

# TAILORING TECHNOLOGY TO THE URBAN CYCLIST

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## **ATTESTATION OF AUTHORSHIP**

"I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person (except where explicitly defined in the acknowledgements), nor material which to a substantial extent has been submitted for the award of any other degree or diploma of a university or other institution of higher learning."

This is for Gertie who, strangely, started this.

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## ABSTRACT

This practice-based research investigates the design of jackets for the purpose of urban cycling. The objective of this research is to promote a discussion on the specific functional requirements of a jacket for the increasing number of professional women who are choosing to cycle to their place of work.

The research has been motivated by a personal dissatisfaction with the availability of appropriate clothing for female urban professionals, particularly tailored jackets with specific features to wear, not only on the road but also in the office.

A critical framework of practice and fit testing for functionality underpins the research and leads to the use of the technology of laser cutting combined with an experimental approach to tailoring and construction. These approaches ultimately changed the design direction that developed into the final selection of woollen jackets created for temporal urban settings.

# INTRODUCTION

“Design is one means we have to creatively and constructively respond to dissatisfaction” (Smythe, 2011, p. 9).

This practice-based research was initially motivated by personal circumstances. Until recently, for medical reasons, I had to commute to work by bicycle. While cycling, I observed that different types of clothing seemed to elicit differing responses from other road users. When I dressed in the lycra and fluoro of a sport cyclist, the attitude of the motorists appeared to be aggressive and impatient; to an extent that personal safety became an issue. On other occasions, when I adopted everyday clothing, my sense of being safe on the road increased and my engagement with motorists was noticeably improved. However, I observed, with dissatisfaction, that there was a lack of clothing, particularly jackets, suitable for female urban cyclists to wear, not only on the road but also upon arrival in the office. As a practitioner for thirty years, within the woman’s apparel industry, my experience has largely been with the bespoke or the made to measure sector. Although contracts have been served within larger clothing companies, as a sample machinist, pattern maker and designer, the luxury of working with individual clients, addressing specific fit requirements has served to motivate and inspire this research.

The research considers Smythe’s understanding of design as a creative and constructive response to dissatisfaction by locating the problem of the dressed body in the context of urban cycling. It draws on Joanne Entwistle’s notion of the fleshy body and her contention that ideas of dress and clothing have generally been constructed separately from the body itself. Entwistle also notes that little empiri-

cal research actually exists about the relationship between this fleshy body and the clothing that dresses it (Entwistle, 2000). In this sense, Entwistle’s work would seem to justify the need for further research and careful testing of this under-studied relationship. This practice-based research project is proffered as a contribution to this field.

Underpinning the project, then, is also the issue of fit. In so far as it incorporates both physical and psychological meanings, fit is a subjective and often highly emotive term. Closely related are the notions of body image and, more specifically, body cathexis. Body cathexis is understood here as the “degree of satisfaction with the body, however, rather than the image per se” (Kaiser, 1997, p. 108). In identifying and discussing affects and emotions used to describe the complex relationship between the body and the clothing, La Bat & DeLong suggest that “body cathexis is the evaluative dimension of body image and is defined as positive and negative feelings toward one’s body” (LaBat & DeLong, 1990, p. 43).

Part One establishes the context of the problem of dressing the female cyclist, and how it has been approached through research, design and making of tailored jackets that can enhance a positive body cathexis. The exegesis briefly recounts historical precedents for women’s cycling clothing, from the classically-tailored silhouettes of the late 19<sup>th</sup> Century, to the European “Cycle Chic” phenomena and the contemporary New Zealand “Frocks on Bikes” movement. The relationship between the body-in-motion, tailoring and fit is considered also in relation to perceptions of social appropriateness of clothing worn by women cyclists.



Part Two documents the design, development and making of the jackets. Traditional tailoring techniques are explored and developed to construct a critical framework for practice within which to come to terms with issues such as silhouette and fit testing.

Key iterations in the design process are recorded from the creation of the first samples to the significant transformations that occurred as a result of adopting modern laser-cutting technology. Introduced, initially, as a possible solution to the problem of ventilation, these new construction methods ultimately changed the design direction and created the aesthetic developed in the final selection of jackets.

Part Three discusses specific features of three jackets selected from the final range. These are discussed in relation to the design and performance criteria identified as a result of theoretical and practical work in Parts One and Two.

The exegesis is accompanied by written and photographic records of the body-in-motion, as well as the development of the various design elements of tailoring, construction, materials and colour. Practical tests for functionality and material performance in a real urban setting are also documented.

The Conclusion addresses the degree to which the research fulfils the intended purpose, and sets out areas for potential future research and/or application.

# 1 FASHION AS EMBODIED PRACTICE

## 1.1 The question of appropriateness

The project addresses the experience of the professional woman, who must maintain appropriate dress standards, being compromised when arriving at the work place in what might be deemed socially-inappropriate sports cycle gear (Kaiser, 1990). In many cases, the situation is compounded by showering and changing facilities being limited or non-existent. Drawing on research into the sociology of fashion, dress and embodiment, Entwistle suggests that in situations where we feel ourselves to be “dressed inappropriately, we are uncomfortable; we feel ourselves open to social condemnation” (Entwistle, 2000, p. 326). Thus, being seen to belong to the right group influences our choice of clothing and where there is a mismatch, discomfort occurs.

## 1.2 Fit

Discomfort or dissatisfaction with clothing is often experienced when the physical fit is perceived as unsatisfactory. Like appearance, the implications of what is a good fit is difficult to quantify. “Garment fit means different things to different people, the range of garments the individual deems suited to an activity, and comfort factors both physiological and psychological” (Watkins, 2008, p. 975). Thus, fit, as judged by the wearer, involves subjective and emotional responses. In their discussion of body cathexis, LaBat & DeLong suggest that “When clothing does not fit, the consumer may perceive the cause as

related to the body and not the clothing, with resulting negative feelings about the body” (LaBat & DeLong, 1990, p. 43). On the other hand, it has been suggested that a well-fitting garment “contributes to the confidence, comfort, performance and even safety of the wearer” (Ashdown, 2007, p. 264). For the purpose of this research, the definition of a well fitted garment is a relaxed fit allowing for movement on a bicycle.

## 1.3 Body in motion

In considering fashion as embodied practice, this research combines Entwistle’s understanding of the fleshy body, and her appreciation of the experiential dimensions of dress, with the general problem of fit, and extends those to embrace the body in motion. In her discussion of the fleshy body, Entwistle suggests that;

“Dress involves practical actions directed by the body upon the body, which result in ways of being and ways of dressing, such as ways of walking to accommodate high heels, ways of breathing to accommodate a corset, ways of bending to accommodate a short skirt, and so on” (Entwistle, 2000. P.344).

The specific focus here is on the way that the jackets move with and on the body. Although these jackets are tailored, the demands require an acknowledgement of the need for sweat reduction and movement. Documenting the dressed body in the act of riding a bicycle provides an evaluative framework for the body-in-motion to be observed and tested, therefore enabling an assessment of fit. Any discomfort by the wearer during fit testing indicates a requirement to adjust the jackets. These adjustments and iterations become vital to informing design development.

## 1.4 The tailored body

The concept of the tailored jacket has been developed because tailored garments have traditionally afforded the capacity to transform ones 'inward appearance', poise and confidence. For Woodward, "a particular item of clothing enact(s) an internal and behavioural change in the woman; (for example) wearing the tailored suit helps create a powerful, confident and in-control woman" (Woodward, 2007, p. 21). Such attributes would seem to be essential in controlling the road space she inhabits.

## 1.5 Historical influences

The challenges facing cyclists and the problems of comfort are not new. The introduction of the bicycle to Edwardian society, in the late 1890s, brought about significant changes to women's clothing, particularly in terms of the silhouette (Figure 1).<sup>1</sup> Indeed, historically, it has often been possible to;

" ... identify moments when clothes designed expressly for the performative functions of particular sports have generated an expressive sartorial language of their own, one that, whilst peculiar to the physical requirements of specific sports and pursuits, is imbued with a distinctive sense of style and modernity" (Salazar, 2008, p. 31).

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<sup>1</sup> The Reformist Clothing Movement or Rational Dress Society advocated the use of functional clothing and sought to free women from the constraints of Victorian ideals of femininity through new fashions. Cycling and cycling groups were explicitly connected to such movements (Furness, 2005).

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Figure 1. *Poster for the Swift Cycle Co. Ltd*, (c1898), [Colour lithograph], From Salazar, (2008), London. V&A Publishing.

While the benefits of cycling, in terms of health or freedom from social constraint, were promoted in numerous journals and social groups throughout Northern Europe and America, much attention was also paid to maintaining strict dress codes for women. It “went without question that the whole costume was to be neat and tidy, and should render the woman as inconspicuous as possible” (Simpson, 1998, p. 77). In New Zealand, women’s cycling groups adopted overseas styles of dress; generally a “uniform” consisting of a cycling skirt, a blouse, an Eton jacket, and hat.

A contemporary newspaper article suggested that “the aim of the well-dressed cyclist [sic] should be to look as fresh and nice when she is returning from a long ride as when she started.” (Otago Witness, 15 October 1896, as cited in Simpson, 1998, p. 115). It is interesting to note that such clothes, while they were referred to as uniforms, were also functional everyday garments.

By the early decades of the 20<sup>th</sup> century, the abandonment of the traditional corset, initiated by Poiret (1879-1944), and the advent of leisure wear for women had a profound influence on the new silhouette. Significantly, Coco Chanel’s (1883-1971) relaxed, non-conformist designs introduced a style of clothes that women found comfortable to wear. Moreover, Chanel’s re-conception of the feminine silhouette, through the creation of garments under which the feminine body was merely suggested, contributed to a changing attitude towards women’s tailoring. By the 1920s, the model for women’s tailoring had developed from the riding jacket to a softer, more functional, body-skimming line (Aldrich, 2002) and readily adopted as cycling dress (Figure 2).

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Figure 2. (Calderly, T. circa 1920s). *Elizabeth Calderly, cyclist, wearing a relaxed style of tailoring.*[Photograph]. Retrieved June 25, 2012, from [www.boltonmuseums.org.uk/collections/local-history/local-life/clarion-cycle-club/](http://www.boltonmuseums.org.uk/collections/local-history/local-life/clarion-cycle-club/)

### 1.5.1 The Cycle Chic manifesto

More recently, in 2006, Mikael Colville-Andersen posted an online image of an urban cyclist in his hometown of Copenhagen (Figure 4).

The image of a professional woman dressed for work and riding a bicycle has been described as “the image that launched one million bicycles” (Thurston, 2012). The impact through social media sites also initiated a dialogue for change in attitudes to urban cycling beyond Europe. The most prevalent comments related to the style of clothing. Colville-Andersen subsequently published a manifesto formally describing such a style of cycling as ‘slow cycling’ (Appendix A).

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Figure 3.(Colville-Andersen 2006) *The image that launched one million bicycles* [Photograph]  
Retrieved May 10, 2012, from <http://www.flickr.com/photos>

This image has been removed by the author of this thesis for copyright reasons.

Figure 4. Boegh, H. (2010). *Cyclists in Copenhagen waiting for a green signal*. [Photograph]. Retrieved June 02, 2012, from [www.Henrich-boegh@wikimediacommons](http://www.Henrich-boegh@wikimediacommons) While some helmets are worn, no high-visibility or safety wear can be seen.

### 1.5.2 Current cycling fashions in New Zealand

The desire of professional women<sup>2</sup> to maintain suitable dress standards while cycling is at odds with the association many have in New Zealand of cyclists in fluoro jenkins and lycra (Figure 5). Sport cycling clothing emerged in the 1980s and 90s with the advent of technical materials allowing cyclists to look sportsmanlike (Harmanci, 2011).

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<sup>2</sup> For example Antoine (2012), Cuthbert (2012), Finesmith (2012), Khoo (2009).

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Figure 5. *Commuter cyclist*. [Photograph]. Retrieved May 27, 2012, from [Treehugger.com](http://Treehugger.com) <http://cyclingauckland.co.nz/general/2011/04/cycling-defined>

There is an emerging group of cyclists in New Zealand who – influenced by their European counterparts - wear ordinary street clothes when cycling. Getting hot and sweaty while cycling to work is seen as a barrier for many people (Taylor, Kingham & Koorey, 2009). A global movement called “Frocks on Bikes” declared in their 2009 manifesto (Appendix B) that they were “...not anti-sportswear or anti-lycra, but Frockers are fabulous biking in our everyday clothes” (Coom, P & Marshall, J. ,2007). The following images were taken at a “Frocks On Bikes” fashion event in Auckland where local designers showed their interpretation of cycling clothing.





Figure 6. Law, L. (2012). *"Frocks On Bikes" fashion show*. [photographs] used with permission. 2012

The selections of garments are making a fashion statement that anything can be worn on a bicycle. The clothing makes no direct references to the bicycle. Figure 7 shows an urban cyclist attending the event. Her clothing reflects a look of ease that implies a regular use of her bicycle.

This image has been removed by the author of this thesis for copyright reasons.

Figure 7. Marshall, J. (2012). [Untitled photograph of an urban cyclist at an Auckland "Frocks on Bikes" 2012]. Retrieved May 12, 2012, from <http://aucklandcyclechic.blogspot.co.nz>



### 1.5.3 Design precedents

Relevant design precedents have been identified because of specific features incorporated and marketed as suited to both cycling and professional work environments. The men's *Brompton Oratory* jacket<sup>3</sup> uses light-coloured corduroy fabric, suitable for indoor use, but also treated with silicon making it water-resistant for outdoors. As



Figure 8. Carleymith. (2011) *The Brompton Oratory* jacket. [Photograph by S.Barter 2012]. Safety features in the form of 3M reflective detailing and fluoro back flap are overt messages that this is designed for cycling.

<sup>3</sup> The men's dual purpose jacket was awarded the Gold Eurobike award for excellence in design. The head of the design team was Will Carleymith.

Carleymith (2011) notes;

"A cycling jacket that didn't look like a cycling jacket, and which normalises cycling, without any loss of functionality on the bike"(para. 4). There are currently no women's versions of this garment on the market. Andrew Ritchie, founder of *Brompton*<sup>4</sup> said "It is top of the list to get a women's jacket out there next" (Harker, 2011 para. 8).



Figure 9. Carleymith, (2011) *The Brompton Oratory* jacket. [Photograph by S.Barter 2012]. Showing the use of 2-way heavy gauge zips for ventilation, the placement within the under arm provides for easy access when riding. The feature is hidden while worn in the office setting.

<sup>4</sup> The Brompton Bicycle Ltd is a London based manufacturer of the folding bike.



Figure 10. Carleymith, (2011) *The Brompton Oratory jacket*. [Photograph by S.Barter 2012]. The 'shooting' back detail and hidden reflective features.



Figure 11. Carleymith, (2011) *The Brompton Oratory jacket*. [Photograph by S.Barter 2012]. The storm collar with reflective detailing.

The raincoat shown in Figure 12 is referenced because of its use of reflective trim. Both the placement of the trim and the option for concealment reinforced my own decision to use a similar product. A further point of interest was that the owner of the *Water Off A Duck's Back* cycle clothing company used her own cycling experience to assess the requirements for the raincoat, since she "knew exactly what the city cyclist who 'had to look smart for meetings' needed in a coat" (Dehn, 2011 para. 3).



Figure 12. *Ladies Mackintosh, Water Off A Duck's Back*. [photograph]. Retrieved June 04, 2012, from <http://www.wateroffaducksback.co.uk/ladies-mackintosh-3-p.asp>



## 2 THE DESIGN PROCESS

### 2.1 Introduction

Part Two documents the design development and making of the jackets that emerged from the research process. The jackets are designed for urban commuter cycling by professional women. The functionality of the features also had to meet the physiological requirements of both indoor and outdoor conditions. These design features have been informed by personal experience as well as a review of selected jackets that currently exist in the marketplace.

The following sections reveal how an experimental process of inquiry into tailoring and construction methods influenced and determined decisions leading to the final research outcome.

### 2.2 Use of personal experience

Beginning with an investigation that focused on a personal experience of fit, it became necessary to create a realistic form and personally fit-test the emerging jackets while cycling.

A personal mannequin reflecting the researcher's real body shape was made. This enabled the sample garments to be trialled and fitted for observation. This continued until the design progressed to a point that the fit criteria changed and fit models were introduced.



Figure 13. Barter, S. (2011) *Personal mannequin developed for fitting and observation.*  
[Photograph]

## 2.3 Tailoring

Underpinning this research is the proposition that the tailored jacket has the ability to improve the body cathexis.

“It is the tailored costume for which, applying the classical postulate of symmetry and balance, tailoring technique is employed to counteract the nature of the body, that is it’s irregularities and asymmetry” (Loschek, 2009, p. 102).

The tailoring technique that Loschek refers to here employs traditional, and often bespoke, characteristics associated with the shaping and moulding of layers of canvas and stitching (Aldrich, 2002). This, in turn, enables the silhouette to be manipulated into the fashionable form required.

Techniques are employed to balance the torso by using the width of the shoulder, waist and hip, or bust, waist and hip. In order to achieve this classical silhouette a narrowing of the waist is required. However, for the functional purpose, that is, to comfortably ride a bicycle, a restrictive waist area is problematic.

In order to combine the aspects of tailoring with a degree of flexibility and function, the method of the bias cut was employed in an experimental manner to accommodate movement and ease through the waist area.



Figure 14. Barter, B. (2012). *Development of first cycling garment, Iteration #2*. [Photograph]

## 2.4 Experimenting in 3D

Michiel Keuper is a European designer whose work - primarily concerned with the art of draping - seems particularly relevant to my own experimentation with the real body form.

"Because you're directly working three dimensionally, you come up with ideas that you would never have been able to think on paper." (Keuper in Duburg & Tol, 2009, p. 25).

In experiments with draping cloth, especially when using alternative grain lines, the unpredictable nature of the cloth becomes apparent. The technical considerations of construction and seam finishes must then be considered in the design process.

French fashion designer Madeleine Vionnet (1876-1975) was known for her innovative techniques in the use of the bias-grain (Kirke, 1998). What is of relevance to this research is her practice of adapting or innovating methods of construction according to the characteristics of the specific fabric being used. Innovative solutions were sought during design development. (see 2.7.2, below).



Figure 15. Barter, S. (2011) *Experimenting with bias cut grain* revealing the use of the bias, enabling a silhouette to emerge that uses the natural drape of the fabric. The bias grain has been used to mould the large front panels in Iteration #1 in such a way that a waistline formed enhancing the silhouette with the minimum of cutting. [Photograph]



## 2.5 Materiality

Fabric choice is a critical factor in the success of any garment. In the development of the first cycling jacket, (Figure 15), a heavy felted wool was sourced at a local woollen mill. Historically, the association of wool with high quality tailoring developed from its ability to be moulded and shaped during construction. It remains the fabric considered to have the greatest qualities for tailoring (Aldrich, 2002, p. 28). Other considerations included wool's suitability to outdoor environments due to its low thermal conductivity and ability to adapt to changing conditions; its tactile qualities, offering a comfort factor in both indoor and outdoor applications, and; its recent association with high quality garments, such as the successful New Zealand brands Untouched World and Icebreaker.

The significance of using wool with a felted finish became apparent during trials when the advantages of the double warming effect of the fabric, due to the ability of the felted fibres to trap air, could be appreciated. The felted finish also increases the ability of the fabric to keep the body from becoming chilled if wet or damp (Watkins, 1995). It is for these reasons that the decision was made to use wool for the final garments.

## 2.6 Bias grain and use of woollen fabric

Three significant factors that influenced the creation of the first garment were; the woollen fabric mentioned in the previous section, the use of the bias cut, and the experience of weather conditions recorded in the cycling journal entry (31/5, Appendix C). Further experimen-

tation with construction led to a style of tailoring that resulted in a functional and versatile sleeveless jacket. The aim was to create a defined silhouette without the use of interlinings. The wool panels (cut on the bias) softened as the garment was worn, providing a subtle shaping over the bust, waist and hip. This led to the development of a softer style of tailoring.

### 2.6.1 Problems associated with this approach

What was unresolved was the problem of maintaining flexibility linked to the inability to predict the movement of the large panels. Fusing and different weights of fabric were trialled. However, on such large panels, this was both time consuming and costly. 3M reflective piping (Figure 16) was introduced to the work as a possible stabiliser. This was later rejected when a decision was made to use an optional reflective feature within the work.



Figure 16. Barter, S. (2011) *Use of reflective trim as a stabiliser*. [Photograph]



Figure 17. Barter, S. (2011). *Development of Iteration #3 (Olive), Iteration #4 (black and Iteration #5 (olive))* [Photograph]



## 2.7 Introduction of laser cutting technology

### 2.7.1 The need for ventilation

The prototype jacket shown in Figure 15 was tested while cycling to observe the performance in relation to the physiological comfort of the rider. Discomfort that arose was due to a lack of ventilation through the back and sides, caused by overheating while the body was under exertion and poor thermal exchange (Watkins, 1995).

The need for some kind of opening was explored through research into examples of sportswear using design detailing that integrates both function and form. It was noted that felted wool, with its matted surface, allows direct cutting without fraying. Considering these together led to the idea of precise and accurate holes positioned exactly where I was feeling the discomfort. The search for a precise method of achieving this resulted in experimentation with laser cutting technology.

Since the primary function of the perforations is for thermal exchange, placement of the holes is therefore arranged to dissipate excess heat. A secondary consideration offers opportunities for the enhancement of the form by drawing attention to specific sections of the body. This was a design decision and trials were made on a number of samples, and by varying the size and arrangement of holes the required ventilation was achieved.

Trials involved various blocks and patterns cut into wool using a x-660 universal laser machine. Precision cuts guided by CAD/CAM<sup>5</sup> system can be made to within 10 millionths of a metre without fraying<sup>6</sup>.

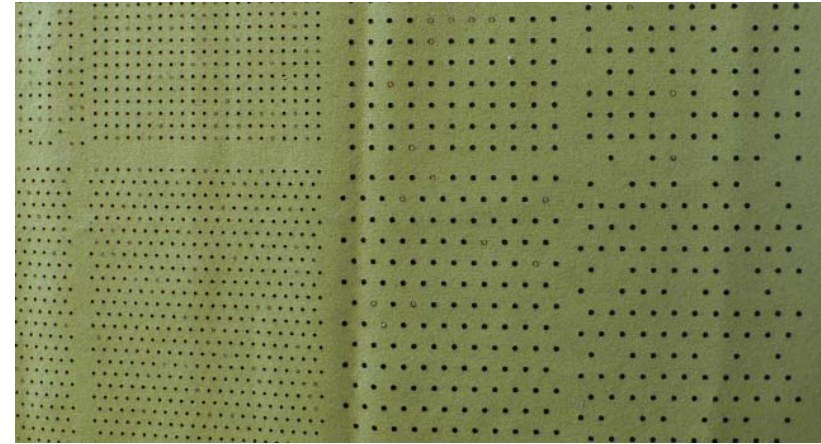


Figure 18. Barter, S. (2011) *First trial of perforations with a laser cutter*. [Photograph]

Trials were made on AutoCAD software to finalise the size and spacing and locations of the perforations across the different panels. As the advantages of CAD became apparent, the decision was made to laser-cut the whole garment.

<sup>5</sup> Computer Aided Drafting (CAD). Computer Aided Manufacturing (CAM)

<sup>6</sup> ...Retrieved 7 June, 2012 from [http://www.assuredlaser.com.au/english/laser\\_systems/product\\_line/specs/x660.pdf](http://www.assuredlaser.com.au/english/laser_systems/product_line/specs/x660.pdf) These machines direct a current through nitrogen, helium and carbon dioxide gases that can cut through a variety of materials including aluminium, steel, plastics and fabrics.



Figure 19. Barter, S. (2011) *First perforations on the jackets iteration #5*. [Photograph]



Figure 20. Barter, S. (2012) *Use of laser perforations to create additional shaping, Iteration #1*. The blocks of perforated holes were used to give the illusion of added shape and form to the jackets, combining aesthetic and functional qualities. [Photograph]

### 2.7.2 Developments in the tailoring that arose as a result of the laser cutting technology

An outcome of this experimentation was the emergence of a distinctive finish on the cut edge of the woollen fabric. The fused fibres eliminated the need for seam finishing. A decision was made to let go of pre-conceived notions, such as the convention that a tailored jacket must have interfacing and linings. This meant that unresolved construction issues from the earlier work were revisited (see 2.6.1 above). The problem that I had faced was how to finish the edges without distorting the silhouette. By obviating the need for edge finishing, the use of laser cutting allows new possibilities for design and construction.

### 2.7.3 Mouldling and manipulation of edges

To reduce the bulk within the seam, an experiment using laser cutting technology to solve the issue of stabilising the centre fronts was undertaken (Figure 21). This was achieved by eliminating the seam allowances and finishing the edge with the 12mm fused 7 bias-cut strip. Edge stitching through all thicknesses worked well, both functionally and aesthetically. The experimentation continued with this form of edge-binding to mould and form particular sections such as the collar and the lapel by adjusting measurements and easing the edge-binding as it was being applied as shown in Figures 22 and 23.



Figure 21. Barter, S. (2011) *The problem of bulky and uncontrolled edges in Iteration #5* required a stabilising solution as shown in Figure 22. [Photograph]

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7 The joining of two or more layers with heat and pressure.





Figure 22. Barter, S. (2012) *First trial with edge binding in iteration #6.* [Photograph]



Figure 23. Barter, S. (2012) *Construction of edge binding showing fused bias strip applied to Iteration #2 of the sleeved jacket.* The important aspect was to keep a record of the measurements during the trials to ensure the results would be accurate and repeatable for each fabric [Photograph]

An evolution of shape had taken place. While the original silhouette and tailoring style had clearly referenced the Edwardian riding jacket (Figure 24), the new tailoring style that emerged was determined by a requirement for a higher level of functionality that had arisen as a result of the practical fit testing and performance trials on the bicycle.

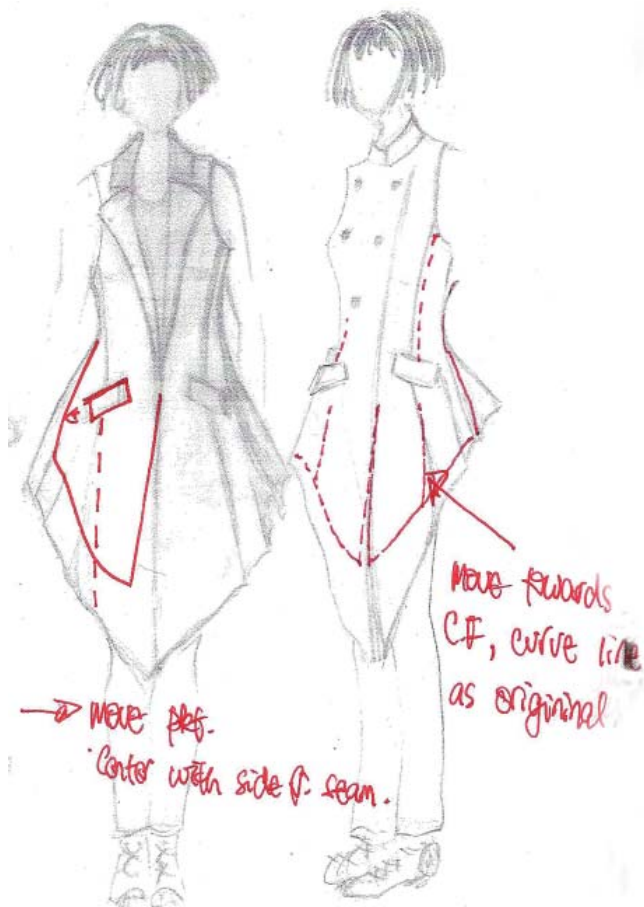


Figure 24. Barter, S. (2011) *Continuation of the feminine silhouette design process*. [Scanned drawing]

The jacket was then pared down to the essential design elements; the double-breasted fronts, the large collar, the tailored silhouette and a perforated panel created for comfort through the back (Figure 25). However, the silhouette that emerged had become shapeless, and not achieved the tailored style I had envisaged.



Figure 25. Barter, S. (2012) *Paring down to essential features (Iteration #7)*. [Photograph and sketch]



Figure 26. Barter, S. (2012) *Sleeveless jacket (Iteration #8)* showing the addition of belt, and collar to add shape to the torso. [Photograph]

I returned to the premise of the classical style of tailoring that alludes to the careful balance and definition of the torso. The vertical seam lines through the torso were well balanced and gave symmetry to the figure. A wide collar and lapel was added to accentuate the shoulder line and the positioning of the buttons and addition of the belt suggest a waist (See Figure 26).

The tailoring and construction methods had by now become firmly established and issues of styling and overall design features of further jackets were based around these.





Figure 27. Barter, S. (2012) *Inside of jacket (Iteration #8)* showing the 'pinked' finish.  
[Photograph]

#### 2.7.4 Inner seam finishing

The laser-cut edge presented further opportunities for innovative detailing. These jackets are to be unlined. Traditional edge-finishing to prevent fraying, such as pinking, is now unnecessary as the laser-cutting process has fused the edge. However as a design choice pinking has been applied to the inner seam allowance and deliberately exaggerated.

While pinked or 'zigzag' seam finishes are associated with an older style of garment construction, the juxtaposition here with new laser technology, hints at the possibility that something so exacting, so precise also evokes something of the skill of handcraft.

Attention to this detail of seam finish suggests that the jackets are intentionally unlined, and that the exaggerated inner seam detailing has been created for the pleasure of the wearer.

### 2.7.5 Further advantages and disadvantages of working CAD/CAM technology

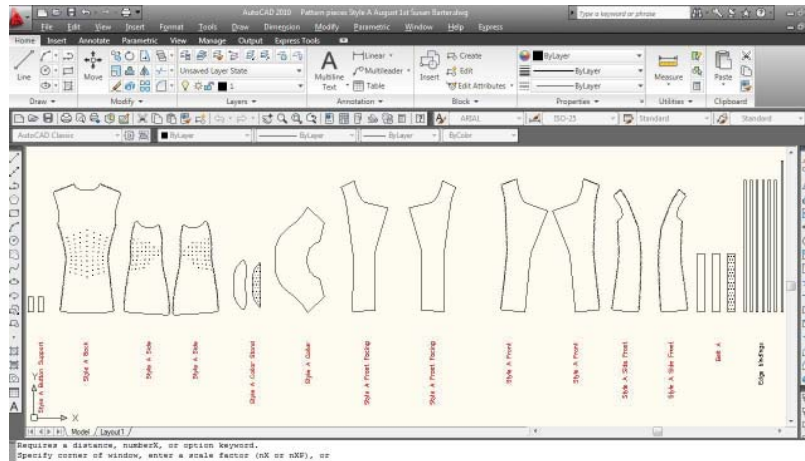


Figure 28. Barter, S. (2012). *CAD screen showing the pattern pieces selected for cutting*. [Digital image]

Benefits of using CAD/CAM technology included on-screen manipulation of material, form and shape, as well as the ability to quickly gather further information on things such as yields or cut sheets.



Figure 29. Barter,B. (2012). *Working with AutoCAD technician*. [Photograph]

The use of the CAD/CAM system was chosen due to compatibility with the laser cutter's technology. The researcher was familiar with Lectra software and drew on experience gained within the clothing industry to adapt and innovate available resources. The cardboard pattern pieces were photographed, then introduced into the CAD drawing, traced, and printed full-sized on paper for checking before being emailed to the laser-cutter.



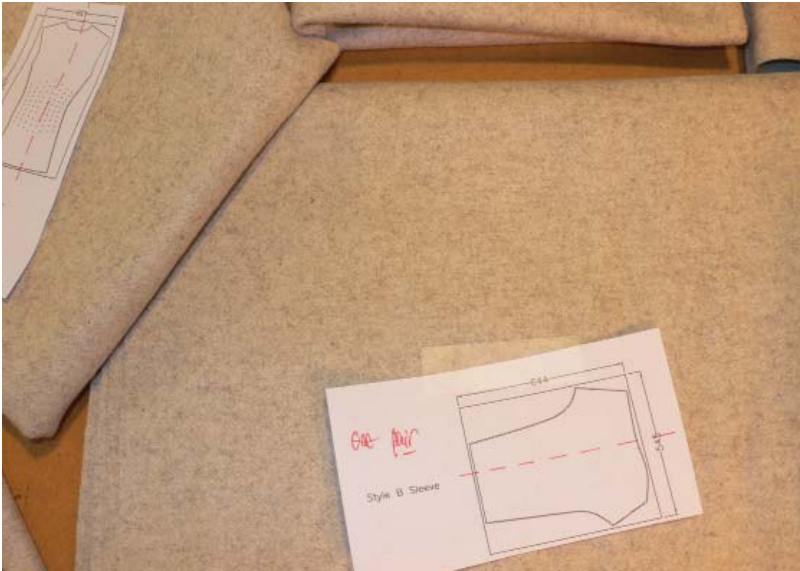


Figure 30. Barter, S. (2012) *Benefits of using digital technology, labelling of pieces for cutting.* [Photograph]

Having access to the files in various formats enabled clear communication and pattern storage. The preparation of the first cut for the laser-cutter is vital. The jackets must be cut on the correct grain line as some pieces are on the bias grain. Having an accurate drawing that was used to produce labels reduced errors (refer to Figure 30).

The laser-cutting machine that was used is limited by the size of the cutting bed. The work area of the laser bed is 812 x 457mm. So the decision to cut all the pattern pieces for the jackets created constraints in the size of each piece. Trials were carried out using longer and wider pieces. By using a template, the larger panels could be cut accurately. However, a few mistakes were made during this process. For example, fabric moved out of position. Taking this into consideration, a decision was made to reduce the size of the pattern pieces within the overall design.



Figure 31. Barter, S. (2012). *The laser bed showing preparation of test sample.* [Photograph]



Figure 32. Cheng, K. (2012). *Problem solving with the laser cutter technician.* [Photograph]

## 2.8 Use of journal to record details; discussion of significant entries

Primary data was recorded in a journal of cycling experiences (for example, see Appendix C). Information gathered was used to initiate new ideas, record results of trials and help to establish the design criteria for the jackets. The activity of cycling provided ideal opportunities to think about specific requirements of the clothing.

A question raised within the entry related to the concept of the long front hemline. The hypothesis primarily addressed the protection of the thigh area from the elements and, secondly, the issue of modesty when wearing skirts. This was a theme that featured in the earlier work. However, when the length and proportion of the elongated hems were tested to maintain the symmetry and balance of the torso, they were considered unsuccessful. When this functionality was questioned, the straight hemline was adopted.

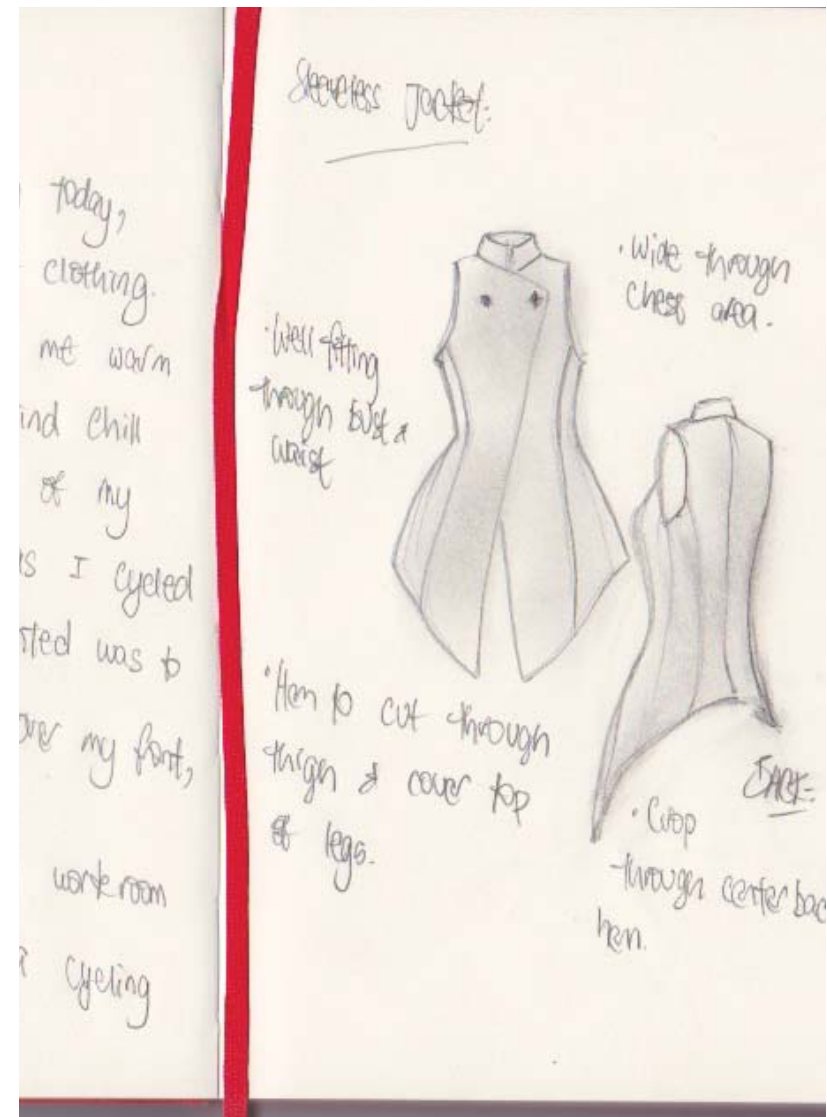


Figure 33. Barter, S. (2011). Entry in cycling journal used to inspire first cycling jacket. [Sketch]

## 2.9 Testing procedures

### 2.9.1 Fit-testing garments

These trials draw on the personal experience of being an urban cyclist faced with the issue of workplace environments with no showering facilities. Experimenting with concept jackets took place until notions of fit and style were determined. Various iterations of the sleeveless jacket became known as Style A. The sleeved jackets were named Style B. Initially, self-observations made the process of testing fairly straight forward, as I wore the trial jackets in the work place, in social settings and on the bicycle each day. However, there were two significant problems associated with this method.

Firstly, the jackets had to be sampled<sup>8</sup> to a level of finish that could be worn both on the bike and in the work place. This put limits on the kind of fabrics selected and the requirements for garments to be finished to a certain standard restricted the level of spontaneity.

Figure 34 illustrates part of my process of recording, analysing and resolving issues of critique. As part of the next stage of analysis the garments were fit-tested on models.

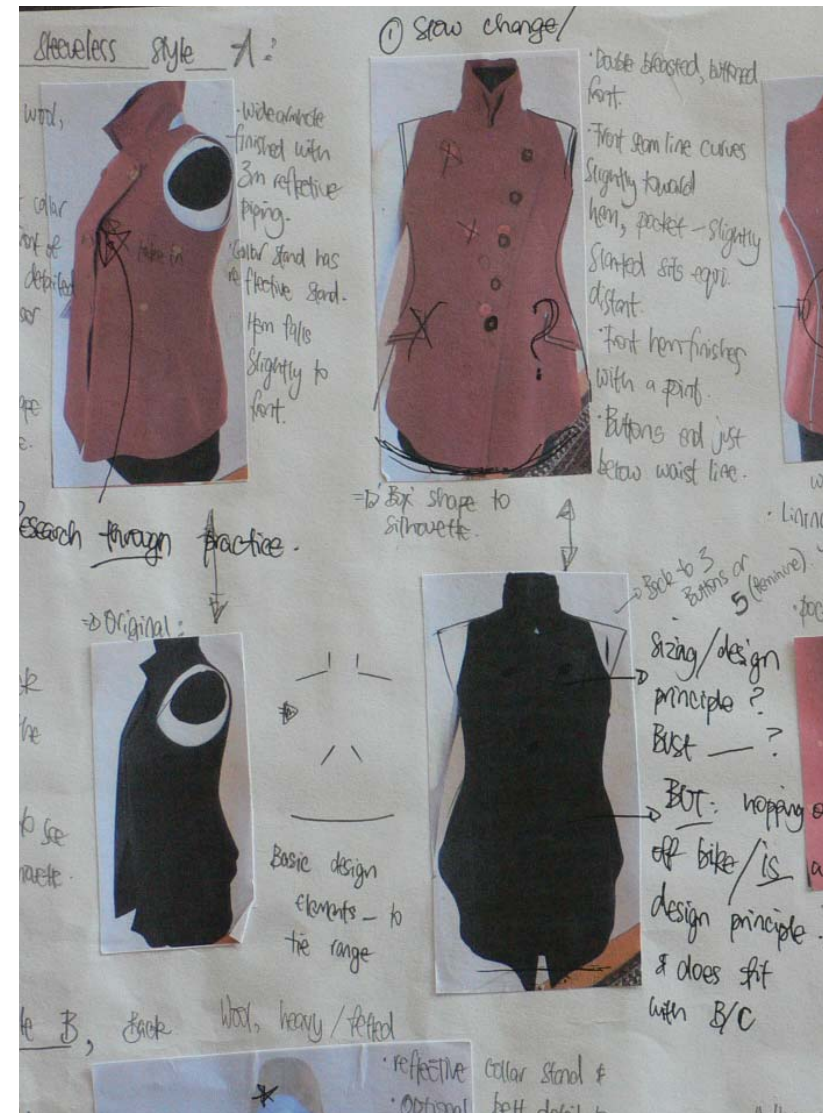


Figure 34. Barter, S. (2012) Illustrative process of critique. [Photograph]

<sup>8</sup> Sample a trial garment used to test the style, the fit or the fabric before production occurs.



### 2.9.2 Introduction of fit models for observation

It was important to observe the jackets on a variety of models. The fit models<sup>9</sup> used were of medium-size, the mid-range for the intended size range.

### 2.9.3 Assessment of discomfort and fit

To categorically state what comfort is, or whether a jacket is comfortable is difficult. On the other hand, in a study entitled 'A technique for assessing postural discomfort' in the field of ergonomics, (Corlett & Bishop, 1976) state that discomfort allows the subject to be specific about the area and degree of discomfort. This notion of comfort became a definitive and useful tool.

"Garment fit isn't straightforward, but what is apparent in an ill-fitting garment is a feeling of discomfort, perhaps an irritation at a constant need to pull at and readjust a garment to feel comfortable." (Watkins, 2008, p. 975). The use of fit models enabled points of discomfort to be determined. Firm guidelines were established so that the models themselves did not distract from the garments (Fan, Yu, & Hunter, 2004).

<sup>9</sup> "A fit model is a model with a figure type of the target customer who is used to develop and check the fit standards for the manufacturer. (Shaeffer, 2001, p. 411)



(Above) Figures 35. Barter, S. (2012) Examples of ill fitting jackets, revealing problems that were later rectified. (See Figure 38) [Photograph]

(Above) Figures 36. Barter, S. (2012) Testing body in motion. [Photograph]

#### 2.9.4 Sizing and pattern establishment for a medium size range

Both of these models (Figure 38) would purchase medium sized clothing. Information was gathered by observing each iteration on a different fit model. The concept was that the jackets would look equally flattering on someone with a preference for a loose or a snug fit, thus establishing a relaxed sizing system. A size 14 block was used for the final patterns, with sufficient design ease to allow for movement on the bicycle.



Figure 37. Barter, S. (2012) *Development of style A by draping*. [Photograph]



Figure 38. Barter, S. (2012) . Showing the final alterations to style A. These additions established the characteristics and styling for the final three jackets. The addition of the button on dual purpose belt change of the collar shape and alteration to the shaping of the front panels resolved the issues of ill fitting. [Photograph]

### 3 THE FINAL JACKETS

#### 3.1 Design criteria for the range of cycling jackets for this exercise

As a result of this research, three final jackets were selected. The specific features will be considered in light of the established criteria.

The established criteria are to;

- 1) Offer protection from the elements, wind and damp weather conditions. Considering particularly vulnerable areas such as the chest and neck.
- 2) Enhance the safety of the rider by the considered styling details i.e. no dangerous features and the addition of 3M reflective trim for riding at night.
- 3) Incorporate considered tactile qualities.
- 4) Have closures and openings that are both flexible and functional to keep out draughts when cold and can be easily opened when warm.
- 5) Address social appropriateness for an office /café setting.
- 6) Incorporate a tailored style to fit into the work place.
- 7) Be easily worn with a variety of silhouettes.



### 3.2 Styles A, B & C

The following three styles were selected; style A, B and C. In order to satisfy the design criteria, each jacket varies slightly offering specific features to address aesthetic and functional requirements. The addition of sleeves provides for a variation of seasonal change. This has also been accommodated by the shape and style of each collar. Different lengths present options for each jacket resulting in a variation of silhouettes. While the relaxed fit is consistent throughout all styles, style B is designed as a more voluminous jacket and style C has a closer fit.



Figure 39. Barter, S. (2012) *Design of Style A*. [Ink drawing]

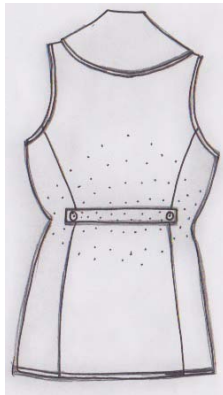


Figure 40. Barter, S. (2012) *Design of Style B*. [Ink drawing]

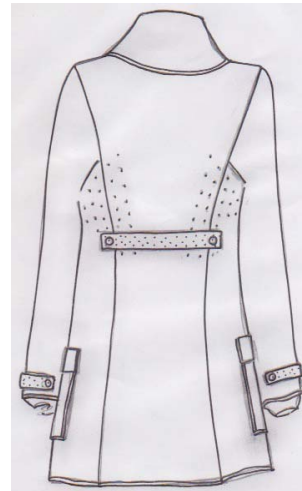


Figure 41. Barter, S. (2012) *Design of Style C*. [Ink drawing]





### 3.2.1 Style A; sleeveless jacket.

- Relaxed silhouette and fit (see See Figure 42)
- A wide shoulder detail defined by the deep collar. For a detailed discussion see 3.32 (See Figure 42)
- A mid thigh length (see Figure 42)
- A flexible tailored collar and functional rever (see Figure 43)
- A generous and practical armhole (see Figure 44)



Figure 42 . Barter, B. (2012) *The relaxed silhouette, A well balanced shoulder line and wide collar detail, and mid thigh length.* [Photograph]



Figure 43 Barter, B. (2012) Edge binding combined with an exaggerated collar and rever that accentuates the tailored style. [Photograph]



Figure 44. Barter, B. (2012) A final solution for the armhole shape using edge binding. Active wear must take into consideration a perspiration factor, thus the deepening of the front arm-scye was important. [Photograph]



Figure 45. Barter, B. (2011) Development of armhole shape using the traditional tailoring. The narrow shoulder line and heavy fabrics combined to present a construction problem. [Photograph]



Figure 46. Barter, B. (2012) Final fabric colour shown in the office setting. The concern was that the colour would be unacceptable, however, in observing this worn with all black clothing, and in the work place it became clear that the combination was acceptable. [Photograph]

### 3.2.2 Style B; sleeved jacket

- Voluminous silhouette (see Figure 47)
- Wide relaxed shoulder line (see Figure 47)
- Longer length for additional warmth practical and safe length for cycling (see Figure 48)
- Square cut wide sleeves, see 3.3.3 for discussion on sleeve development (see Figure 49)
- Three way soft and flexible collar, see 3.3.2 for detailed discussion on development of collar (see Figure 50 & 67)
- Draught stopper gusset at sleeve hem (see Figure 51)



Figure 47. Barter, B. (2012) *A voluminous silhouette enhanced by the wide open collar, the cut of the jacket swings naturally open providing ventilation for indoor wear.* [Photograph]





Figure 48. Barter, B. (2012) *Practical safe length for cycling jacket has sufficient ease of movement on the bicycle.* [Photograph]



Figure 49. Barter, B. (2012) *A square cut deep armhole consistent with the tailoring style that uses a relaxed shoulder line allowing for a comfortable and fit.* [Photograph]



Figure 50. Barter, B. (2012) *The exaggerated collar shown worn in a mid position, this can be easily adjusted by altering two buttons.* [Photograph]



Figure 51. Barter, B. (2012) *A gusset sewn within the sleeve hem addressed the issue of maintaining sleeve proportions.* [Photograph]



### 3.2.3 Style C; shawl collar, sleeved jacket

- Boxy silhouette and shorter length. (See Figure 52)
- Curved panel seams through the centre front. (See Figure 52)
- Relaxed fit through the shoulder line. (See Figure 53)
- Shawl collar with 3M-collar stand. (See Figure 54)
- Wide tailored collar and rever (See Figure 55)
- Slim fitting sleeve. (See Figure 56)



Figure 52. Barter, S. (2012) *Using a combination of curved seam lines, wide collar and rever, pocket angle and button placement to create the classic tailored style containing symmetry and balance.* [Photograph]



Figure 53. Barter, S. (2012) Note the closure over the chest area, due to the reflective collar stand (Figure 54) the raised shawl collar covers the chest area. There is no need for further button closure with this style. [Photograph]



Figure 54. Barter, B. (2012) The 3M reflective collar stand is used within this style for the purpose of construction and functionality. The raised back neck protects the neck area from draughts. [Photograph]



Figure 55. Barter, B. (2012) *Edge binding finish on collar and lapel to accentuate the tailored style.* [Photograph]



Figure 56. Barter, B. (2012) *Style C in office setting.* [Photograph]



### 3.3 Elements common to the jackets

#### 3.3.1 Double breasted and button closure

The double-breasted design is an important development in addressing issues of weather protection. The issues surrounding the cut, closure and the shaping of the centre front panels were influential in the final outcome .



Figure 57. Barter, S. (2011) *Iteration #3* is a comfortable jacket due to the large bias front panels but the issue of closure was difficult. Functioning buttons were placed to create symmetry which was a non-traditional closure. The combination of the wide double breasted fronts cut on the bias became unstable. [Photograph]

The following iteration reflects the change in direction. The double-breasted panel was narrowed to allow the closure to be simplified. This required only three buttons to open and close in line with a traditional double-breasted closure.



Figure 58. Barter, S. (2012) *Iteration #7* Narrowing the bias front panel and simplifying the closure of the double breasted fronts addressed the issues. The fit has become relaxed and the shape is suggested by the shaping of the panel. [Photograph]

This final iteration added subtle waistline shaping and accentuated the waist by the positioning of the buttons.

These features that have been thoroughly tested have determined the closure for Style B (Figure 60) and Style C (Figure 52). Due to the nature of the shawl collar construction the centre front panels are cut on the straight grain. However, the same principles were employed for closure and double breasted fastenings.



Figure 59. Barter, B. (2012) A reduced number of buttons on iteration # 8 has proven to be both functional and flexible. [Photograph]



Figure 60. Barter, S. (2012) Style B Double breasted front. It became apparent that the flexible fronts and minimal button closure were sufficient to meet design criteria. [Ink drawing]

A further feature for closure is the additional waist button this can be used as an alternative closure in extreme weather conditions, to increase ventilation or hold the fronts together during windy conditions.



Figure 61. Barter, B. (2012) *Alternative button. This position for all styles to accommodate a greater flexibility of closure.* [Photograph]



Figure 62. Barter, B. (2012) *The primary function of the button on back belt is to affix the 3M reflective trim. The secondary function is that of fit. The placement is at the small of the back, an area that is flattering on most body types. The extra ease can be easily adjusted by moving the button position. (Note the width of the button support to accommodate this feature).* [Photograph]



### 3.3.2 Collar

The progression and development of the collar has been influenced by the change in tailoring style. Figure 63 shows the initial collar shaping, employing a traditional form of tailoring. The incorporation of the edge-binding technique used in the collar development means one single layer can be used resulting in a collar that can be wrapped closely around the neck, protecting the wearer from the elements. This would be difficult to achieve if interlinings were used. The ability to alter the collar with ease and with one hand when cycling was essential to the requirement for these jackets.



Figure 63. Barter, S. (2011) *Initial collar shape*. [Photograph]



Figure 64. Barter, B. (2012) *Style A showing the development of the collar shape*. [Photograph]



Figure 65. Barter, S. (2012) *Style A showing development of collar closure*. [Photograph]



Figure 66. Barter, B. (2012) Style A with the collar closed and worn up to protect the neck from the elements. [Photograph]



Figure 67. Barter, B. (2012) The exaggerated collar in style B can be easily adjusted to the three positions shown. The addition to the collar of an extra button allows the collar to close snugly into the neck specifically for outdoor wear. Quick adjustment can be made to open the collar providing ventilation when required. [Photograph]



### 3.3.3 Sleeves

For active wear, the sleeve shape and design is crucial to the overall comfort and functionality of the jacket.

“One noted couturier, in order to achieve a comfortable sleeve, kneels beside his clients and asks them to place their hand on his head. Fitting the underarm area then proceeds with the arm in this abducted position” (Kleibacker, 1981, as cited in Watkins, 1995, p. 169).

Three styles of sleeve were selected for testing established by flat pattern work and draping. In line with Kleibacker’s approach I set up a sleeved mannequin that allowed for the consideration of the underarm position testing for movement. Observation during fit testing was essential to ensure the correct fit and look was achieved.



Figure 68. Barter, S. (2012) *Kimono slim fitting sleeve with perforated gusset (Sleeved Iteration #1)*. It combined a kimono sleeve with a wide shoulder line. This combination worked, the slim fitting sleeve cut on the bias grain felt too restrictive. [Photograph]



Figure 69 . Barter, B. (2012) *Early trial of perforated sleeve sections using fully perforated gusset (Sleeved Iteration #1)*. [Photograph]

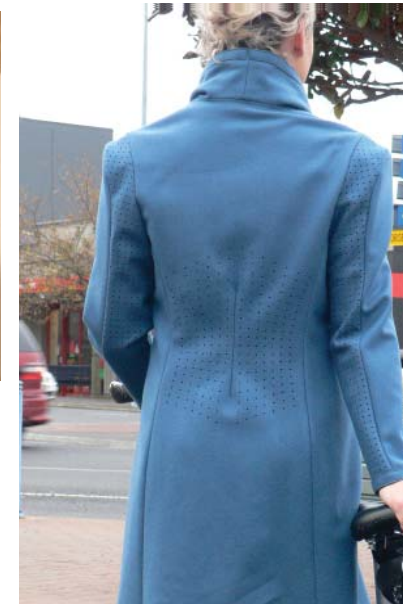


Figure 71. Barter, S. (2012) *Three piece tailored sleeve with perforated panels (Sleeved Iteration #2)*. This shows an experiment with an unlined 3-piece tailored sleeve. During observation on a number of different fit models, it became obvious that the shoulder line had to be well fitted this did not meet the criteria of a flexible fit. [Photograph]



Figure 70. Barter, R. (2012) *Square cut kimono (Sleeved Iteration #3)* allowed for a comfortable unrestricted movement while cycling, but this first iteration was too bulky when trialled in an office. The proportion of the sleeve width raised the question of how to stop the draughts at the sleeve hem see figures 80 and 81. [Photograph]



Figure 72. Barter, S. (2012) The square cut sleeve shown in Style B has a deep cut armhole that allows for ventilation and an ease of movement while cycling without adding bulk to the underarm area. [Photograph]



Figure 73. Barter, B. (2012) Using the same square cut armhole for style C and cutting a slimmer fit through arm to balance the proportions. [Photograph]

### 3.3.4 Pockets

A decision was made to add pockets addressing both form and function the design lines support the styling within both jackets. In style B the opening of the large patch pocket is covered by a folded bias flap to stop any gaping of the large side panels and also weather proofing the pocket contents.(See Figure 74) Style C utilises the pocket position and angle that defines and creates further shaping by the use of the angled line. Pockets would disrupt the minimalist look of the sleeveless jacket.



Figure 74. Barter, S. (2012) Style B the soft folded bias flap stops gaping and maintains the line and form through the side panel. [Photograph]





Figure 75. Barter, B. (2012) *Style C* an edge binding finish of the pocket opening addresses the issue of the of stretching at the pocket opening. [Photograph]



Figure 76. Barter, R. (2011). Photographs revealed that when trialled on the street, the black jacket made the wearer almost invisible. [Photograph]

### 3.3.5 Materiality and colour for final jackets

A decision to work with felted wool, or specifically, a light duffle cloth was made on the strength of the benefits of thermal comfort, durability and ability to be tailored. For this project, I was looking for a bold colour palate. This arose from the observation of a street scene (Figure 76) which revealed that the colour yellow stood out; perhaps not surprisingly for a colour that is used intentionally in road markings to alert and warn.



Figure 77. Barter, B. (2012). *Final fabric choice - Yellow*. [Photograph]

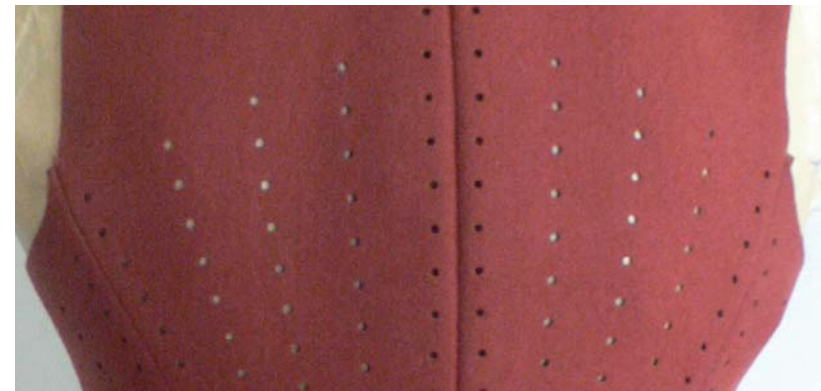


Figure 78. Barter, R. (2012). *Final fabric choice - Rust*. [Photograph]



Figure 79. Barter, R. (2012). *Final fabric choice - Blue*. [Photograph]



Figure 80. Barter, R. (2011) *On street colour testing*. Safety is an important aspect and a significant design criteria of this work. [Photograph]

These garments are not intended as safety garments. However, to be seen at night is an important criteria (Figure 81). Comparing the photograph taken during the day with the same jacket worn at night, reflecting the light source of a following vehicle, shows the effectiveness of the 3M product. Road testing at night revealed the visibility and the functional value of the reflective elements chosen. However, the dilemma was how to incorporate this feature into the garments. Having established the usefulness of the 3M product on the bicycle, the second question was how appropriate reflective detailing is in the office, or in any other social setting.



Figure 81. Barter, R. (2011) *Testing reflective trim at night and day* a trial was introduced incorporating 3M piping within the seams. However wearing this iteration of the jacket was unsuccessful as a 'mismatch' occurred and the sense of social inappropriateness was evoked when worn off the bicycle. [Photograph]





Figure 82. Barter, S. (2012) *The use of multi purpose sleeve and waist tabs on sleeved iteration #3. Initially these were trialled to in a further capacity to control fullness.* [Photograph]

Multipurpose features were incorporated in the jackets in the form of reversible waist and sleeve tabs enabling the reflective fabric to be exposed or hidden as needed. To maintain a consistency of construction, laser-cut pieces are edge-stitched together with the perforated 3M reflective material. The decision to perforate the 3M reflective trim was to blend with the fabrics, achieve a sense of aesthetic integrity and to allude to the precision of laser cutting as something that has an exacting and mechanical precision - much like the bicycle itself.



Figure 83. Barter, S. (2012) *Note the response of the reflective tape to the light source of the camera. The sleeve hem tabs are particularly beneficial for the indication of hand movements while cycling at night.* [Photograph]





Figure 84. Barter, S. (2012) *Presentation: Film image*. [Photograph]



Figure 85. Barter, S. (2012) *Style A jacket*. [Photograph]

### 3.4 Presentation of the final work

The presentation of the final work for the purpose of examination was an installation that incorporated both a static display of the garments and a moving image video. A classroom at AUT (used for the purpose of audiovisual presentations) was chosen to show the work. The windowless room with a facing white wall created a screen to project the video. The angular shape of the room was used to advantage by positioning the mannequins and the projection area in such a way that, upon entering the room, the relationships between the moving and static forms of the jackets could be more clearly appreciated. The tailored mannequins were evenly spaced and angled to draw one's attention to the screen beyond. A wide spacing between each mannequin allowed the viewer to walk easily between each jacket. Concrete floors and an industrial aesthetic to the room evoked an urban setting.

The three jackets were displayed; one of each of the designs, and each jacket was a different colour. Button closure was varied, as were the collar and reflective belt options. Adding to this, the mannequins were spaced on slightly different angles. Lighting was focused on the jackets; the rest of the room was dimly lit to allow the moving images of the video to be seen. The duration of the video was two and a half minutes and ran as a continuous loop. An audio track of street sounds created an ambient sound relevant to the setting and creating the dynamic of life.

Functional aspects and particular design features of the jackets were demonstrated in the video (Appendix D). Presenting the jackets on a moving body (the body in motion), afforded an appreciation of dy-

namic qualities that could not be adequately articulated within the text of the exegesis or by viewing the static garments. The story line of the video loosely follows the day in the life of a cyclist travelling to and from work in an urban setting. It demonstrated the procedure for opening and closing the each jacket. This revealed the functionality of the buttoning and the inside of the jackets. The office scene shows interaction between two models wearing the jackets of differing lengths. Moving into the night-time street scene, the models leave work to visit a café then proceed to cycle home. During this scene, the adaptability of the functional collar is highlighted.

In total, three different models with varying body shapes and heights were filmed against a backdrop of a typical office and urban landscape. The video demonstrates the social appropriateness and suitability of the jackets for both corporate settings and commuter cycling scenarios for which they were designed. Visibility is highlighted showing the use of colour during the daytime and the use of reflective detailing at night. The sounds were recorded on location and mixed during the editing process to create the ambient background.



Figure 86. Barter, S. (2012) *Style B jacket*. [Photograph]



Figure 87. Barter, S. (2012) *Style A jacket*. [Photograph]

## CONCLUSION

This research has been undertaken to address the problem of the lack of appropriate clothing for female urban professionals who choose to cycle to work. The project embraces Smythe's (2011) conception of design as "one means we have to creatively and constructively respond to dissatisfaction" (Smythe, 2011, p. 9). Initially stimulated by dissatisfaction related to personal circumstances, the researcher now has a wider theoretical and practical understanding of the social and historical circumstances within which women's cycling garments have developed. These, in turn, have been linked to contemporary understandings of fit, body cathexis and comfort.

More specifically, the above have been explored in relation to principles of traditional tailoring. Methods of construction were pared down to the essential elements such as creating balance and symmetry and emphasis was placed on the aesthetics of tailoring.

The significant changes that occurred during the research led to a re-assessment of my traditional approach to construction, such as eliminating interlinings and the use of the bias grain. These were required to create a flexible jacket with the necessary ventilation.

A key contribution of this research is to explicate how the practical conventions of tailoring have been re-considered and transgressed by the adoption of contemporary design and fabrication technologies. Laser-cutting technology allowed perforation areas to increase ventilation for body comfort. Additionally, the technology enabled different construction methods to be employed, since finished seams

were not needed due to the laser-cut edges of the woollen fabric being sealed to prevent fraying. The use of laser-cut bias edge-binding gave control of the shape of the garment which overcame the non-use of structural lining elements. This consequently creates a different aesthetic.

Moreover, these new possibilities both create and are created by a requirement for a higher level of functionality that has been identified by the practical fit-testing and performance trials - on the bicycle - conducted as primary field-research.

I see this as the beginning of a conversation. Anecdotal evidence suggests an increase in the number of professional women who are choosing to cycle (Torrie, 2012, Williams, 2012) and suggests that there is a significant interest in cycling specific clothing<sup>10</sup> as opposed to sportswear. The final garments that have been created through the research process have demonstrated that it is possible to create garments to meet the needs of the professional woman who commutes by bicycle.

Clearly, further research would afford opportunities to develop a wider range of clothing to complement the focus of this research into jackets. It became apparent that those who walk to work face similar issues to cyclists, so further work could be done to reach this wider market.

Wool and cashmere were the chosen fibres for this research due to the trials taking place during the cooler seasons. For further devel-

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<sup>10</sup> For example refer to the following websites "Dashing tweeds", "Georgia in Dublin", "Levi's commuter line", "Outlier"; These clothing companies have started producing cycling specific items for the commuter cyclist..

opment the researcher has noted that during the warmer seasons, particularly in New Zealand, the issue of sunburn is relevant therefore lighter fabrics with UV protection will be trialled. Lastly, the investigation of high-tech, high-performance fabrics is an area where the product could potentially be developed for a larger target audience.

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# APPENDICIES

## Appendix A: Copenhagen Cycle Chic Manifesto 2008;

I choose to cycle chic and, at every opportunity

I will choose Style over Speed.

I embrace my responsibility to contribute visually to a more aesthetically pleasing urban landscape.

I am aware that my mere presence in said urban landscape will inspire others without me being labelled as a 'bicycle activist'.

I will ride with grace and dignity.

I will choose a bicycle that reflects my personality and style.

I will, however, regard my bicycle as transport and as a mere supplement to my own personal style. Allowing my bike to upstage me is unacceptable.

I will endeavour to ensure that the total value of my clothes always exceeds that of my bicycle.

I will accessorise in accordance with the standards of a bicycle culture and acquire, where possible, a chain guard, kickstand, skirt guard, fenders, bell and basket.

I will respect the traffic laws.

I will refrain from wearing and owning any form of 'cycle wear'.

## Appendix B: Frocks on Bikes Manifesto 2009

Frocks on Bikes is first and foremost for women.

While we “heart” supportive guys we’re all about the ladies.

Frocks on Bikes is for women of all shapes and sizes.

Frocks on Bikes is for women of all ages.

(If you’re still very much a girl and not just a girl at heart, we’d love to see you along with another Frocker.)

Frocks On Bikes says; Anything in your wardrobe is cycle gear.

FOB is not anti-sportswear or anti-lycra but

Frockers are fabulous biking in our everyday clothes.

Frocks On Bikes loves biking for all its reasons-

Biking as a means to an end, and biking in an end in itself.

We welcome women who are enthusiasts of convenience, fun, sustainability, invigoration and socialising-who may or may not be fans of bikes.

But biking is a direct first-class ticket to all these things!

Frocks On Bikes inspires being conspicuous, positive, fabulous and encouraging.

We spread our message by being highly visible women clearly having fun, being sexy, biking in our everyday lives, being friendly and being everywhere!

Frocks On Bikes are friendly and courteous.

Frockers inspire and fuel virtuous spirals everywhere we go, we are courteous to people with no wheels, people with two wheels and people with four wheels alike.

Frocks On Bikes is apolitical.

We are about wellbeing and sustainability and fun.

These are beyond party politics and affiliations.

Frocks On Bikes is about dressing for the best of both style and practicality.

We show that biking is safe while being safe and sustainable.

It shouldn’t be “your accessories or your life!”

Frocks on Bikes is street wise and safety savvy as well as stylish.

We know we have the right to Frock on the roads, but we know it’s a jungle out there!

Frockers expertly deploy superb survival skills as well as animal prints!

Frocks On Bikes loves support from sponsors we admire for their good environmental ethics and corporate social responsibilities.



## Appendix C: Journal Entries

16/11 "Windy day today wore the light weight black with long fronts. The tails wouldn't stay over the leg area fabric too soft. Stopped & fastened the lower 3 buttons. Rest of the trip was more comfortable, not completely satisfied. Consider heavier fabric? Or is this not a valid solution."

As a consequence of a wintery ride, an initial sketch was made of a sleeveless jacket. Another cold ride on a damp evening inspired an experimental sleeveless cycling jacket. The following entry is discussed in detail within section 2.9.4.

31/05 "Got caught in the pouring rain today, soaked through all layers of clothing, merino base layers helped to keep me warm for a while but with the wind chill factor driving on the front of my body I soon cooled down as I cycled into a head wind. All I wanted was to have a heavy covering directly over my front, from my chin to my knees."

31/07 "Long ride into the city, no train today. Testing thick black woollen jerkin. Wearing thick woollen skirt, light weight merino. Sunny day but cool in the shade. Reflection; great on the flat, but on hills became too hot and waistline felt too restrictive. When standing and not under exertion this was not an issue. Couldn't get a good breath climbing hills."

See discussion in section 2.7.1.

## Appendix D: DVD Presentation