Chapter 7

Help or Hindrance: The Use of Tools for Opening Packaging

A. Yoxall, J. Langley, J. Luxmoore, R. Janson, J.C. Taylor and J. Rowson

7.1 Introduction

Packaging has to maintain several key functions: preserve and protect the product, make the product appeal to the consumer and not least allow access by the consumer to the contents. Ease of access or ‘openability’ is becoming a more serious issue for packaging designers, manufacturers and engineers because of the way in which society is changing with huge increases in the proportion of older people. Ageing brings with it many issues, such as loss of strength and dexterity, which can have a major effect on the way in which people interact with everyday items such as packaging. In this paper, the authors undertake an assessment of some of the common tools that have been designed to aid older people in opening common packaging items. The study indicates that whilst some tools are effective, most offer little or no benefit due to the tools themselves not overcoming issues such as loss of dexterity and strength.

Many everyday situations, whether opening a door, boarding a bus or a train, using a phone or getting money from a cash machine can be a difficult task for the older people or people with disabilities. Another everyday item, packaging, whether for food, medicines or other products, has also been found to cause difficulties in terms of accessibility for the older or disabled consumer. A survey of 2,000 people over the age of 50 by Yours Magazine (McConnell, 2004) found that 91% of respondents had had to ask for help in opening a package whilst 71% of respondents had injured themselves trying to open packaging. Opening packaging is, therefore, a huge problem for the older people and those with disabilities. The problem is compounded by the fact that the number of ‘older’ people in the UK is steadily increasing. By the year 2020, half of the adult population is predicted to be over the age of 50 (National Statistics Office, 2006).

The Yours Magazine survey stated that three out of five people over the age of 50 have purchased tools to help them open packaging. Tools to aid the opening of
jars were the second most popular packaging opening aid. However, somewhat alarmingly, a large number of respondents still resorted to using \textit{pliers, scissors, rubber gloves, knives or other tools to try and prise open products}. Clearly, the use of such implements has the potential to cause serious accidents, especially in the hands of the weakest and least dextrous in society.

\section*{7.2 Previous Work}

There is a huge potential market for jar opening tools to help older people in particular to access safely the jars they buy. There are several jar opening products on the market but an analysis of their effectiveness has never before been undertaken. There have been several previous studies looking at the hand grip strength of consumers. These studies generally employ the use of grip dynamometers (such as the work by Giampaoli \textit{et al.}, 1999), which measures the grip force that a subject can apply across two parallel bars in the palm of the hand. Other such studies use pinch gauges, again measuring strengths not directly related to opening jars or bottles (Mathiowetz \textit{et al.}, 1985). As demonstrated by Crawford \textit{et al.} (2002) and Yoxall \textit{et al.} (2006), strength measurements are very dependent on the geometry of the test. This test data is therefore of little use in an analysis of packaging openability, as the forces recorded will not be the same as those the users apply when opening containers. There have also been several previous studies looking at the forces users can apply to jars, such as those by Imrhan and Loo (1988), Rohles \textit{et al.} (1983) and Voorbij and Steenbekkers (2002). These reports used devices designed to measure the force a user can apply to a jar lid. However, the tests were not fully representative of the real opening situation. Both Imrhan and Rohles fixed the lid to a table rather than allowing the tester to be held in the hand in the same way in which packaging is actually opened. Voorbij and Steenbekkers’ tester could be freely held but altered the materials used from those found in packaging altering the friction characteristics and hence the torque measured. This was highlighted in work by Yoxall and Janson (2008), in which torque measurements were taken using a measuring device manufactured from actual items of packaging. Crawford \textit{et al.} (2002) investigated the way in which lid size and shape affected openability, and discovered that the diameter of a lid affects the torque a user can apply. They also found users could apply more torque to square lids than round lids. None of this previous work involved any tool or other aid to alter the applied torque, and all the subjects used only their bare hands.

This study is not concerned with the actual strength of specific individuals or the average strength of a population as considered in much of the work listed above. Instead, the work is aimed at finding out whether or not using a tool is likely to improve a user’s chance of opening a package. The forces that an individual can generate are not considered, only the ratio between the opening forces they can apply just using their hands and the forces using a range of opening tools. This normalised torque reading can therefore be used to rate the tools in terms of the actual increase they are likely to make, regardless of the strength or ability of the subject.