

Article

Care and Production of Clothing in Norwegian Homes: Environmental Implications of Mending and Making Practices

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Abstract: Mending, re-design, and altering are alternatives for prolonging the use period of clothing. It is a common assumption that nobody mends clothing anymore in Western societies. This paper studies Norwegian consumers' clothing mending and making practices. We ask how common the different mending and making activities are, has this changed during the past several years, who are the clothing menders and makers, and further, are these practices related to consumers' environmental opinions? We build on three quantitative surveys in Norway from 2010, 2011, and 2017. Many consumers do mend their clothing at least occasionally, especially the simpler tasks, such as sewing on a button and fixing an unravelled seam. Women and the elderly are more active in making and mending, whereas the young are bit more likely to make something new out of old clothing. The mending activities were correlated with respondents' environmental opinions. Mending clothes is more common than is usually assumed. Knowledge of current practices and barriers for clothing mending enables us to recommend measures that can potentially increase the use time of clothing. These results can be beneficial in clothing design, home economics, and crafts education as well as understanding consumer behavior and making policies that aim at environmental improvements within clothing consumption.

Keywords: clothing maintenance; mending; repair; redesign; knitting; clothes making; sewing; remaking; sustainable fashion

1. Introduction

Mending, re-design, and altering are some of the alternatives users have for prolonging the use period of clothing that is damaged, does not fit, or is not used for aesthetical reasons [1,2]. From an environmental point of view, prolonging clothing lifetime has several advantages [3]. A short lifetime increases the need for products to be replaced faster, hence increasing the environmental load from the production, transportation, and disposal phases. Extending the average life of clothes by a third while reducing the need for new clothing would reduce the carbon, waste, and water footprints from the production stage by more than 20% [1] (p. 2). The interest in mending is increasing within research of sustainable clothing consumption [4,5]. However, in this literature as well as in current media discourse it is a common assumption that consumers do not mend clothing anymore in Western societies. This was even commented on by fashion icon Vivienne Westwood: "When I was a little girl you used to learn to sew all the holes in things, darning socks, but nobody mends clothes anymore ... People have never even used a needle—they don't know how." [6]. Gwilt studied what prevents people from repairing clothes and writes "within ... two or three generations the culture of repairing and altering clothes has largely disappeared" [7] (p. 332), but this claim of change has not been

documented. Similarly, Fisher et al. [4] (p. 64–65) report that in the U.K. “repairs to clothing are no longer undertaken as a normal, regular activity due to a lack of skills and equipment at home and the cost of professional repair and alterations services compared to the price of new clothes”. This statement is based on what consumers said in interviews, but does not document the actual change in activity level.

There is a sliding transition between repairing, remaking something new from old textiles, and making new things from new materials. These activities require a similar type of competence and the motivations for doing them can coincide, being somewhere between leisure and a chore [8]. Favorite clothing items are kept longer than those lacking emotional attachment, and individual tailoring and customization have several advantages for meeting the user’s preferences [9,10]. Therefore, we include also domestic textile production within the scope of our study in the form of sewing and knitting.

This paper discusses whether consumers actually no longer mend or make clothing. Our study is based on three surveys of Norwegian consumers’ clothing mending and making practices (home sewing and knitting), and we ask specifically:

- (1) How common are the different mending and making activities and have these changed during the past several years?
- (2) Who are the clothing menders and makers?
- (3) Are these practices related to consumers’ environmental opinions?

Knowledge in current practices and knowledge of possible barriers for domestic clothing care and production will enable us to recommend measures that can potentially increase the lifespan of clothing. These results can be beneficial in clothing design, home economics, and crafts education as well as understanding policies that aim at environmental improvements within clothing consumption.

2. Background

Garments that are no longer in use, can be given a new life either by changing their form (repair, alteration, or re-design) [10], changing the user (second-hand sales, hand-me-downs, borrowing, etc.) [11], or by changing the garment’s function, i.e., repurposing it to a new use area. One example of this is using worn-out garments as cabin wear or for gardening [12]. This article focuses on the first alternative. Garments may be re-sewn for different reasons, either to repair damage, or to alter their original appearance or fit. The former is defined by Sennett as static repair that restores an item to its previous state, while dynamic repair changes the item’s form or function [13]. Holroyd uses the term “mending” for static repair and “remaking” for dynamic repair [14]. In addition, our study includes sewing and knitting, which are techniques that can be used for either mending and altering existing textile items or making new textile items. These activities are here divided into three main categories, mending (static repair), altering (dynamic repair), and making (sewing/knitting).

There are several reasons for why textiles and clothing may require mending or altering. Textiles age through different mechanisms, such as mechanical stress, photochemical degradation, thermal degradation, physical structural changes, or chemical attack [15]. Natural ageing is usually a combination of several ageing mechanisms, and can cause holes, rifts, broken seams, loose buttons, and faded colors among many other issues. On knitted fabrics, holes can be darned, whereas on woven materials, patching techniques are more often used. Sewing threads can become worn or be badly sewn in the first place, causing a seam or a button to loosen. Seams fail also if they do not tolerate the strain/load they are exposed to. Some garments can fade, change colour, or obtain permanent stains due to use and laundering. These problems may be solved by re-dyeing the garment. Stains can be removed or hidden. These are just a few examples of activities that consumers can undertake [16].

Consumers may also alter garments’ original appearance for several reasons, such as problems with fit, the length of trousers, an unwanted colour, and a lack of personal characteristics, or if they have some unwanted decorations that the user may want to remove.

Klepp [17] has reviewed Norwegian mending advice literature (needlework books, periodicals, and women's magazines) from the 20th century. The results show that both the techniques and reasons for mending changed during this period. In the beginning of the century, the techniques were very specialised and time-consuming. Invisible mending was the goal. Later, the methods became far simpler and their potential to enable unique aesthetic expression became more important. There has also been a change in focus of textile making. Creativity has become an increasingly more important reason for home-sewing instead of the economic reasons that were more important earlier [17,18]. Today, clothing mending and home sewing are perceived to a larger degree as a hobby instead of housework. This is also valid in Finland, where Aalto has studied clothing maintenance habits. She shows that the amount of handicrafts and people making their own clothing has been reduced significantly in the past few decades. Today, handicrafts are a hobby and not an alternative for making utility objects to replace purchases from stores. An increased supply and selection of clothing has also diminished the need to make personal, affordably priced clothing [19].

On the other hand, participation in crafts seems to have grown in the U.K. during the past decade, as we see in the increasing market for craft activities in the form of festivals, workshops, and make-your-own kits developed by craft-makers [20–22]. Repair has gained political attention. Sweden has reduced the value-added tax on repair services from 25% to 12% in order to fight the throwaway culture [23], and such measures are also discussed in Norway.

Within research, there is increasing interest towards Do-It-Yourself (DIY) [24] as well as a better understanding of the connection between making, mending, and wearing [14]. In a Nordic context, the term "husflid" (craft) is a central concept, with historical, political, and aesthetic significance and importance for today's market and education. Nevertheless, there is a lack of knowledge of the scope of these activities. Very little research focuses on comparisons between different countries and the relationship between knowledge, attitude, and behavior in the field.

Norway is today one of the richest countries in Europe and at the same time a very typical example of a high-cost Western country dominated by imported fast fashion and high clothing consumption. The amount of clothing in circulation has increased greatly during the past decade and the yearly consumption is around 16.6 kg/capita, which is just slightly higher compared to the other Nordic countries that consume 13–16 kg/capita [25]. Norway used to be poor, for many years ruled by neighboring countries, located on the outskirts of Europe, with a harsh climate and a long coastline and a lot of mountains. The country has a strong folk culture and a vibrant textile tradition [26,27]. Knitting, wool, and homemaking are more connected to the Norwegian way of life than in countries such as Sweden and the U.K. [28–30].

Some studies on consumers' clothing repair and altering practices have been made. Klepp [12] studied 24 Norwegian women who were about 40 years old. All of them repaired some of their clothes, but they also got help from their mothers, mothers-in-law, and professionals. They mainly did small repairs, such as fixing unravelled seams and loose buttons.

This topic has also been studied in the U.K. Participants of focus group studies felt that skills in repair and alteration had gone down in general and that they repair less often than earlier [4,31]. The main reasons for this were a lack of equipment and skills, as well as the low cost of new clothing relative to the cost of professional repair. However, clothes that were expensive or valued in other ways were more likely to be repaired. They might undertake smaller mending tasks, such as sewing on buttons or fixing hems. Some also gave their clothes to parents or grandparents to be repaired. The authors suggest, among other things, policy measures that would improve the education system in order to include textile repair and maintenance skills and consider ways to encourage the supply of professional repair and alteration services [4,31].

A larger scale survey also executed in the U.K. showed that there is a need for garment mending. Fourteen percent of the respondents said that they had garments that they had not used during the past year because something had been broken, such as a zip, elastic, or a lost button, while 16% had garments that needed repair for some other reason [1]. Thirty percent of respondents said that they would be more likely to wear more of the clothes they have not worn in the past year if they had the skills to repair/alter more clothes at home, and 27% if they had the spare time available to repair or

alter their clothes. Access to a repair kit would help 19% of respondents, while access to a sewing machine would help 18% of the respondents. About 62% of respondents owned clothing that could be used if it was repaired. Only 18% of respondents said they were not capable of doing any clothing repair, such as sewing on a button. In addition, 38% were interested in learning more about how to repair clothes.

A Swedish study looked into differences between consumer groups. Focus group interviews indicated that the group of retired respondents did mend clothing more often than the other two interviewed groups, and sewing on buttons or repairing broken seams was most commonly done. They used a tailor for more complex repairs, such as broken zippers. Another focus group, fashion-interested youth, sometimes also repaired clothing, mainly jeans, whereas a group of parents of small children had less time to repair, and did not prioritize the task as much [32]. However, the study did not specify in more detail the situations of when people decide to mend or alter their clothing, which clothing is repaired, and when it is considered to be worth the trouble.

The most detailed data about Norwegian mending and knitting habits can be found in time use surveys. Statistics Norway carries out an extensive diary-based survey every tenth year [33]. In the diaries, the respondents fill in what main and secondary activities they do within 10-minute intervals during 2 consecutive days, but the survey continues through a whole year. The number of persons who participated in the study in 2010 was 3975. The sample is representative of the Norwegian population aged 16 to 79. Figure 1 shows the percentage of respondents that use time on the maintenance of clothing, shoes, and seams (excluding cleaning-related tasks, such as laundry and ironing) or on knitting during an average day of a year. Detailed results are given in Tables A1 and A2 in Appendix A. The results show that during the past 3 decades, the average time used has gone down for both of the activities. The average time used on maintenance has gone down from 3 to 0 min per day, and the percentage of people who carry out the activity during an average day decreased from 5% to 1%. Similarly, the average time used on knitting has gone down from 4 to 2 min per day, and the percentage of people who carry out the activity during an average day decreased from 7% to 3%. The results also show that women and the elderly age group are more active than men and the younger age group. However, the change in time consumption among those that participate in the two activities has developed in different directions. On the days that respondents mended clothing, the time used on mending had gone down, while those who knitted used more time in 2010 than in 1980.

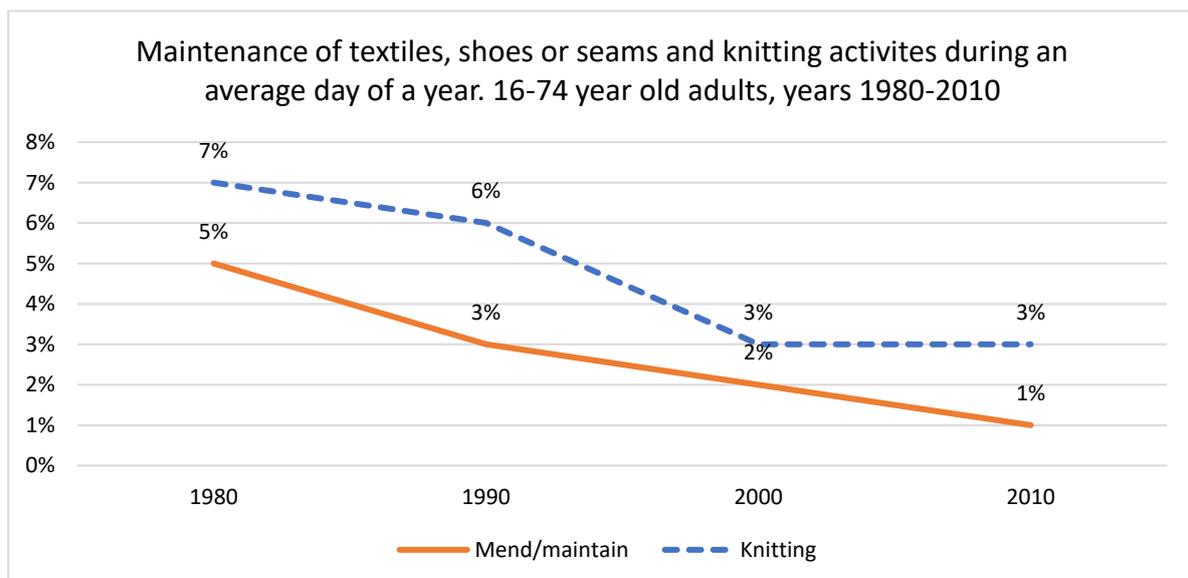


Figure 1. Percentage of Norwegians that knit or maintain (mend) textiles, shoes, or seams during an average day of a year. Ages 16–74 year old adults, years 1980–2010 [33].

These statistics show a clear decline in the number of participants, but they do not provide detailed information of who still makes and mends clothes, what clothes are made or mended, or why. The category it measures is wide and imprecise. Further, it does not provide information about what has happened after 2010.

This brief literature review has shown that recent literature on consumers' clothing mending practices is sparse, and there is little information on the actual change during the past few decades as well as whether consumers connect these practices to sustainable behavior. This article studies these aspects based on three surveys in Norway.

3. Materials and Methods

Questions related to consumers' clothing mending and making practices have been included in three quantitative surveys in Norway in 2010, 2011, and 2017. The main demographic variables of the three surveys are given in Table 1. The surveys were based on different projects, so they have some differences in topics and sample selection, but they repeated some of the same questions related to clothing mending and making.

The first survey included only questions related to clothing consumption practices. It was conducted during 2010 and a total of 268 answers were received. Respondents were recruited through different channels. Most of them were Norwegian households randomly selected from the telephone directory, but due to the low number of responses (113), additional respondents were recruited through personal and work-related networks and publicity in the media. The distribution of respondents is uneven with an evident preponderance of female respondents (83%). The average age of these respondents is 37 years, the age group of 25–39 year olds is overrepresented in comparison to the average age of the adult population, and the youngest and oldest age groups are underrepresented. Therefore, the received data is not representative and the results cannot be used for generalizations for the Norwegian population as a whole. However, the results can be used in comparing how common the use of the various mending and making techniques are within the group. These cases are not weighted.

Table 1. Respondents divided by gender and age and compared with the Norwegian adult population [34].

Background Variables	Sample 2010 ¹	Sample 2011 ²	Sample 2017 ²	Norwegian Population ³	
Number of respondents (N)	268	1124	1001	-	
Gender	Male	17%	50%	51%	50%
	Female	83%	50%	49%	50%
Average age	37.1	45.2	45.9	47.9	
Age group	Below 24	11%	10%	11%	11%
	25–39	51%	29%	28%	26%
	40–59	34%	38%	36%	34%
	60+	4%	23%	25%	29%

¹ All respondents were 15 or older. ² All respondents were 18 or older ³ Figure applies to the population above the age of 18.

In order to be able to relate these results to a nationally representative sample and follow changes over time, some of the questions were repeated in two larger surveys during 2011 and 2017. These surveys included several consumption-related themes, and mending of clothes was only a minor part of them. Due to financial limitations, not all mending and making questions from 2010 could be repeated in these surveys, and we chose to focus on some common techniques. These surveys were conducted by a professional opinion polling company (TNS Gallup). They use a pre-recruited random sample panel of 500,000 people who are willing to participate in surveys. The sample is pre-stratified by age, sex, and education level. The final sample is weighted by TNS Gallup corresponding to the distribution of the population. The total weighting is based on a demographic weight (region,

gender, and age), which is adjusted for education according to the population distribution [35]. Only respondents above the age of 18 were recruited to our surveys.

In total, 1124 respondents answered the survey in 2011 and 1001 in 2017. These survey samples have equal gender distribution, and the average age of respondents was 45 in 2011 and 46 in 2017. The surveys were conducted over the Internet. Since 2010, over 90% of the population of 15 years and older have had internet access in Norway. Therefore, this method can increasingly be used for nationwide representative surveys. Internet access falls from the age of 65–70, but is generally adequate for the survey target group. The received data from these surveys were analysed with the SPSS software.

The survey method is limited to what people choose to say about their opinions and habits, and various biases can affect the response as discussed in the method literature [36].

4. Results

4.1. Prevalence of the Different Mending and Making Activities

In 2010, 35% of the respondents said they repaired damaged clothing often, 51% sometimes, and only 14% said they never did it. Easier reparations, such as sewing on a button or repairing a seam that has unravelled, were the most common (Figure 2). This is followed by mending holes or tears on clothing either by patching or darning. The more demanding repairs, such as zipper replacement and amending the size of clothing, were not that common. The results indicate that it is more common to repair clothing and make something new from old clothing than to sew new clothing. The survey conducted in 2010 was based on a non-representative sample and is therefore only used to see how common the various mending and making activities are among these respondents.

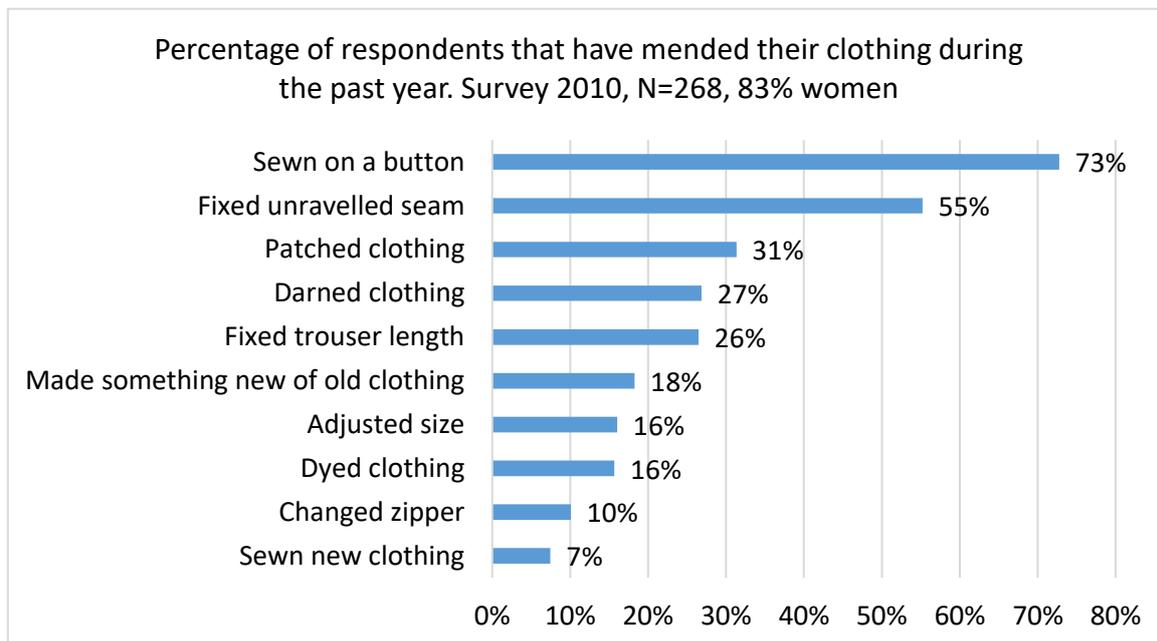


Figure 2. Percentage of respondents that have mended their own clothing or made new clothing during the past year. (Data from 2010 survey where selection was female-dominated).

There is a significant correlation between respondents who said they repair damaged clothes when possible and respondents reporting having done these activities. They report to have done repairs during the past year more often than respondents who do not generally intend to repair clothing (Figure 3). Interestingly, a high percentage of respondents that said that they “never repair clothing” also said that they have done some repairs during the past year, usually either sewing on a button or fixing an unraveled seam. This suggests that making such minor repairs may not be considered as “real” clothing repair. This also shows that one should interpret the answers to such

general questions with caution and that more specific questions, such as whether you have or have not sewn on a button, may give different answers.

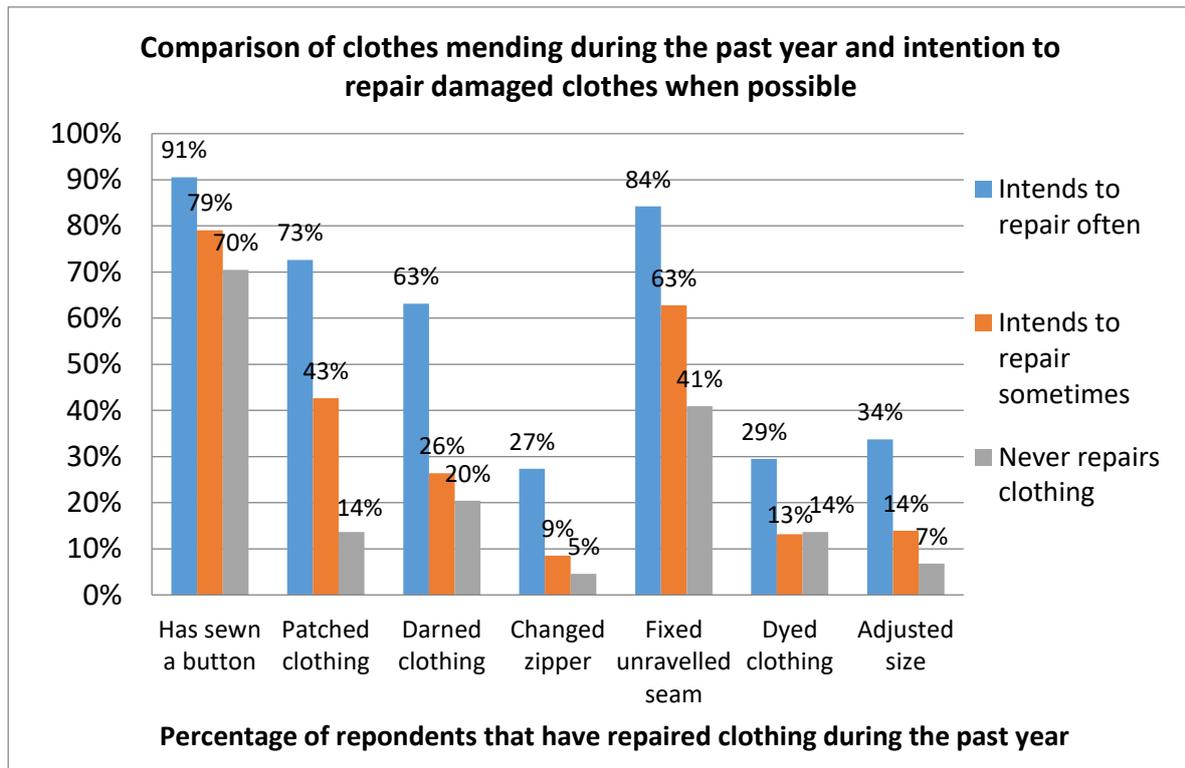


Figure 3. Comparison of respondents' intent to repair clothing and the reparations they have done during the past year. (Survey 2010, $N = 268$).

Figure 4 shows that it is most common for the respondents to do most mending and making activities by themselves. The only exception is changing a zipper, which is more often done by others through private networks that are more commonly used than professional repair services. Due to the non-representative sample with a small number of men and elderly respondents, it is not possible to draw any conclusions on differences between demographic variables in this matter.

Results from the representative surveys in 2011 and 2017 are given in Figure 5. As the method and sample selection are similar, these surveys can be used to see the changes over time. Both surveys indicate that a majority of respondents have undertaken at least some simple mending activities, such as sewing on a button, during the past year, but there is a reduction in the percentage of respondents between these two surveys undertaken 6 years apart. The reduction in all mending activities is significant ($p < 0.000$ when tested with the Pearson Chi-Square), while the differences in clothes-making activities are not significant between the two surveys. In 2017, 65% of respondents had done at least one of the six mending or making activities included in the survey (62% if knitting is excluded); while in 2011, the same figure for the five activities was 70%.

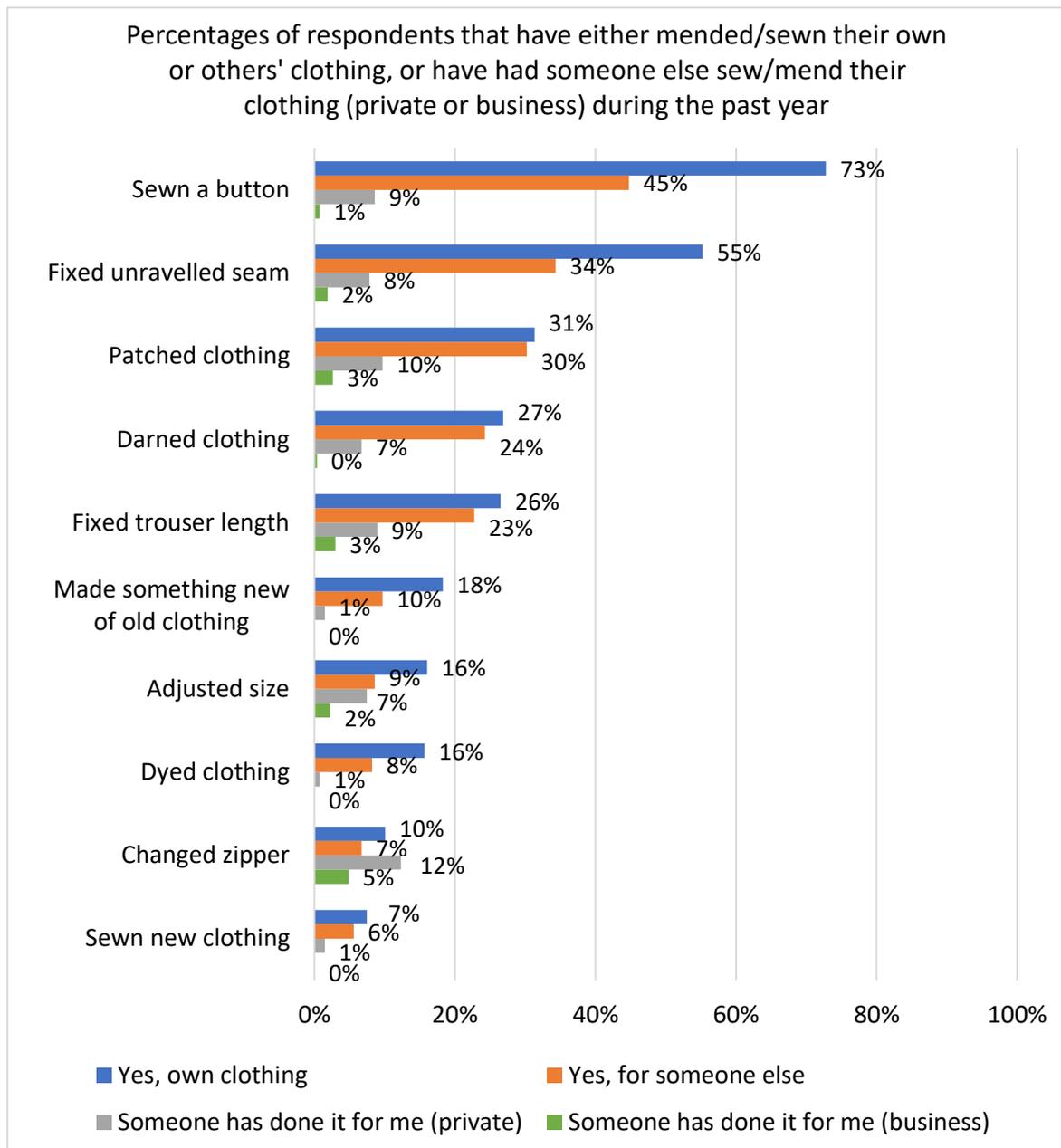


Figure 4. Percentages of respondents that have either mended/sewn their own or others' clothing or have had someone else sew/mend their clothing (private or business) during the past year. (Survey 2010, $N = 268$, 83% women).

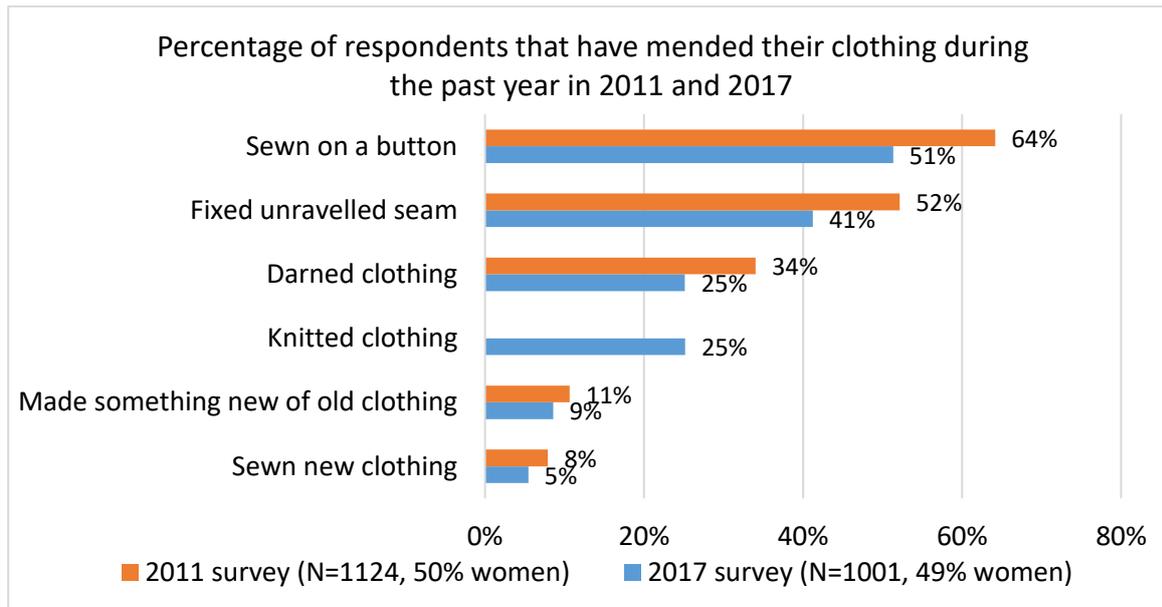


Figure 5. Percentage of respondents that have mended their own clothing or made new clothing during the past year. (Data from two representative surveys from 2011 and 2017).

4.2. Who Are the Clothing Menders and Makers?

The two representative surveys from 2011 and 2017 were used to see differences between demographic variables. The results for 2011 divided by demographics are given in Table 2. There are significant differences between the genders in all clothing mending and repair categories, as women say they are more active in all the different activities. There are significant differences between age groups in four of the five mending categories. The elderly are more active in repair, including sewing on buttons, fixing unravelled seams, and darning clothing, whereas the young are more likely to make something new from old clothing. There was no significant difference in sewing new clothing between the age groups. Respondents reported that their economic situation the past year had only minor importance for the repair activities. Respondents who were struggling economically, were more likely to sew new clothing, whereas the slightly higher percentages in the other categories are not statistically significant. However, even some of the high-income families do repair. Education only had a minor effect, as respondents with a higher level of education were more likely to conduct minor repairs (sewing on buttons and darning clothing), but the difference in other activities was not significant. Non-working respondents were more likely to fix unravelled seams and darn clothing than students and working respondents were. Having children below the age of 15 decreased the likelihood of some mending and making activities, but the difference was not significant for darning clothing or making something new from old clothes. This tendency confirms the Swedish study, where this group (families with small children) said that they did not have as much time to repair [20].

The results from the most recent survey (2017) by background demographics are given in Table 3. The tendencies are similar to those of the previous survey, as women are more active in all clothing mending and making activities than men are.

This survey included an additional question about knitting that had not been asked before. The answer to this question shows that about every fourth Norwegian adult had knitted during the past year (almost half of all women), which is a high percentage. The oldest age group (above 60 years old) of respondents knits the most followed by the youngest (18–24 year olds).

Similarly to previous studies, this survey shows that respondents in older age groups are more active within all three listed mending activities [37], while there are not significant differences between the age groups in making new clothing. Non-working respondents were more likely to darn and knit clothing, while students were more likely to make something new from old clothing.

Differences between the other mending and making categories were not significant between student, working, and non-working respondents. We no longer see the significant difference in mending activities between households with and without children. This may be partly explained by the fact that this time, the respondents were asked to report whether they have children under the age of 18 in the households, while the previous survey included smaller children (below the age of fifteen). Also in this study, respondents with a higher education are more active in all clothing repair categories as well as in making something new from old clothing, while the level of education had no significant effect on knitting or sewing new clothing.

All activities in both surveys are dominated by women. For mending, age is the second most important of the surveyed demographic variables, as the older age groups repair more than the younger. However, the age distribution in making activities is more even.

Table 2. Percentage of respondents who said they had repaired or made clothing during the past year. Survey 2011, $N = 1124$. Significance tested with the Pearson Chi-Square and the level is indicated as: ** = $p < 0.01$, * = $p < 0.05$.

		Sewn on a Button		Fixed Unravelling Seam		Darned Clothing		Made Something New of Old Clothes		Sewn New Clothing	
		(%)	Chi-Square	(%)	Chi-Square	(%)	Chi-Square	(%)	Chi-Square	(%)	Chi-Square
All	Mean	64		52		34		11		8	
Gender	Male	45	$\chi^2 = 187.694$,	30	$\chi^2 = 238.545$,	17	$\chi^2 = 154.018$,	4	$\chi^2 = 46.628$,	2	$\chi^2 = 51.787$,
	Female	84	$p < 0.000$ **	76	$p < 0.000$ **	52	$p < 0.000$ **	17	$p < 0.000$ **	14	$p < 0.000$ **
Age	18–24	59	$\chi^2 = 13.275$,	44	$\chi^2 = 15.651$,	23	$\chi^2 = 14.252$,	18	$\chi^2 = 8.058$,	7	$\chi^2 = 7.074$,
	25–39	60	$p = 0.004$ **	48	$p = 0.001$ **	33	$p = 0.003$ **	11	$p = 0.045$ *	10	$p = 0.070$
	40–59	64		53		34		9		5	
	60+	73		62		43		10		10	
Children	No children	67	$\chi^2 = 9.499$,	54	$\chi^2 = 4.450$,	36	$\chi^2 = 1.815$,	12	$\chi^2 = 2.854$,	9	$\chi^2 = 4.574$,
	Children below age of 15	58	$p = 0.002$ **	48	$p = 0.035$ *	31	$p = 0.178$	8	$p = 0.091$	5	$p = 0.032$ *
Activity	Student	64	$\chi^2 = 5.911$,	51	$\chi^2 = 8.234$,	27	$\chi^2 = 8.024$,	16	$\chi^2 = 5.797$,	6	$\chi^2 = 3.011$,
	Working	62	$p = 0.052$	50	$p = 0.016$ *	34	$p = 0.018$ *	9	$p = 0.055$	7	$p = 0.222$
	Non-working	71		60		41		12		10	
Economic situation	Good	63	$\chi^2 = 2.982$,	52	$\chi^2 = 0.485$,	34	$\chi^2 = 2.095$,	10	$\chi^2 = 3.135$,	7	$\chi^2 = 3.954$,
	Bad	70	$p = 0.084$	55	$p = 0.535$	40	$p = 0.148$	14	$p = 0.077$	12	$p = 0.047$ *
Education	Elementary, secondary or vocational	63	$\chi^2 = 4.879$,	52	$\chi^2 < 0.000$,	33	$\chi^2 = 4.063$,	11	$\chi^2 = 0.024$,	8	$\chi^2 = 0.173$,
	College or university	70	$p = 0.027$ *	52	$p = 0.994$	39	$p = 0.044$ *	11	$p = 0.877$	9	$p = 0.678$

Table 3. Percentage of respondents who said they had repaired or made clothing during the past year. Survey 2017 $N = 1001$. Significance tested with the Pearson Chi-Square and the level is indicated as: ** = $p < 0.01$, * = $p < 0.05$.

		Sewn on a Button		Fixed Unravell'd Seam		Darned Clothing		Made Something New of Old Clothes		Sewn New Clothing		Knitted Clothing	
		(%)	Chi-Square	(%)	Chi-Square	(%)	Chi-Square	(%)	Chi-Square	(%)	Chi-Square	(%)	Chi-Square
All	Mean	51		41		25		9		5		25	
Gender	Male	36	$\chi^2 = 108.446$,	20	$\chi^2 = 188.652$,	10	$\chi^2 = 131.978$,	3	$\chi^2 = 36.558$,	1	$\chi^2 = 33.588$,	3	$\chi^2 = 271.208$,
	Female	69	$p < 0.000$ **	63	$p < 0.000$ **	41	$p < 0.000$ **	14	$p < 0.000$ **	10	$p < 0.000$ **	48	$p < 0.000$ **
Age	18–24	37		32		10		9		6		27	
	25–39	44	$\chi^2 = 34.186$,	34	$\chi^2 = 20.173$,	19	$\chi^2 = 27.828$,	9	$\chi^2 = 0.520$,	7	$\chi^2 = 1.852$,	23	$\chi^2 = 11.325$,
	40–59	53	$p < 0.000$ **	45	$p < 0.000$ **	31	$p < 0.000$ **	8	$p = 0.914$	4	$p = 0.604$	22	$p = 0.010$ *
	60+	65		50		31		9		5		33	
Children	No children	53	$\chi^2 = 0.862$,	41	$\chi^2 = 0.181$,	24	$\chi^2 = 1.501$,	8	$\chi^2 = 1.064$,	5	$\chi^2 = 0.019$,	26	$\chi^2 = 1.260$,
	Children below age of 18	50	$p = 0.353$	43	$p = 0.671$	28	$p = 0.221$	10	$p = 0.302$	6	$p = 0.890$	23	$p = 0.262$
Activity	Student	45	$\chi^2 = 7.613$,	41	$\chi^2 = 4.224$,	16	$\chi^2 = 8.231$,	11	$\chi^2 = 1.405$,	10	$\chi^2 = 6.675$,	25	$\chi^2 = 6.492$,
	Working	50	$p = 0.022$ *	40	$p = 0.121$	25	$p = 0.016$ *	8	$p = 0.495$	4	$p = 0.036$ *	23	$p = 0.039$ *
	Non-working	59		47		30		9		6		31	
Education	Elementary, secondary or vocational	46	$\chi^2 = 9.927$,	37	$\chi^2 = 5.219$,	21	$\chi^2 = 7.155$,	6	$\chi^2 = 5.535$,	4	$\chi^2 = 2.387$,	23	$\chi^2 = 1.404$,
	College or university	56	$p = 0.002$ **	45	$p = 0.022$ *	28	$p = 0.007$ **	10	$p = 0.019$ *	6	$p = 0.122$	27	$p = 0.236$

4.3. Mending and Making Activities' Connection to Environmental Opinions

There is much we do not know about the motivation for the various activities. The review of changes in motivations for mending since the beginning of the 20th century [17] shows that the same activities can be motivated by economic as well as environmental reasons or be linked to the desire for creativity and the joy of making something. Here, we will only discuss possible links between activities and environmental concerns.

The 2011 survey included claims related to environmental opinions. The respondents were asked if:

- Recycling is an important environmental measure (five point likert scale from disagree to agree strongly)
- Climate change and extreme weather worry me (five point likert scale from disagree to agree strongly)
- New technologies will solve environmental problems without us needing to make big changes to our way of living (five point likert scale from disagree to agree strongly)
- Have environmental problems caused you to reduce your clothing purchases? (Answering alternatives: yes, no, or do not know. Do not know answers were excluded from the analysis.)

These can be used to compare whether people who are active in repair and making differ in their environmental opinions from those who are not. These results are given in Table 4. Respondents' environmental opinions are significantly correlated with their clothing mending and making activities. We can see that consumers that are more active in clothing mending and making are more likely to:

- Report to have reduced their clothing purchases for environmental reasons
- Are more worried about climate change and extreme weather
- Think that recycling is an important environmental measure

Respondents' opinion on whether new technologies will solve environmental problems did not have significant connection to most of the mending and making activities. The exception was darning clothing, as respondents that darned more were less likely to believe that new technologies will solve environmental problems.

Table 4. Comparison of environmental opinions between respondents that either had or had not repaired or made clothing during the past year. Survey 2011 with One-way ANOVA where the significance level is indicated as follows: ** = $p < 0.01$, * = $p < 0.05$.

		New Technologies Will Solve Environmental Problems (from 1 Disagree Strongly to 5 Agree Strongly)		Climate Change and Extreme Weather Worry Me (from 1 Disagree Strongly to 5 Agree Strongly)		Recycling Is An Important Environmental Measure (from 1 Disagree Strongly to 5 Agree Strongly)		Reduced Clothing Purchases for Environmental Reasons (0 = No, 1 = Yes)	
		Mean	Anova	Mean	Anova	Mean	Anova	Mean	Anova
Sewn on a button	Yes	3.00	F(1, 1112) = 0.422,	3.28	F(1, 1111) = 15.619,	4.43	F(1, 1112) = 9.113,	0.22	F(1, 982) = 11.810,
	No	3.04	$p = 0.516$	2.98	$p < 0.000$ **	4.27	$p = 0.003$ **	0.13	$p = 0.001$ **
Fixed unravelled seam	Yes	2.98	F(1, 1109) = 1.536,	3.31	F(1, 1108) = 15.853,	4.46	F(1, 1110) = 13.034,	0.24	F(1, 977) = 18.954,
	No	3.05	$p = 0.216$	3.03	$p < 0.000$ **	4.28	$p < 0.000$ **	0.13	$p < 0.000$ **
Darned clothing	Yes	2.88	F(1, 1100) = 8.883,	3.40	F(1, 1099) = 20.025,	4.53	F(1, 1101) = 18.030,	0.31	F(1, 971) = 41.672,
	No	3.07	$p = 0.003$ **	3.06	$p < 0.000$ **	4.30	$p < 0.000$ **	0.14	$p < 0.000$ **
Made something new of old clothing	Yes	2.91	F(1, 1106) = 1.373,	3.48	F(1, 1105) = 8.489,	4.61	F(1, 1107) = 10.197,	0.43	F(1, 977) = 41.686,
	No	3.02	$p = 0.242$	3.14	$p = 0.004$ **	4.35	$p = 0.001$ **	0.17	$p < 0.000$ **
Sewn new clothing	Yes	2.92	F(1, 1110) = 0.763,	3.46	F(1, 1108) = 5.819,	4.65	F(1, 1110) = 10.136,	0.33	F(1, 981) = 10.113,
	No	3.01	$p = 0.383$	3.14	$p = 0.016$ *	4.35	$p = 0.001$ **	0.18	$p = 0.002$ **

5. Discussion

Norwegians' clothing mending and making practices were surveyed during three different surveys conducted in 2010, 2011, and 2017. We obtained more detailed data concerning mending than making because the surveys included a larger number of different mending techniques.

The results confirm that many consumers do mend their clothing, as 65% of the respondents report to have undertaken at least one mending or making task, such as sewing on a button or fixing an unravelled seam in 2017. It is clear that repairing is more common than people think, especially when compared to the common assumption of "nobody" repairing clothing anymore. The figure is quite high, and may be related to the fact that even though Norway has a high standard of living, it is also characterized by a high degree of craft-production [38]. Handicrafts are valued, very much associated with national folk dresses and knitting [27,39]. Folk dresses and hand knitting have contributed to the maintenance of industrial textile production in Norway and to the fact that there are outlets for hand knitting yarn and other equipment for home production also in small towns [27].

Every fourth respondent reported that they had knitted something during the past year. This indicates that knitting in Norway is about twice as common as in other Western countries, such as the U.S. and U.K. In the U.S., 13% of adults participated in weaving, crocheting, quilting, needlepoint, knitting, or sewing in 2012 [40]. The Immediate Media Craft Intelligence survey [41] estimates the number of knitters in the U.K. to be 5.9 million, which equals to about 9% of the U.K. population. The few comparable data we have from several countries indicate that there may be major differences in the scope and that this should be investigated further.

The results correlate with the time use statistics where women and the elderly were more active than the young and men. The surveys' percentages are different because time use statistics give figures for how many people conduct the activity on an average day [33], while our surveys indicate how many have repaired or made something during the past year. The higher percentage among women than men was as expected, as taking care of clothing and textiles are female-dominated areas of household chores. For example, women more often take responsibility for laundering [42,43] and the purchase of clothing for other family members [44,45].

Interestingly, a number of respondents that answered that they "never repair clothing" also reported to have done some repairs, such as sewing on a button or fixing an unravelled seam. This suggests that making such minor repairs may not be considered as "real" clothing repair. Another interpretation is that people believe in the common assumption that nobody repairs, and tend to forget that their own practice differs from this. Future studies should take into account the significance of the research method and the level of detail in the questions as here demonstrated by the difference between these answers.

It is less common to remake clothes from old textiles, or make clothes from new materials, than to mend clothes. These activities are also very female-dominated, but they do not follow the same age pattern as mending. Young respondents are more active in remaking, and knitting has a more even age distribution than mending activities. The motivations among the young may differ from the elderly respondents. Previous studies on motivations for participating in home-based crafts have shown a variety of reasons, such as personal pleasure gained from making things skillfully by hand, saving or earning money, socializing with other makers, passing on family traditions and values, and occupying spare time [46]. It seems that there is not only a decline, but also a change in activity patterns. Mason [46] (p. 262) writes that "while craft education is declining in schools, [47] participation in amateur crafts in society is increasing". A survey among young people in the U.K. showed that 75% of 11–16 year olds were 'making' things at home [48]. There may be several reasons for this. Studies on clothing lifespans have shown that older people's clothes have higher average lifespans than the clothes that young people own [49]; thus potentially in more need of repair. In addition, the repair activities are higher among the non-working respondents, indicating that they may have more time for repairs as well as economic incentives.

We stated initially a question about the relationship between environmental opinions and clothing-making and mending actions. There was a significant connection between intention to repair and respondents who said they had repaired something. We also found a significant correlation

between some environmental opinions and many mending and making activities. There was an especially strong connection between respondents who said they had reduced clothing purchases for environmental reasons, and mending and making activities. This may be related to an increased need for mending as existing clothes are kept longer. Another possibility is that an increased awareness of the environmental consequences of textile consumption leads to changes in both attitude and praxis. These assumptions need to be confirmed by further research on actual changes in behavior. Here, survey as a method is limited due to the well-documented gap between knowledge, attitudes, and behaviors [50,51]. We could also observe that respondents more active in mending and making were more worried about climate change and extreme weather and thought that recycling is an important environmental measure. The respondents that darned or remade clothing were slightly more likely to disagree with the statement “new technologies will solve environmental problems“, but this correlation was less strong than the correlation between other environmental claims and mending and making activities. However, previous research has indicated that consumers are more motivated to mend in order to save favourite garments than for environmental reasons [10].

The literature indicates that the main obstacles for mending and domestic repair of clothing are a lack of skills and time. Competence makes work easier, quicker, and more enjoyable and provides a better and more even result. In this matter, education is of importance. Knowing how to operate a sewing machine is an advantage. Clothes could be designed in a way that they are easy to alter, for example by having extra seam allowance that permits size adjustments [9]. Another example is that a rubber band that is threaded in a casing is easier to replace than an attached elastic band.

Even though consumers' competence in handicrafts and sewing affects whether they decide to repair, not all consumers who have the skills choose to repair their clothing. A barrier to overcome is the perception of mending being connected to poverty and not wishing to use clothes with visible mending at social occasions or work [10]. Therefore, the process could be facilitated by planning the garments in a way that the visibility of repair would not matter [9], using easy repair solutions, such as adhesive patches or woolfiller, or embroidery stitch techniques that could be part of a decorative element [9,10].

The fact that consumers do have practical knowledge of simple basic techniques for repair is a great advantage in terms of both the extension of existing clothing's lifespan and the potential for increasing reuse. Better knowledge in current practices and barriers for clothing mending can potentially increase the use time of clothing. These results can be beneficial in clothing design, home economics, and crafts education as well as understanding consumer behavior and making policies that aim at environmental improvements within clothing consumption.

6. Conclusions

Mending contributes directly to increased product lifespans. However, it is possible that making also can lead to this, indirectly. One of the major problems related to a shift to sustainable consumption is the growth in the amount of textiles, low-cost clothing, low value, and consumers with little competence in selecting of quality products and thus products with a longer life.

Behavior is not only a result of attitudes and intentions, but also the opposite: behavior leads to change in attitudes [52]. Practical experience in mending and making clothes can potentially make consumers better able to recognize quality and thus allocate a higher respect for the labor-intensive production as well as the aesthetic and technical quality of said clothes.

These practices will thus help to spread attitudes that are important in the conversion to more sustainable textile consumption, where better products and longer lifespans will be important. Viewed in such a perspective, it is important to expand the knowledge of domestic making and mending and look at the relationship between such activities and attitudes and more concrete opportunities to assume responsibility as environmentally conscious consumers. Future research should include investigating the relationship between those who repair and those who do not in terms of clothing lifespan. What contributes most to increasing repair: could it be, for example, repairable clothes, more practical knowledge, changing attitudes, or easier access to materials,

equipment and spare parts? There is a need for further comparative studies between countries but also studies on repair between different types of products.

Attention to repair services and industry increases. This is important for increasing product lifespans. We need more concrete studies on what is repaired and why through qualitative approaches and preferably wardrobe studies [53]. However, we also need knowledge of what can and should be done at home and when is it desirable to use professional actors. Do the professional repair services replace private repair, or are they rather used by people who also repair themselves? What can increase domestic and professional services? There is probably also a large grey market for favours between friends as well as help across generations. Such relationships can help to increase the lifespan of textiles and strengthen social ties; but again, access to knowledge is limited.

Making and mending clothes is a very female-dominated activity. These are also activities linked to something that all people use: clothes. Clothes are important contributors to environmental problems, but also important to our well-being, self-understanding, creativity, and social interactions with other people. More knowledge about how, why, and what is being mended and made domestically will not only be important for environmental policies, but will also enable us to better balance the relationship between production and consumption of clothing, and thus the importance of clothing in our society.

Repairing clothes requires knowledge, access to proper equipment and materials, and to some extent also that the clothes are actually repairable. Repairing clothes makes it possible to wear clothes longer, which in turn gives the wearer the opportunity to gain more knowledge about them. Being able to repair clothes makes it more profitable to buy more expensive clothes, and potentially also clothes you like better or are made in higher quality, with better fabrics, etc. People who are familiar with repair are likely to be better equipped to detect poor-quality products on the market and to choose better clothes. We therefore believe that repairing clothes can affect clothing consumption and thereby also what it is profitable to produce. Growth in the amount of clothing produced and sold is a major challenge in the textile industry today. Reducing the amount requires increasing the value and lifespans of the individual garments. Access to repair is essential for this to succeed.

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Appendix A

Table A1. Time consumption on maintenance of clothing, shoes, and sewing among 16–74 year old Norwegians in 1980–2010 [33].

Maintenance	Percentage That Carries Out the Activity on an Average Day				Time Use Among Those That Carry Out the Activity (Hours:Minutes)				Average Time Use Among All Respondents (Hours:Minutes)			
	1980	1990	2000	2010	1980	1990	2000	2010	1980	1990	2000	2010
Year												
Average	5%	3%	2%	1%	1:00	1:07	0:52	0:42	0:03	0:02	0:01	0:00
Men	1%	1%	1%	0%	0:47	0:44	1:23	0:30	0:00	0:00	0:00	0:00
Women	9%	5%	4%	1%	1:01	1:09	0:47	0:44	0:06	0:04	0:02	0:01
Age 16–24	3%	2%	1%	0%	1:00	-	-	-	0:02	0:01	0:00	0:00
Age 25–44	5%	3%	1%	1%	0:57	1:04	0:34	0:34	0:03	0:02	0:00	0:00
Age 45–66	6%	4%	3%	1%	1:03	1:16	1:09	0:48	0:04	0:03	0:02	0:01
Age 67–74	5%	5%	3%	3%	-	-	0:32	0:43	0:03	0:03	0:01	0:01

Table A2. Time consumption on knitting among 16–74 year old Norwegians in 1980–2010 [33].

Knitting	Percentage That Carries Out the Activity on an Average Day				Time Use Among Those That Carry Out the Activity (Hours:Minutes)				Average Time Use Among All Respondents (Hours:Minutes)			
	1980	1990	2000	2010	1980	1990	2000	2010	1980	1990	2000	2010
Year												
Average	7%	6%	3%	3%	1:06	1:14	1:02	1:33	0:04	0:04	0:02	0:02
Men	0%	0%	0%	0%					0:00	0:00	0:00	0:00
Women	12%	11%	6%	5%	1:05	1:14	1:22	1:33	0:08	0:08	0:05	0:05
Age 16–24	4%	3%	1%	0%	0:52	1:16	-	-	0:02	0:02	0:00	0:00
Age 25–44	7%	5%	2%	1%	1:07	1:05	1:05	1:08	0:05	0:03	0:01	0:01
Age 45–66	7%	7%	4%	4%	1:11	1:16	1:31	1:32	0:05	0:05	0:04	0:04
Age 67–74	8%	11%	10%	10%	1:06	1:29	1:19	1:49	0:05	0:01	0:08	0:01

“-” In the table indicates that less than 25 persons have performed the activity, and due to this small sample size, the figure is left out.

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