the more gravitational potential energy it has. Water, like everything else, accelerates in whatever direction reduces its total potential energy as quickly as possible.[59]

---

[57]   www.unfpa.org
[58]   www.pump-flo.com
[59]   www.physicscentral.com

27

The flow in a U-straw is caused by the weight and the attraction between the fluid particles and is a phenomenon analogous to the motion of a chain (see figure 3.10).[60] Therefore is it possible for the fluid to travel upwards before it starts its level-seeking process.
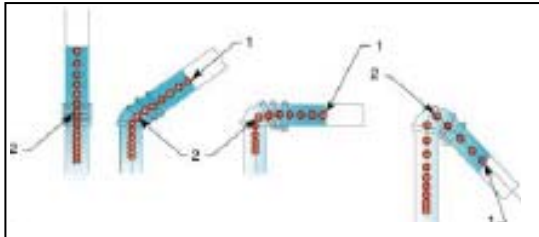


**Figure 3.10** The flow of the fluid particles

---

60 *Nationalencyklopedin*. Bra Böcker AB. Höganäs. 1992

## 3.5  Usability

*To prolong a products life cycle it is important to listen to the consumer's needs, wants and demands. If a consumer finds the product difficult to use he or she will abandon the product and move to a competitive product that is easier to use. To gain consumers trust and make them repeatedly buy the product it is therefore important to have knowledge in the term of usability.*

The International Standards Organisation (ISO) defines usability as "… the effectiveness, efficiency and satisfaction with which specified users could achieve specified goals in particular environments" (ISO 9241-11).[61]

*Effectiveness* refers to the extent to which a goal, or a task, is achieved. In some cases, the distinction between a task being achieved successfully or not may simply be success or failure in that task.

*Efficiency*, meanwhile, refers to the amount of effort required to accomplish a goal. The less effort required, the higher the efficiency. Effort might be measured, for example, in terms of the time taken to complete a task or in terms of the numbers of errors that the user makes before a task is completed. The difference in usability, in this case, would be a difference in efficiency but not in effectiveness. In either cases users have achieved the goal, but the more time taken or the greater the number of errors made, the less the efficiency.

*Satisfaction* refers to the level of comfort that the users feel when using a product and how acceptable the product is to users as means of achieving their goals. This is a more subjective aspect of usability than effectiveness or efficiency. It may also be more difficult to measure.[62]

An important point to note about the ISO definition of usability is that it makes clear that usability is not simply a property of a product in isolation, but rather that it will also be dependent on who is using the product, the goal that they are trying to achieve and the environment in which the product is being used. Usability is therefore a property of the interaction between a product, a user and the task, or set of tasks that he or she is trying to complete.
A product that is usable for one person will not necessarily be usable for another. There are a number of user characteristics, which can be predictors of how easy or difficult a product is to use for that person. Designing for usability means designing for those who will use the product in question. It is vital then to have an understanding of who the users of the product will be and their characteristics. Some of these characteristics are:[63]
- *Experience*, if the users have experience of the product or with other similar products.

---

61   www.usabilitypartners.se
62   Jordan, Patric W. *An introduction to usability*. London. Taylor & Francis Ltd. 1998
63   Ibid.

- *Domain knowledge*, that refers to knowledge relating to a task, which is independent of the product being used to complete that task.
- *Cultural background*, which is important if the product design is made for a particular market.
- *Disability*, by paying attention to the needs of those with disabilities, it is possible to provide opportunities for the disabled that might otherwise be restricted.
- *Age and gender*, since there are user characteristics that often vary with age and gender, it is important to consider this when designing certain products for usability.

## 3.6   Usability testing

*When a company have developed a product that in their eyes is usable, it is important to test it on the primary target group. Today there exits many different methods for testing the products usability. In this thesis, the test method called usability testing will be explained.*

Usability testing is a method for assessing the ease with which products are learned and used. The underlying model for all usability tests is that real users carry out real work with a product. The "product" in this model can be a shrink-wrapped application or a website, a working product or a prototype, or even a series of screen designs mocked up on paper. The important concept is that in usability testing, users are to do something realistic with a product, and to do enough of it to approximate the experience they would have with the real product in the real world. This is a key difference between usability testing and other forms of user input.[64]

The test method was introduced in the late 1980's and rose to popularity in the past decade. Although usability testing may not be the most efficient technique for discovery of usability problems, it is a reliable way to estimate qualitative user's performance and subjective satisfaction with products. Four major trends in usability testing include,[65]
- Common reporting formats and methods for industry,
- Internet application and website testing,
- Testing of mobile, handheld devices,
- Testing in more naturalistic environments such as simulated homes and classrooms.

### 3.6.1   Goals of testing

The overall goal of usability testing is to identify and rectify usability deficiencies existing in a product. Today these products mainly are computer-

---

[64]   www.ergolabs.com

[65]   Wichansky, Anna M. (2000): Usability testing in 2000 and beyond. *Ergonomics*, July, pg. 998-1007

based and electronic equipment and their accompanying support material prior to release. The intent is to ensure the creation of products that:[66]
- Are easy to learn and to use,
- Are satisfying to use,
- Provide utility and functionality that are highly valued by the target population.

More specific goals or benefits of testing are:[67]
- *Creating a historical record of usability benchmarks for future releases.* By keeping track of test results, a company can ensure that future products either improve or at least maintain current usability standards.
- *Increasing sales and the probability of repeat sales.* Usable products create happy customers who talk to other potential buyers or users. Happy customers also tend to stick with future releases of the product, rather than purchase a competitor's product.

### 3.6.2 Limitations of testing

Testing is neither the end-all nor be-all for usability and product success, and it is important to understand its limitations. Testing does not guarantee success or even prove that a product will be usable. Even the most rigorously conducted formal test cannot, with 100 percent certainty, ensure that a product will be usable when released. Here are some reasons why:
- *Testing is always an artificial situation.* Testing in the lab, or even testing in the field, still represent a depiction of the actual situation of usage and not the situation itself. The very act of conducting a study can itself affect the results.
- *The test results do not prove that a product works.* Even if one conducts the type of test that acquires statistically significant results, this still does not prove that a product works. Statistical significance is simply a measure of the probability that one's results were not due to chance. It is not a guarantee, and is very dependent upon the way in which the test was conducted.
- *Participants are rarely fully representative of the target population.* Participants are only as representative as your ability to understand and classify your target audience. Market research is not an infallible science, and the actual end user is often hard to identify and describe.
- *Testing is not always the best technique to use.* In some cases, it is more effective in terms of cost, time and accuracy to conduct other types of evaluation of a product rather than testing it. This is especially true in the early stages of a product when gross violations of usability principles abound. It is simply unnecessary to bring in many participants to reveal the obvious.

---

[66] Rubin, Jeffery. *Handbook of usability testing, how to plan, design and conduct effective tests.* John Wiley & Sons, Inc. 1994

[67] Ibid.

31

However, in spite of these limitations, usability testing, when conducted with care and precision, for the appropriate reasons, at the appropriate time in the product development life cycle, and as part of an overall user-centered designs approach, is an almost infallible indicator of potential problems and the means to resolve them. It minimizes the risk considerably of releasing an unstable or unlearnable product.[68]

### 3.6.3 The number of participants

The number of participants chosen in the usability test depends on:
- The degree of confidence in the results that is required,
- The number of available resources to set up and conduct the test,
- The availability of the type of participants that is required,
- The duration of the test session,
- The time required preparing for the test.

Ultimately, you have to balance your need for acquiring participants with these practical constraints of time and resources.[69]

Experts in the area of usability testing have made research regarding the number of participants in a usability test. The result shows that the number of usability problems found in a usability test with n users is:

$$N(1-(1-L)^n)$$

where $N$ is the total number of usability problems in the design and $L$ is the proportion of usability problems discovered while testing a single user. The typical value of $L$ is 31%, averaged across a large number of projects that has been studied. Plotting the curve for $L$=31% gives the following result:[70]
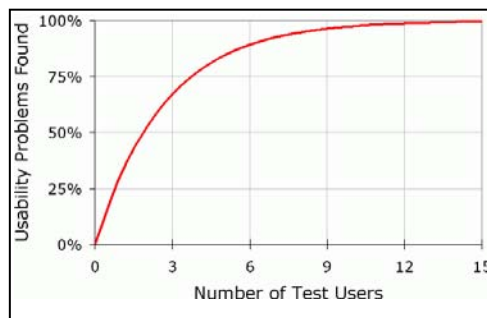


**Figure 3.10** Curve showing the numbers of test participants

The curve clearly shows that a test with at least 15 users discovers all of the usability problems in the design. However, since the goal of usability engineering is to improve the design, not just document its weakness, it is recommended that smaller tests with five users in each is preferable instead of making a single test with 15 users.

---

[68] Rubin, Jeffery. *Handbook of usability testing, how to plan, design and conduct effective tests*. John Wiley & Sons, Inc. 1994
[69] Ibid.
[70] www.useit.com

When usability testing is made in the early stage of the developing phase, it is recommended that a company at least make three tests with five users in each. After a first test, 85% of the usability problems have been found and these will be fixed in the redesign. Finally, when the third test is done all of the usability problems have been revealed and the product is ready to be released on the market.

When multiple groups of disparate users are tested, the recommendation is not to include as many members of each group as in a single test of users. The overlap between observations will ensure a better outcome from testing a smaller number of people in each group. The experts recommend:[71]

- 3-4 users from each category if testing two groups of users,
- 3 users from each category if testing three or more groups of users (you always want at least three users to ensure that you have covered the diversity of behaviour within the group).

### 3.6.4 Methods for usability testing with children

When working with children there are some things that are good to know before starting the observation and the interviews. Here follow some of the guidelines.

*Capacity and inclination to verbalise*. Children have developing capacity to verbalise (both vocally and in writing). Data collection methods used to identify usability problems might be influenced by the fact that children have different verbalisation capabilities. A related skill is the ability to think aloud. This asks the child to translate their experiences to verbal statements. Children below the age of 12 are likely to be unable to think aloud. Some children may not be used to speaking up to adults and may be less likely to report usability problems. Extroversion and verbalisation skills are thus important independent variables to control. It is reasonable to expect that these capabilities of children have direct impact on the outcome of the usability test, so they should be assessed directly, rather than indirectly through the age of the children.

*Capability to concentrate*. Children have developing capability to concentrate to a single activity and to pursue tasks. Consequently, tasks of different complexity and size should be given to different ages. Children could approximately concentrate for about 30 minutes.[72]

*Children's motivation*. Another factor that may influence the outcome of usability testing is children's motivation. For example, frequent intervention by the facilitator together with high motivation to please adults (evidently at younger ages), could also influence the outcome of the usability testing procedures.

---

[71] www.useit.com
[72] Markopoulos, Panos / Bekker, Mathilde (2003): On the assessment of usability testing methods for children. *Interacting with computers*, 15, pg. 227-243

*Ability to adjust to strange environments and surroundings.* Children have varying abilities to adjust to strange environments and surroundings. This can be important when testing is done at a strange location such as a usability laboratory. The social environment for the usability test might also seriously distract children; mention that their peers, noise, other objects in the environment, might distract them while having their parents around is advisable. Allowing them some time to become used to the environment will minimise the amount of distraction.

*Trustworthiness of self-report.* Children are reported to be very honest but sometimes the reliability of reported data is questionable. For example, children may say they hate the "bad" character that may in fact be crucial to the success of a product. Alternatively, they may simply name problems to please the evaluator who looks for them or they may conceal problems if they think they would offend the software creators. Depending on their age, other children, parents, teachers etc. influence the children in different ways.

*Ability for abstract and logical thinking.* Children develop the ability for abstract and logical thinking over time. They also become better at doing more complex reasoning, such as cause and effect reasoning. This influences their ability to understand abstract task descriptions and abstract questions for feedback.

*Gender difference.* These develop and change as children become older. Some researches have shown that girls have been more verbose than boys and girls provided more arguments for their opinion when they were in the age of 9 –11 years old. Furthermore, girls and boys are likely to have different evaluation criteria for assessing products, because of their preferences for different kinds of products and activities.

*Knowledge of language and concepts.* Since children's knowledge of language and concepts is developing, appropriate language or vocabulary is important to ensure that children understand what is expected from them. Using age and culture appropriate language will influence children's understanding of the usability test procedure in general, and more specifically the task descriptions, prompting instructions and requests for feedback.[73]

---

[73] Markopoulos, Panos / Bekker, Mathilde (2003): On the assessment of usability testing methods for children. *Interacting with computers*, 15, pg. 227-243

# 4 Results

*This chapter describes the procedure of how the problem has been solved. The two different studies that have been made are presented and the test plan for each study is explained. Finally, is the result from each test accounted.*

The purpose of this master thesis is to understand and define the three most common problems that children have when they are perforating the package straw hole and consuming the content of a TWA 200S package. Furthermore, the purpose is to translate their demands into technical terms.

To solve this problem the work has been divided into three steps,

1. Study previously made researches to get background information.
2. Accomplish a pre-study at McDonalds.
3. Accomplish a usability test at the usability lab at IKDC (Ingvar Kamprads Design Centrum) at LTH.

## 4.1 Background information

The background information that I have taking part of is
- A consumer study that was made by a consumer research company requested by Tetra Pak,
- Three panel tests that TPCA Italy have performed.

The consumer research company made a research in Mexico with the purpose to evaluate the image and acceptance among consumers of recently launched stand-up pouches. The purpose was also to identify benefits associated to the street pack category of packages.

TPCA Italy performed three panel tests regarding the opening performance. The purpose of the test have been to study the straw hole position and the diameter of the pre-punched hole.

## 4.2 Pre-study at McDonalds

The purpose with this pre-study is to see how children behave with the package in a natural environment and to understand what the problem with the opening performance is and what should be further examined in the usability test.
The purpose of making a pre-study is as mentioned in chapter 2, to make sure that the test procedure is right and that the right questions are asked. In a qualitative study the test procedure is allowed to change during the accomplishment phase but it is always better to get as close as possible to the right procedure right away rather than making each test different since new things has been noticed in the previous ones.

On February 24th and 25th, 2005 a qualitative test was performed on 17 children at McDonalds in Lund. By not breaking ESOMARs guidelines on interviewing children and young people, only children that was accompanied by a parent or any other guardian was approached.

McDonalds was chosen since they are the only one in Sweden who is selling the TWA 200S. The package was launched for a new concept of Happy Meal, with greater freedom of choices and a larger selection of products.

### 4.2.1 Test procedure

*Children participating*

The children that were participating were chosen randomly. The ones that seemed to be in the right age group and where it was appropriate to interrupt their meal were chosen.

| Age | Boys | Girls | Total |
|------|------|-------|-------|
| 4-6 | 1 | 5 | 6 |
| 7-8 | 4 | 2 | 6 |
| 9-11 | 2 | 3 | 5 |
| | | | **17** |

**Table 4.1** Children participating

The children and their parents were asked at the tables in the restaurant if they were willing to participate in a test. If the children wanted to participate, they were asked to open the package while the test leader was observing the procedure and filling in a pre-printed formula.[74] When the package was opened the children was asked how they found the opening performance by pointing at figures illustrating happy and sad faces (see figure 4.1). It is not useful to use Likert scales that are numbered from one to five since children can't translate their feelings into numbers therefore is it better to use familiar figures.
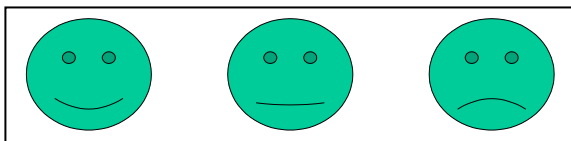


**Figure 4.1**

---

[74] See Appendix 1

### 4.2.2 Package data

The package features are presented in figure 4.2 and table 4.2.



**Figure 4.2**

| Straw type | U-straw, U-1805 |
|---|---|
| | Diameter: 5 mm |
| | Length: 180 mm |
| Straw hole diameter | Diameter: 6 mm |
| Packaging material | TWA 200S |
| Volume | 180 ml |

**Table 4.2**

### 4.2.3 Result

The result of the investigation has been divided into four areas since these areas are affecting the opening performance.

- Where on the package were the children holding their hand?
- Where on the straw were the children holding their hand?
- Where did the leakage come from?
- What the children thought about the opening performance?

*Where on the package were the children holding their hand?*

|                 | Boys | Girls | Total |
|-----------------|------|-------|-------|
| Upper position  | 3    | 5     | **8** |
| Middle position | 3    | 5     | **8** |
| Lower position  | 1    | 0     | **1** |

**Table 4.3**



Upper position

Middle position
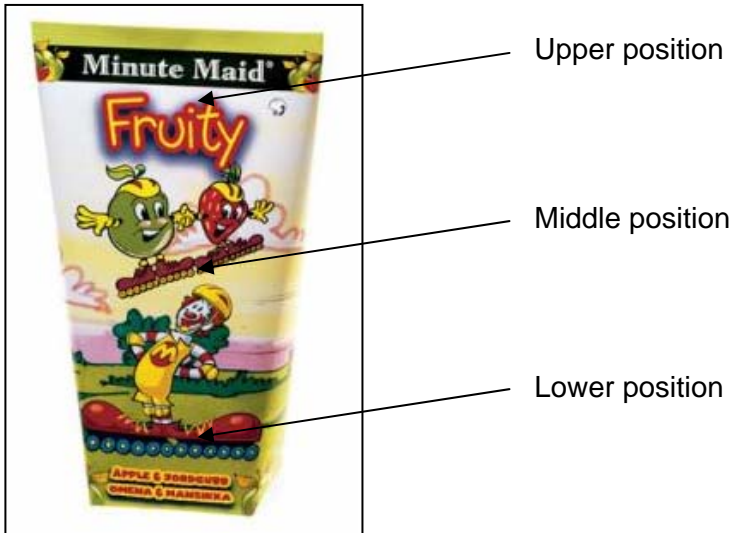
Lower position

**Figure 4.3**

All the children had the package standing on the table while they were opening it.

*Where on the straw were the children holding their hand?*

|                 | Boys | Girls | Total |
|-----------------|------|-------|-------|
| Low position    | 3    | 2     | **5** |
| Middle position | 2    | 6     | **8** |
| Upper position  | 2    | 2     | **4** |

**Table 4.4**



Upper position

Middle position

Low position
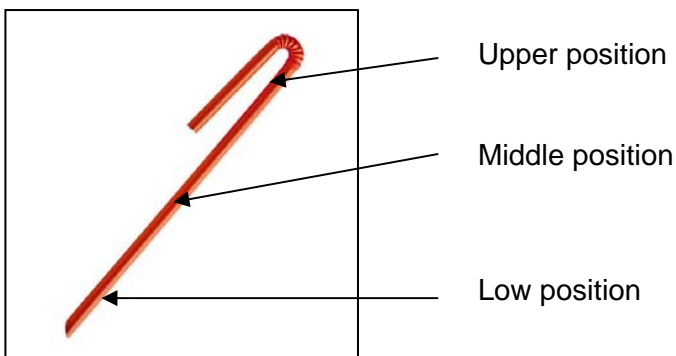
**Figure 4.4**

*Where did the leakage come from?*

There were 4 of 17 children who spilled while they were opening the package and the leakage came from the straw hole. The opening performance was different for all of the children so no conclusion could be made on why they were spilling.

*What the children thought about the opening performance*

Most of the children said that they found it easy to open the package but the impression was that it was harder than they admitted. One reason for this could be that they did not want to give a picture of that it was hard for them in front of the test leader and their family.
It was 2 of 17 who found it hard to open the package but based on the observation an estimation is that rather 8 of 17 found it difficult to open the package.

## 4.3 Usability test at LTH

The third step in this thesis was to perform a usability test. On March 16th to 24th 2005, 14 children in the age of 5-10 years old were asked to participate in a usability test at LTH. Invitations had been send to employees at either Tetra Pak or at IKDC since these parents should be more willingly to participant than others should because they had a personal interested in this work.

In the invitation[75] it was written that the test session should take approximately 30-45 minutes and that it was appreciated if the child brought something with them in order to make them feel better. Because, the usability lab has a quite sterile impression and to "open up" the children it is good if they have something that they like to play with so they feel comfortable.

---

[75] See appendix 1

The usability lab consists of two rooms that are separated by a mirror wall.


**Figure 4.6** Control room


**Figure 4.7** Test room

In the control room you can see and hear everything that is going on in the test room, you are also in charge of the cameras and which pictures that should be recorded. In the test room is the cameras arranged and a table is set for the participant and the test leader to be placed at.

The usability lab at LTH was set with two cameras and one microphone. The cameras had stored two different angles each, so it should be easier for the person in the control room to capture everything on tape.

### 4.3.1 Purpose

The purpose of the usability test is to get a deeper understanding of the problem and to establish the three most common problems that children have with the opening performance of the package.

### 4.3.2 Test procedure

The children and their family were welcomed in the lobby at IKDC and they were then escorted to the usability lab. Depending on the age of the child and how well they were performing, the test session looked little different. The plan was to start by having a little break with cookies and drinks and sit down and talk about what they had been doing that day, were they came from, if they had any siblings, what they had brought with them etc. When I thought they were ready to start with the test I asked them to choose a drink and open it while they were sitting at the table. The first children that were participating in the test only opened one package each but the further I got with the test I understood that several packages should be opened since sometimes the cameras couldn't get a clear view and that it also could be interested to see if they improve by opening several packages. The next step in the test session was to ask the child to stand up and open a package. Two of the children were not asked to stand up since they were barely able to open them when they were sitting at the table. During the session depending on their age and their ability to verbally express their thoughts, the child was asked if they found it easy or hard to open the package, what they found easy or hard etc. [76]

---

[76] See appendix 2

*Children participating*

| Age | Boys | Girls | Total |
|------|------|-------|-------|
| 5-6  | 4    | 1     | 5     |
| 7-8  | 4    | 1     | 5     |
| 9-10 | 3    | 1     | 4     |
|      |      |       | **14** |

**Table 4.5**

As mentioned in chapter 3 regarding the number of participants, you only need approximately 15 children to gather all the usability problems that exist in the product. It also mentioned that if you are going to use multiple groups of disparate users, you should at least use three users from each category if testing three or more groups of users.

In my research, I was interested to see if there are any differences between the different age groups and see if they have the same problems or if some problems are depending on their age. The idea was to have two boys and two girls in each group but the problem was that everyone had boys that were willing to participate. However, since the problem could be depending on their fine motor ability it does not matter that there not is as many girls as planned since they are generally better at that in the early ages.

### 4.3.3 Package data

The packages that were used in test were ordered from Mexico and contained 10 different flavours. The package features are presented in table 4.6.



**Figure 4.8**

| Straw type | U-straw, U-1805 |
|------------|-----------------|
|            | Diameter: 5 mm  |
|            | Length: 180 mm  |
| **Straw hole diameter** | Diameter: 6 mm |
| **Packaging material** | TWA 200S |
| **Volume** | 200 ml |
| **Paper board** | 30 mN MeadWestVaco |
| **Inside coating** | /j (6+24) |
| **Factory** | Quaretaro |

**Table 4.6**

### 4.3.4 Result

The result of the investigation has been divided into three areas
- Where on the package were the children holding their hand?
- Where on the straw were the children holding their hand?
- Where did the leakage come from?

*The number of packages that was opened by the test participants.*

| 5-6 years old | Sitting | Standing | Total |
|---|---|---|---|
| Girl A | 8 | | **8** |
| Boy A | 3 | | **3** |
| Boy B | 4 | 1 | **5** |
| Boy C | 3 | 1 | **4** |
| Boy D | 3 | 3 | **6** |
| | | | |
| Total | **21** | **5** | **26** |

| 7-8 years old | Sitting | Standing | Total |
|---|---|---|---|
| Girl A | 3 | 3 | **6** |
| Boy A | 4 | 3 | **7** |
| Boy B | 4 | 2 | **6** |
| Boy C | 3 | 1 | **4** |
| Boy D | 1 | 1 | **2** |
| | | | |
| Total | **15** | **10** | **25** |

| 9-10 years old | Sitting | Standing | Total |
|---|---|---|---|
| Girl A | 2 | 1 | **3** |
| Boy A | 2 | 1 | **3** |
| Boy B | 4 | 3 | **7** |
| Boy C | 1 | 1 | **2** |
| | | | |
| | | | |
| Total | **9** | **6** | **15** |

**Table 4.7 a, b, c**

*Where on the package were the children holding their hand?*

Table 4.8 a, b, c shows the most important values that were captured from the research.

| | 5-6 years old | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | Sitting at the table | | | | Standing | | | |
| | Boys | Girls | Total | | Boys | Girls | Total | |
| Upper position | 13 | 7 | **20** | 95 % | 3 | | **3** | 60 % |
| Middle position | | 1 | **1** | | 2 | | **2** | |
| Lower position | | | | | | | | |

| | 7-8 years old | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | Sitting at the table | | | | Standing | | | |
| | Boys | Girls | Total | | Boys | Girls | Total | |
| Upper position | 11 | 3 | **14** | 93 % | 4 | 2 | **6** | 60 % |
| Middle position | 1 | | **1** | | 2 | 1 | **3** | |
| Lower position | | | | | 1 | | **1** | |

| | 9-10 years old | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | Sitting at the table | | | | Standing | | | |
| | Boys | Girls | Total | | Boys | Girls | Total | |
| Upper position | 6 | 2 | **8** | 89 % | 1 | 1 | **2** | 33 % |
| Middle position | 1 | | **1** | | 3 | | **3** | |
| Lower position | | | | | 1 | | **1** | |

**Table 4.8 a, b, c**

Table 4.8 clearly shows that the most common way of holding the package is at its upper part.



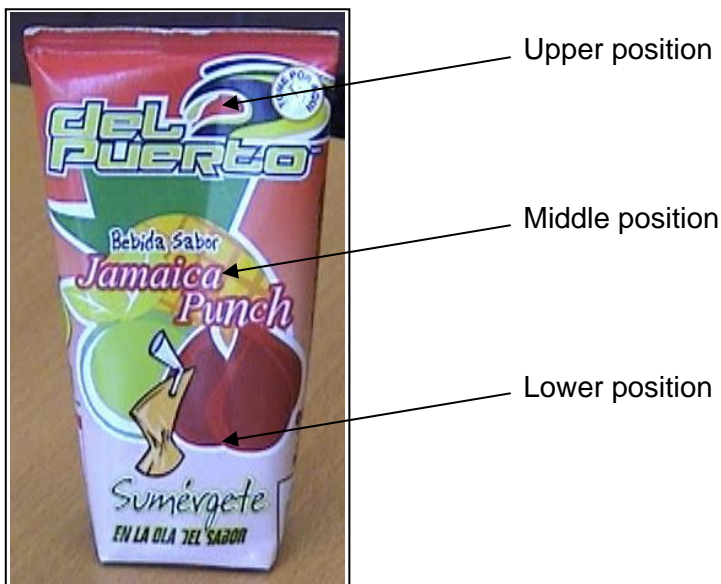Upper position

Middle position

Lower position

**Figure 4.9**

43

*Where on the straw were the children holding their hand?*

Table 4.9 a, b, c shows the most important values that were captured from the research.

| | 5-6 years old | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | Sitting at the table | | | | Standing | | | |
| | Boys | Girls | Total | | Boys | Girls | Total | |
| Upper position | | 1 | **1** | | | | | |
| Middle position | 6 | 4 | **10** | 48 % | 2 | | **2** | 40 % |
| Lower position | 7 | 3 | **10** | 48 % | 3 | | **3** | 60 % |

| | 7-8 years old | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | Sitting at the table | | | | Standing | | | |
| | Boys | Girls | Total | | Boys | Girls | Total | |
| Upper position | | | | | | | | |
| Middle position | 4 | 2 | **6** | 40 % | 1 | 3 | **4** | 40 % |
| Lower position | 7 | 1 | **8** | 53 % | 6 | | **6** | 60 % |
| Unable to see | 1 | | **1** | | | | | |

| | 9-10 years old | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | Sitting at the table | | | | Standing | | | |
| | Boys | Girls | Total | | Boys | Girls | Total | |
| Upper position | | | | | | | | |
| Middle position | 3 | 1 | **4** | 44 % | | | | |
| Lower position | 4 | 1 | **5** | 56 % | 5 | 1 | **6** | 100 % |

**Table 4.9 a, b, c**

In table 4.9, you can see that the position that the children are holding their hand on the straw is equally distributed between the middle and the lower position.
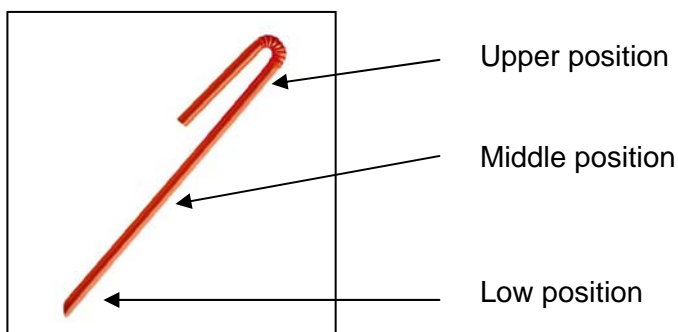


Upper position

Middle position

Low position

**Figure 4.10**

*Where did the leakage come from?*

Table 4.10 a, b, c shows the most important values that were captured from the research.

| | 5-6 years old | | | |
| --- | --- | --- | --- | --- |
| | Sitting at the table | | Standing | |
| | Total | Leakage | Total | Leakage |
| Straw hole | **8** | | **3** | |
| Straw | **4** | **81 %** | | **80 %** |
| Straw and straw hole | **5** | | **1** | |
| No leakage | **4** | | **1** | |

| | 7-8 years old | | | |
| --- | --- | --- | --- | --- |
| | Sitting at the table | | Standing | |
| | Total | Leakage | Total | Leakage |
| Straw hole | **5** | | **2** | |
| Straw | **1** | **40 %** | **2** | **60 %** |
| Straw and straw hole | | | **2** | |
| No leakage | **9** | | **4** | |

| | 9-10 years old | | | |
| --- | --- | --- | --- | --- |
| | Sitting at the table | | Standing | |
| | Total | Leakage | Total | Leakage |
| Straw hole | **2** | | **3** | |
| Straw | **2** | **55 %** | | **67 %** |
| Straw and straw hole | **1** | | **1** | |
| No leakage | **4** | | **2** | |

**Table 4.10 a, b, c**

In table 4.10, you can see the total amount of packages that were leaking during the opening performance.

# 5  Analysis

*The content of this chapter is the analysis from the pre-study at McDonalds and from the usability test at LTH.*

## 5.1  The pre-study at McDonalds

The feeling that I got from observing the children at McDonalds is that the problem that they have with the package is during the perforation phase. It seems like they cannot get through the PPH and will need to coax with the straw before it is in place. The packages do not leak but it takes some time before the straw is in place. The absent of leaking could be due to that the package only contains 180 ml therefore should packages containing 200 ml also be tested since they are on the primary market. It could be that children who are opening an under filled package finds it easier than if the package is filled to the top.

It was quite hard to follow the procedure since it only takes a couple of seconds to perforate the package. To get a clearer understanding a videotaped test should be performed. In this test, the focus should be on the straw hole and how the children are holding the package and the straw.

## 5.2  The Usability test

The overall felling that I got from the test session in the usability lab is that the children are having many problems with the opening performance even if they say that they find it easy. It seems as if the children do not see any problems with the package; they think it is a nice package with a lot of colours and cool graphic's. As long as they have something left to drink, they are happy. Just as one boy said after his package had leaked, "It doesn't matter that it was leaking, there is still a lot of juice left in the package and the juice that came on the table will I wipe afterwards."

Table 4.8 showed the results from where the children were holding their hand on the package and in this table, you could see that the most common way of holding the package was at its upper part. The reason of this is that when the child holds the package at its upper part the pressure on the package is decreased and this in turn means that the leakage is reduced. Another reason is that the child gets a more stable package if they hold it at its upper part since the package will not bend backwards when they try to perforate the PPH.

Table 4.9 showed the results from where the children were holding their hand on the straw and in this table, you could read that it was equally distributed between the middle and the lower position of the straw. The reason of this is that the straw is weak and to compensate this, the child needs to hold on the lower part of the straw otherwise is it bending.

Table 4.10 showed the result from were the packages were leaking. Based on this table and my observation I could not observe any significant problem that just occurred in one of the age groups. All of the children, no matter what age group they where in, all had the same problems with the package, it was leaking from the straw hole and from the straw. I also could not see any difference between the girls opening performance regarding to the boys.

The only difference that is noticeable is that the younger children do not seem to understand how they should prevent the package from leaking. They do not seem to learn from their previous problems, they had the same problem with the next package they were opening. While the older ones seemed to figure out what was the problem and tried to prevent it on the next package that they were opening. For example, one boy who's package was leaking through the straw since he had not straighten the straw. On the next package, he started by straighten the straw.

I have discovered during the analysis of the video material different steps that the children must make before they have opened the package.

1. Find the package.
2. Find the straw.
3. Remove the straw from the package.
4. Take the straw out of the plastic.
5. Find a place to throw the plastic away on.
6. Hold the package.
7. Find the PPH.
8. Find the right way to insert the straw on.
9. Penetrate the package.

From the video material, you could see that the children do not have problems with step 1-8, the problem starts at step 9.

### 5.2.1 How the leakage occurs

There are two ways that a package could be leaking on, from the straw hole and from the straw.

The leakage from the straw hole often occurs when the point of the straw is pressed against the edge of the straw hole (see figure 5.1). The straw has perforated the foil and small holes have occurred, but when the straw is pressed at the edge the contents of the package is pouring out. No matter how hard the child is trying to push the straw it does not come into the package.

**Figure 5.1** Straw tip pressed against the edge of the straw hole

The leakage from the straw occurs in two different ways. The first way often happens when the straw is in place but the children have forgotten to straighten the corrugated U-bend, see siphon effect chapter 3.4.4. They push either slightly on the packages or on the straw and the contents start pouring (see figure 5.2).



**Figure 5.2** Leakage from the straw

The second way that leakage from the straw occurs is when the children have been drinking from the package and they then put it down. There then appear small drops of the contents in the straw that then start dripping on the table.
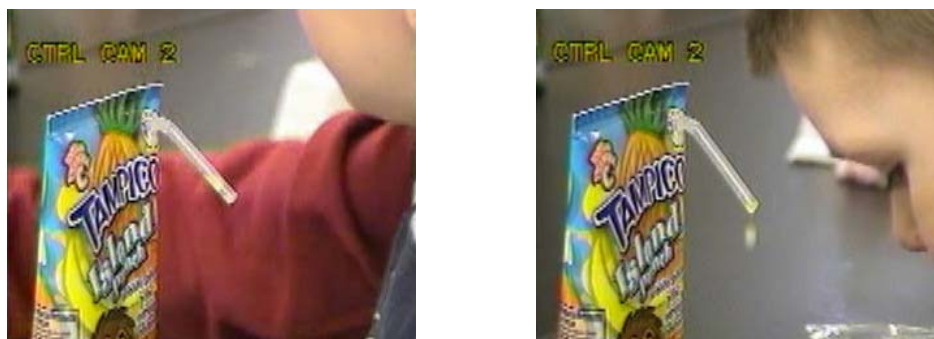



**Figure 5.3** Drops that has appeared in the straw

49

### 5.2.2 Reasons of leakage

To get a clearer understanding of the reasons why the packages are leaking when children are opening them a meeting with Erik Sebelius at Tetra Pak R&D was arranged.

The reason why the packages are leaking from the straw hole is depending on the straws. The problem with the straws is that they are very weak and easily bends. The weakness also affects the opening performance; with a stiffer straw, the opening performance will be better and it will be easier to penetrate through the PPH.

The reason why the content is pouring out from the straw is due to the siphon effect. When the children slightly squeeze on the package, they press the volume of the content up in the straw and when a U-straw is being used, the siphon effect occurs. As mentioned in chapter three the fluid strive to flow until all of it is at the same level. In a package, this phenomenon will continue until the fluid level of the package is the same level as the mouthpiece of the straw (see figure 5.4).
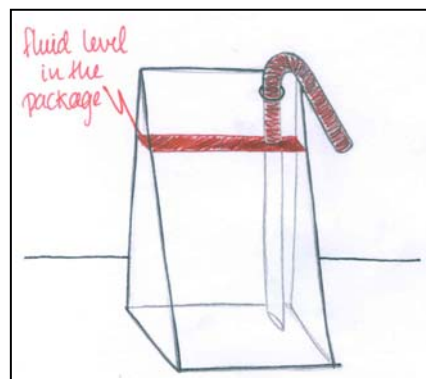


**Figure 5.4**

The reason why it appears small drops in the straw is because of the corrugation in the U-bend. When the children has been drinking from the package and puts it down on the table some of the contents gets caught in corrugation and starts to drop out of the straw.

# 6  Conclusion

*This chapter contains the author's conclusions that are based on the video material and discussions with experienced people.*

After analysing the video material, I have discovered that the three most common problems that children are having with the opening performance are:
- It is hard to penetrate through the pre-punched hole.
- It is leaking from the straw hole when they try to penetrate the straw into the package.
- It is leaking from the straw. It either pours or drops from the straw.

To confirm my conclusion a meeting with John Morgan, Commercial Director of Tetra Pak Straw Business was arranged. He told me that they have started a project called, *The next generation of straws,* where they are evaluation today's straws and makes research on how tomorrow's straws will look like. They have in this project asked the consumers what they most of all would like with the straws and the top answers are that it should not be leaking from the straw hole or from the straw.

# 7  Recommendation of future investigation

*In this chapter, the author presents her own suggestions and recommendations to the company.*

From the result you can read that the dominant way of which the children are holding the package is at its upper part, which is the way the TWA is suppose to be held at. The children are also holding the straw at the right way, either at the lower or at the middle position. The conclusion that I get from this is that even if the children are doing everything right, they are having major problems with the leakage, which not is due to them. The problems lie within the package or the straw.
I therefore have two recommendations for future investigation:
- Make an investigation regarding a new straw solution,
- Make an investigation if it is possible to change the under filling volume.

## 7.1.1  New straw solution

To make the penetration of the package easier a stiffer straw is needed. To receive a straw that is stiffer, a straw with a smaller diameter or a straw that is modified at the point of the straw could be used.

To eliminate the drops that appear in the straw another type of straw will have to be examined. There exists a straw called Thai-straw, which is a straight straw with a smaller diameter than the other ones are having. Since this straw will be stiffer, the problems with the leakage from the straw hole and the dripping from the straw will hopefully be eliminated if this straw is evaluated.

To eliminate the siphon effect that occurs in the U-straw a straight straw will need to be used.

To prevent the content from coming up in the straw, a straw with a bigger volume should be examined. A straw with a bigger cross section area or a straw that is longer could do this.

Today there are two different straws that are recommended for the TWA 200S package, the Telescopic straw and the U-straw.
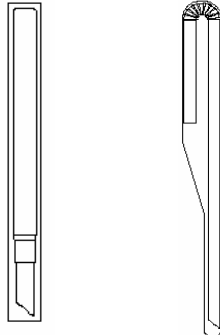


**Figure 7.1** Telescopic straw and U-straw

When a drinking straw is chosen for a package, the decision depends on the viscosity of the product and the shape and the size of the package. When consumers are children, the width of the straw can be thinner when it comes to low viscous products than it is for packages that are turned towards adults. Tetra Pak has made some general policies for their straws: [77]

180-284 ml packages > 4 mm straws
300 ml packages > 4 or 5 mm straws
500-568 ml packages > 5 mm straws

All of these demands need to be taking into consideration and it clearly shows that it could be a hard task to get one straw that fulfil them all. What I recommend Tetra Pak to do is to take contact with Tetra Pak Straw business, explain their problem, and see if they can develop a straw that will fulfil the demands that is set on the straw. If this is not possible, I recommend concentrating on the penetration task since its here that all of the children were having their problems.

### 7.1.2 Under filling volume

As mentioned in chapter five the siphon effect occurs when the children are opening the package with a U-straw.

My suggestion is to make experiments with the under filling volume, if the fluid level already at the beginning is lower, the siphon effect will be reduced.

A lower fluid level will also reduce the content from coming up in the straw. If this is done, the risk of spilling is decreased.

### 7.1.3 Reduce the number of steps

Today there exist nine steps before the package is opened. By reducing the step, Tetra Pak will receive happier consumers since they are eliminating sources of irritation.

---

[77]   Information gathered from Tetra Pak's internal homepage

# References

**Published material**

**Books**

Andersen, Ib. *Den uppenbara verkligheten, Val av samhällsvetenskaplig metod.* Lund. Studentlitteratur. 1998

Andersen, Poul Erner / Risum, Jørgen. *Livsmedelsteknologi 1.* Lund. Studentlitteratur. 1991

Armstrong, Gary. / Kotler, Philip. *Marketing an introduction, sixth edition.* Pearson Education, Inc. Upper Saddler River, New Jersey, USA. 2003

Bell, Judith. *Introduktion till Forskningsmetodik.* Third edition, Lund. Studentlitteratur. 2000

Holme, Idar M. / Solvang, Bernt K. *Forskningsmetodik, Om kvalitativa och kvantitativa metoder.* Second edition, Lund. Studentlitteratur. 1997

Jordan, Patric W. *An introduction to usability.* London. Taylor & Francis Ltd. 1998

Lekvall, Per. / Wahlbin, Clas. *Information för marknadsföringsbeslut.* Fourth edition, Göteborg. IHM Publishing. 2001

Olsson, Jan / Skärvad, Per-Hugo. *Företagsekonomi 99.* Liber AB. 2000

Rubin, Jeffery. *Handbook of usability testing, how to plan, design and conduct effective tests.* John Wiley & Sons, Inc. 1994

Thorén, Anders. / Vinberg, Björn. *Pocket book of Packaging.* Sörmlands Grafiska AB. 2000

**Articles**

Markopoulos, Panos. & Bekker, Mathilde. (2003): On the assessment of usability testing methods for children. *Interacting with computers*, 15, pg. 227-243

Sensback, Paul R. (2000): Don't kid around with kid packaging. *Marketing News,* Nov 20, pg. 14

Singh, Sonoo. (2001): Fast food, spreading rapidly. *Marketing Week*, Dec 06, pg. 38-39

Singh, Sonoo / Broome, Neil (2001): No stopping to eat or drink. *Marketing Week*, Jul 5, pg. 38

Wichansky, Anna M. (2000): Usability testing in 2000 and beyond. *Ergonomics*, July, pg. 998-1007

**Encyclopaedia**

*Nationalencyklopedin.* Bra Böcker AB. Höganäs. 1990

**Electronic sources**

www.ergolabs.com (050404)
www.esomar.nl (050207)
www.icc.se (050207)
www.tetrapak.com (050517)
www.unfpa.org (050309)
www.useit.com (050411)
www.quickmba.com (050519)
www.sticky-marketing.net (050523)
www.usabilitypartners.se (050523)
www.pump-flo.com (050524)
www.physicscentral.com (050524)

**Verbal sources**

Luis Buendia, Manager Commercialization Emerging, Tetra Pak Carton Ambient AB, 2005-03-14

Erik Sebelius, Senior Market Analyst, Tetra Pak R&D, 2005-04-22

Christoffer Norberg, University Lector, Division of Heat Transfer, LTH, 2005-05-16

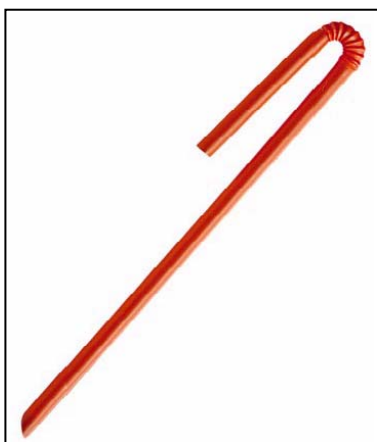John Morgan, Commercial Director, Tetra Pak Straw Business, 2005-05-19

# Appendix 1

**Pre-printed formula**

## Person data

| Ålder | |
|-------|--|
| Kön | |

### Var på sugröret

| Hur hålls sugröret? | | |
|---------------------|--|--|
| Med "pengreppet" | | |
| | Antal fingrar? | |
| | Vilka fingrar? | |
| Med hela handen | | |
| Med fingrarna | | |
| | Antal fingrar? | |
| | Vilka fingrar? | |

| Hur viks sugröret? | |
|--------------------|--|
| Inte alls | |
| 90º | |
| 180º | |
| Annat | |

### Var på förpackning

| Hur öppnas förpackningen? | |
|---------------------------|--|
| Stående på bordet | |
| I handen | |

| Hur hålls förpackningen? | | |
|--------------------------|--|--|
| Med hela handen? | | |
| Med fingrarna? | | |
| | Hur många? | |
| | Vilka? | |

## *Läckage*

| Från sugrörshålet | |
|---|---|
| Vid öppningsförfarandet | |
| Vid drickandet | |
| Annat | |

| Från sugröret | |
|---|---|
| Vid öppningsförfarandet | |
| När förpackningen lyfts upp | |
| När förpackningen ställs ner | |
| Annat | |

## *Frågor*

Har du druckit Fruity Juice förut?
Ja_____                    Nej_____

Hur ofta brukar du dricka Fruity Juice?

| Varje dag | | Flera gånger i veckan | |
|---|---|---|---|
| En gång i veckan | | Flera gånger i månaden | |
| En gång i månaden | | Sällan | |

Hur tyckte du att drickan var att öppna?

Tror du att du kan beskriva vad det var som fick dig att känna så vid öppnandet av drickan?

# Appendix 2

## Invitation to the parents

Hello,

My name is Sofia Henstrand and I am doing my Master Thesis at SBS Emerging. My Master Thesis is a part of the project *Opening performance on TWA 200S* and I am having Hanna Mårtensson as my supervisor.

One part of my thesis is to perform a qualitative research on children in the age of 5-9 years old in order to examine how they open and handle a TWA 200S package. The research will take place at the Institute of Technology in Lund in a usability lab were the children will be videotaped. This because it is easier to interpret and analyse the information you get.

It is here were You comes into the picture, I will need children that are born in the years 1996, 1998 and 2000. Tomas Sällström and Hanna Mårtensson thought that You could have children in that age that I'm looking for and that You and your child maybe is interested to take part of this test.

The test will take part in the weeks 11 and 12 and You decide yourself which day and time that will suit You and your child best.

If You are interested and You think that your child will take part of this test please contact me on the phone 046- 36 38 98 or at my e-mail sofia.henstrand@tetrapak.com

If You know any other children in the age that I'm looking for or if You have any questions don't hesitate to contact me, either on the phone or on the e-mail.

Yours sincerely, Sofia Henstrand

# Appendix 3

**Discussion Guide**

Name, were they live, which school/kindergarten they go to etc.
What they have brought with them?
Coffee break; ask if they have open a package like this before
Make some drawings, Easter cards, their family etc.
Test procedure;     Open a package while they are sitting at the table
                    Open a package while they are standing in the room

Question after the test.
How did you find the packages, was it easy to open them (show the picture of
the happy/sad faces)?
Can you describe what was easy/hard with the opening performance? Why
did you find it easy/hard?
If you compare when you were sitting versus standing which was the easiest?
Why was it easiest?

Try to gather the children's spontaneously comments about the package.