



Age and active life of clothing

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Keywords: Clothing life span; longevity; product lifetime; active use.

Abstract: The purpose of this paper is to provide data on clothing concerning life span and length of active use period, as very little information is available. The article is based on a study of 620 clothing items that 16 households (35 people) disposed of during six months. A wardrobe study method was used, which included clothing registrations and in-depth interviews based on the selected pieces of clothing. The informants reported on the disposal reason for each item, how much it had been used, and how long they had owned it.

The clothes that went out of use had an average total life span of 5.4 years and had been with the current owner for the past four years. This suggests that many of the clothes had been inherited or purchased used. Total life spans ranged from brand new to about 50-year-old garments. Clothes for children and teenagers had shorter average life spans, while adults above the age of 51 disposed of clothing 4.6 years older than the average.

Our results indicate that the total life spans were longer than most previous research has estimated. However, many of the items had been used very little: 8% had never been used by anyone, and every fifth garment was either never used or had been used only a couple of times by the current owner. More research is needed, especially concerning the active use period, such as number of use times and differences between various consumer groups.

Introduction

Very little information is available of actual life span and use per unit of clothing. The purpose of this paper is to provide more realistic data for clothing LCA studies concerning the estimated longevity (age) and the period of active use. To be able to do provide this data, it is also necessary to discuss the relationship between life span and use, and to discuss the methods we have available for uncovering relevant information on these matters. Based on an overview of previous studies, the paper shows the uncertainties inherent in existing knowledge. This knowledge gap could potentially be filled through a quantitative analysis of data on wardrobes and clothing disposal. The data is valid for a Norwegian context, but literature on available data from other countries is also discussed.

Background

Textile and clothing industry combines high speed and low-cost production with high

volume consumption, which causes significant environmental impacts (Fletcher, 2008; Fletcher & Grose, 2012). From an environmental point of view, prolonging product life span can have several advantages (Cooper, 2010). A short life span increases the need for products to be replaced faster, hence increasing the environmental impact from the production, transportation and disposal phases.

The length of life span and intensity of use of clothes varies widely. The oldest existing Norwegian garment is 1700 years old (Guhnfeldt, 2011), and we have clothing in use today that is over 100 years old (Lilleby, 2014), while some clothes are only used once or not used at all (Laitala & Boks, 2012). A garment can be used by multiple users who take turns, for example through sharing or renting, or by multiple users who own the garment in a sequential order, for example through inheritance or so-called second-hand purchases (Klepp & Laitala, Unpublished).

Clothing's life span is dependent on both the technical and social robustness, and the flexibility of the apparel. The relationship between the length of life span and number of use times is complex. Owning a large number of clothes increases the chance that a given garment is used rarely, and thus many years may pass before such items are worn out. Measuring life alone will therefore not offer information about resource efficiency unless the number of uses per item is taken into account.

Very little information is available on actual life span and use per item of clothing. For example, two separate studies estimate life span of clothing items as varying from ten up to 104 uses (Birtwistle and Moore 2007; Collins and Aumônier 2002). Beton et al. (2014) have estimated that all garments have a life span of 1-3 years, but they refer only to their own and others' estimates that are not documented by research. A large survey based on respondents' own estimations found that the average active use of clothing is 3.3 years (Langley et al., 2013). A Dutch study estimated that the average lifespan of trousers was 6.2 years, skirts and dresses 15.2 years, sweaters 7.1 years, blouses 7.2 years, t-shirts 6.8 years, blazers 11.5 years and jackets 11.6 years (Uitdenbogerd, Brouwer, & Groot-Marcus, 1998, p. 127). The life span of a skirt was thus estimated to be twice as long as that of a pair of trousers. The calculation was based on the number of garments in 16 households and correlated with how much was purchased by the household. In her PhD study, Uitdenbogerd also asked survey respondents about how long they used two different garments before they were disposed of, and the result of cotton trousers was 2.45 years, for wool sweaters the average was 6.17 years (Uitdenbogerd, 2007, p. 281). The differences between the results of these studies are quite substantial. This confirms how uncertain indirect means of estimating garment life spans are. As we do not know enough about what contributes to clothing longevity, when such figures are used in LCA studies, the results will hardly be realistic.

Method

In order to obtain more reliable knowledge about the use phase, we have used a method that examines families' wardrobes and enables a comparison between the quantity of clothing, their technical condition and social life. The

article is based on studies of clothing that 16 households disposed of during a six month period. During the project period, the total of 620 garments were taken out of use and registered. The households consisted of 35 people totally and each participant stopped using on average 18 garments; however the figures varied from 0 to 71 items per person. A so-called *wardrobe study* method was used, which includes clothing registrations and in-depth interviews based on the selected pieces of clothing.

Households were selected strategically, the goal being to interview people in different life situations. They were placed in three main groups: 1) young adults without children, 2) parents of small children and 3) retired or soon to be retired adults.

The informants reported the disposal reason for each item, how much it had been used and how long they had owned the item. Clothes were evaluated afterwards in a textile laboratory, and their condition was registered in detail including whether the garment had holes or rifts, stains, pilling and how worn it looked. In addition all other available information was registered, such as colour, brand, and all data given on the apparel labels. The goal was to compile comprehensive information on clothing practices including all the stages of consumption from acquisition, use, care, to disposal. This paper presents the results that are relevant for LCA studies related to length of life spans and active use.

Results

Information on clothing life spans is given in Figure 1. The clothes that went out of use had an average total life of 5.4 years, and had been with the current owner for the past four years. This shows that many of the clothes were inherited or purchased used. The total life span ranged from brand new to about 50 years.

Clothing that adult men disposed of, had on average a 1.5 years longer life span than women's clothing in the study. However, the difference was not significant to 95% level ($P=0.059$) due to the small sample size for men's clothing

Clothes for children and teenagers had the shortest life spans, while adults above the age of 51 disposed of 4.6 years older clothing than

the average. In Klepp's study, the mean lifespan of the clothes of 40-year-old women was 7 years (Klepp, 2001). In our data material, clothing for this group was used slightly shorter, namely 5.2 years. This may be

due to a growth in prosperity in the time-span between the two studies, but can also be due to differences in the sample, or other methodological aspects.

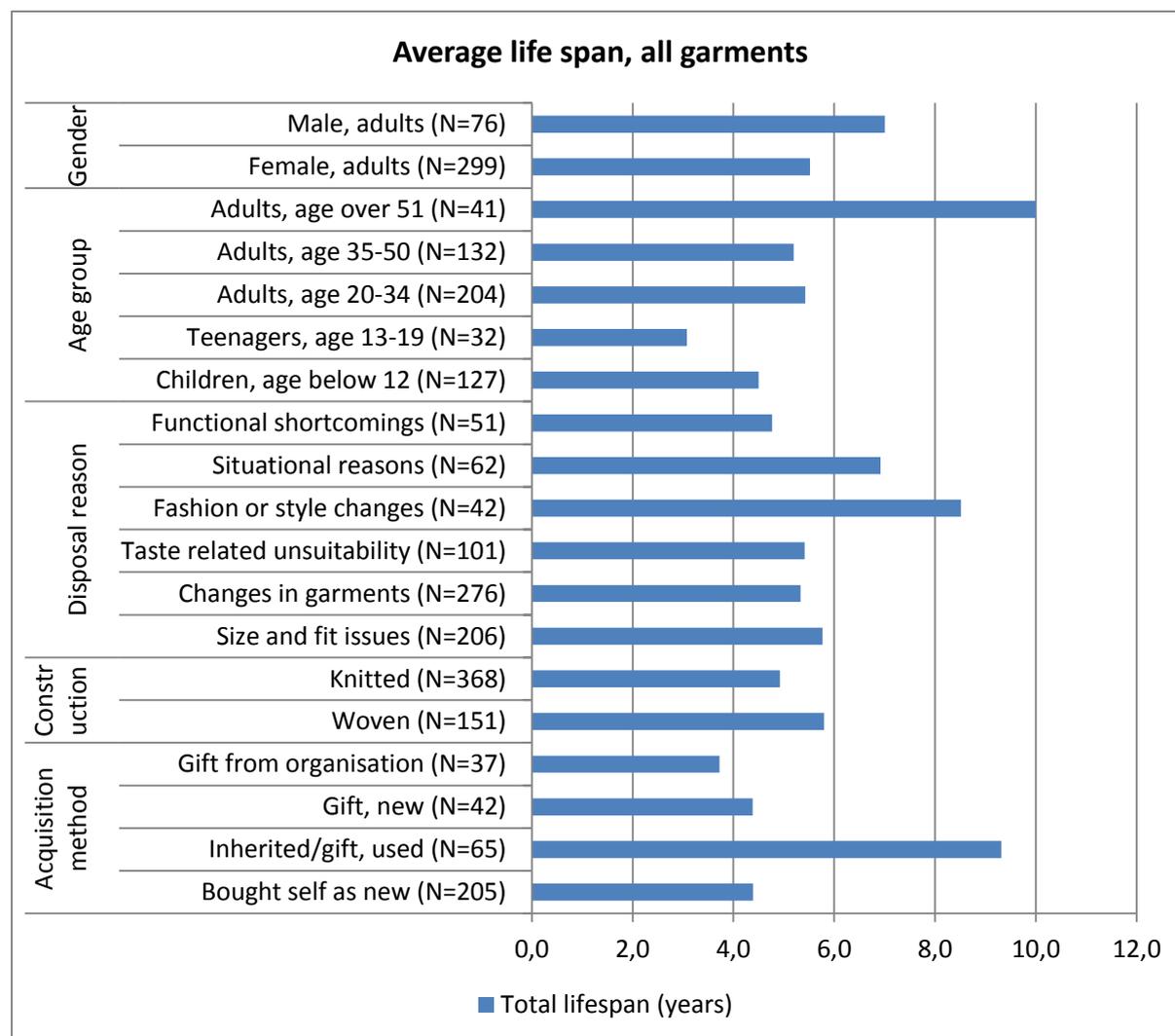


Figure 1. Average length of clothing life spans. N indicates the number of clothing items.

The life span of the clothes was almost identical regardless of whether the plan was to give or sell the garments for reuse, or to throw away the apparel. However, there was a difference in use time for the current owner related to disposal plan. The use time was 1.6 years shorter for the clothes that were to be given with an aim of prolonged use, than for those that were to be discarded. Therefore, these clothes had a potential for new use periods with new owners and thus longer total life span. The degree of wear was an

important criterion for what the owner planned to do with the clothing.

The clothes that owners reported were disposed of wholly or partially due to fashion changes, were on average 3 years older than average of all the disposed clothes. Clothing disposed of due to situational reasons were 1.6 years older than average. Clothing with functional defects, however, had been used for half a year shorter than average. Clothing with various changes in the material had an average life span, which is understandable

based on the large proportion of the clothes in this category. When comparing the different degrees of wear and tear, clothes that were described as worn out had a useful life of 4.2 years (one year below average), while those described as having a worn look had a life span of 7.3 years (two years above average). The clothing that was described as washed out had a long life span, 10.9 years, which is 5.5 years above average. If the clothes had been damaged by laundering, the average use time was reduced. Colour bleeding during washing reduced use life with 2.5 years, and shrinkage with 1.6 years. It is not clear how the informants have drawn a line between products that they described as having a worn look, being worn out, or being washed out, but it is likely that washed out products have been used and laundered often, and show signs such as thinning of material and colour fading. Clothes that were disposed of because of a change in living circumstances were 3 years older on average. Uncomfortable clothes were discarded faster, and their life span was a year shorter.

In Klepp's (2001) study the clothes that went out of use because of fashion, had the same life span as clothing that was disposed of because of wear (approximately 8 years), but the "out of fashion" clothes had been stored longer between the time of disposal and the last time they were used. In both the Klepp study and the present study, these "out of fashion" clothes remained equally long stored "at mercy", namely 2.8 years. It is not known if this storage time affected the degree to which fashion is used as an argument for disposal. It is conceivable that the clothes were to a lesser degree deemed as obsolete when they were last used, 2 to 3 years earlier, than at the time the owner described them as too outdated to be used. Other reasons for not using the garment might have been more important then.

As expected, different types of garments have different life spans. Many of the smaller items that were often described as "consumables" such as socks, stockings, and underwear, have shorter lifespans. This result was also found in the survey by Langley et al. 2013. Nightwear and outerwear had above average life spans. At first sight, the fabric structure seemed to contribute as well, as woven materials have slightly longer life spans than knitted. However, much of the clothing referred

to as consumables (socks, stockings and underwear) are made of knitted materials, and these types of garments in general have shorter lifespans than other types of garments. When these are excluded, the woven and knitted items have the same lifespan, 5.9 years.

Never used

Our results indicate that the total life spans were longer than the aforementioned estimates indicated in other studies. Many of the clothes had been used very little. 8% of the garments were never used, and in total every fifth garment was either never used or used only "a couple of times" by the current owner. This is consistent with findings in Klepp's study, where the corresponding figures were 9 and 19% of the clothes (2001). Most of the unused clothes were gifts or inherited clothing items from family and friends. In these cases the receiver had very little control over what she/he was given. In other cases, rarely used items consisted of clothing that was not tried on before purchase, or that was bought on sale. It is evident that the way clothes are acquired has an impact on whether they are likely to be used.

Many clothes had been lying unused in the wardrobe for years before they were disposed of. The average time lapse from last use time, was 1.4 years. It was common that children's clothing was disposed of sooner when the apparel no longer fit. On average, they were used for the last time seven months ago, while the average for clothing for adults, was 1.7 years. We have not taken into account that the clothes can have been stored a few months before our visit and registration. On the other hand, it may also be that some clothes were taken out of use because of the research project, and thus had shorter waiting time than average.

Conclusions

Our results indicate that the total length of clothing life spans were longer than most previous research has estimated. However, much of the clothing had been used very little. 8% of the garments were never used, and totally every fifth garment were either never used or used only a couple of times by the current owner. In addition, the active use period is much shorter than the total life span.

The average time lapse from last use time was 1.4 years.

Our data material is not large enough to draw firm final conclusions. However, some interesting findings were found. The way clothing is acquired has great influence on the length of life span. This should be drawn into future LCA calculations. For example, clothes that are given as business gifts are seldom used and have therefore a higher environmental impact than corresponding garments acquired by the users themselves.

More research is needed, especially concerning the active use period such as number of use times, and differences between various consumer groups.

Acknowledgments

We would like to thank Madeline Buck for her valuable contribution in clothing registrations. We want also to thank Norwegian Research Council and Orkla ASA for financial support on the project 'From textile waste to material resources in a grave to cradle perspective'.

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