I, Hao Chen, hereby submit this original work as part of the requirements for the degree of Master of Design in Design.

It is entitled: Basketball Player Perspective and Shoe Material Appeal

Student's name: Hao Chen

This work and its defense approved by:

Committee chair: Peter Chamberlain, M.F.A., M.Phil.
Basketball Player Perspective and Shoe Material Appeal

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by

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Member: Steven Doehler, M.A.

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Abstract:

Countless materials are used to produce products nowadays, and the amount is still increasing every day. As one of the most direct communications between product and people, designers use materials to express the temperaments of products. However, people’s feedback to one material varies wildly sometimes because of people’s many perspectives. Due to the innumerable materials and perspective differences, the material selection in design and production processes is always a huge challenge.

The purpose of this thesis is to reveal the relationship between people’s perspective and their shoe material appeal. Also, the processes of discovering the relationship could be considered as the approach for designers to predict target users’ tastes to materials. Surveys were conducted by showing material sample images (black and white) to interviewees with different basketball skill levels. The survey results represented the correspondence between people’s perspectives and materials. Shoe renders were tested in order to prove the correctness of the correspondence. Test results proved the correspondence, which could be applied by designers to find the correct material according to people’s perspective.

Key words: material, perspective, shoe, basketball, correspondence
I would never have been able to finish my thesis without the guidance of my committee members, help from friends, and support from my family.

In general, I would like to express my deepest gratitude to my thesis chair, Peter Chamberlain, who gives me great support to each step of my thesis, and patiently corrected my writing. I would like to thank Steven Doehler, who gave me constructive suggestion to my thesis structure. I would also like to thank Craig Vogel, who shared his design thinking to open up my thesis topic.

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Chapter 1: Introduction

People wear shoes not only for functionality, but also for the appearance and aesthetic. Basketball shoes are a special category because of the unique requirements of the sport. Frequent body contact in basketball games leads to the need for higher quality and extreme protection. The development of material engineering nowadays produces more and more materials that not only satisfy the requirements of basketball sports, but also generate unexpected temperaments from each new material. Therefore, two pairs of shoes with the same form language could represent very different feelings (Figure 1. & Figure 2.).

![Nike Zoom Kobe 7 Normal version](image)

Figure 1. Nike Zoom Kobe 7 Normal version
People have different preferences to even one material in different combinations. The emotion diversification is not just influenced by material, but also by the difference of people’s perspective. Basketball players would like to pick shoes, which appear high tech (Figure 3.), because they believe the high technology will give them better protection when they are playing games. However, people that do not play basketball so often prefer the shoe that looks more fashionable or comfortable (Figure 4.), since they consider the shoe as fashion in daily life, rather than professional athletic equipment. Therefore, shoe designers need to consider the relation behind material appeal and the target user’s perspective, so that the material application on shoes satisfy their target user’s aesthetic requests.
Figure 3. Nike Hyper Dunk 2013

Figure 4. Air Jordan 4
Chapter 2. Literature review and methodology

2.1 Material selection in product design

As mentioned previously, the material selection plays an essential role to represent product temperament, which leads designers to value material selection a lot during design processes. In the following book, authors mention material classification and selection methods.

2.1.1 Classification

In chapter 7 of *Materials and Design*, Michael F. Ashby and Kara Johnson introduce the importance of classification as the first step. Classification is the most basic step to bring order into any scientific endeavor. It is the foundation of geology, zoology and biology, which created the classification systems. “Classification could give order to an initially disordered population into groups that have similarities. Deeper levels of similarities can further categorize these groups.” (Michael F. Ashby, Kara Johnson. 2009) A successful classification system could help people to coordinate the significant similarities, and order the samples into a logical arrangement.

Classification plays a key role in design. Designers need to make choices from large amounts of data and ideas. Classification could help designers locate the selection by
referencing the index (requests). Meanwhile, designers could even predict the selection by analyzing the tendency from the classification, since perspectives are arranged by logic.

The goal of this thesis is to find out the relationship between people’s perspective and material appeal. Classification is essential to arrange the material samples that were used to generate surveys and tests. Material classification will help to find the tendency of data, which is linked to people’s perspective.

2.1.2 Material selection methods

In chapter 7 of Materials and Design, the authors show four main material selection methods for product design: selection by analysis, selection by synthesis, selection by similarity and selection by inspiration.

Selection by analysis

The inputs here are the technical requirements. The method of analysis is systematic. It is based on a deep understanding of the underlying phenomena. And it is robust - provided the inputs are precisely defined and the rules on which the modeling is based are sound.
This method follows a very scientific principle. It's widely used to select specific material. There is not any aesthetic factor involve in material selection processes.

![Diagram of material selection process with constraints and database of materials leading to possible materials and processes: No.1, No.2, No.3.]

**Figure 5. Selection by analysis (by Michael F. Ashby, Kara Johnson)**

**Selection by synthesis**

Synthesis has its foundation in previous experience and analogy. Here the inputs are design requirements expressed as a set of features describing intentions, aesthetics and perceptions. The path to material selection exploits knowledge of other solved problems ("product cases") that have one or more features in common with the new
problem, allowing new, potential solutions to be synthesized and tested for their ability to meet the design requirements.

This method could be used to solve both scientific and abstract aesthetic requests. However, the experiences of previous material application cases always limit entry-level designers to make material selection by synthesis.

![Figure 6. Selection by synthesis (by Michael F. Ashby, Kara Johnson)](image)

**Selection by Similarity**
There are many reasons why a designer may wish to consider similar materials: the need for substitution, breaking pre-conceptions or simple exploration.

Selection by similarity

Designers get most of their ideas from other designers (past as well as present) and from their environment. It is possible to search for these ideas in a systematic way that is the basis of selection by synthesis. Selection by inspiration relies on a mental index (or indexed books or computer files) to search for features and the way they are created. But many good ideas are discovered by accident. The encounter is “inspiring”, meaning that it provokes creative thinking. The scientific method is of no help here; inspiration of this sort comes by immersion; by exploring ideas almost at
random. It can be fired by interaction with products, browsing in stores that market good design, or browsing in books.

![Curiosity Diagram](image)

**Figure 8. Selection by inspiration (by Michael F. Ashby, Kara Johnson)**

All these methods except the first one (selection by analysis) could be used to translate abstract material request to real material selections. The translation processes need foundation of experiences and previous product cases. The purpose of this thesis is to connect the classification of shoe materials to people’s
perspectives. This connection is considered as the “experiences” that help designers to rapidly retrieve materials.

2.2 Color classification model review

Most color classifications are very mature and successful. Scoping color classification could help us figure out a model for shoe materials arrangement. In this thesis, survey methods are based on the model in the book Color Image Scale (Shigenobu Kobayashi, 1990). In this book, the author classifies colors by using cross quadrant analysis map (figure 9). Also, each color comes with an explanation of application and taste checkpoint at full length. This classification helps people retrieve colors with a sense of purposes.
Figure 9. Cross quadrant analysis map and explanation for color classification (by Shigenobu Kobayashi)

This color classification system shows the interrelationship between people’s perception and color. The author reveals the relation by putting the word distribution and color distribution together within one cross quadrant. In this system, color combinations that resemble each other are grouped together into categories,
so that each color combination’s distinguishing characteristics are easier to see, and their image can be differentiated with greater precision.

**Figure 10. Color combination image scale (by Shigenobu Kobayashi)**

The author shows images or real objects to people and asks them the words they would like to describe. Then representing the cross quadrant analysis map links the words and colors, which are predominantly appealing in image or object.
Figure 11. This image shows the corresponding relationship between colors, words, and Objects (by Shigenobu Kobayashi)

In this thesis, people were asked to use words to describe material that was presented by printed image. Using this method is similar to Shigenobu Kobayashi’s, which could represent people’s perception. By synthesizing an individual’s personal information, a corresponding system connecting material, perception (words) and perspective could be established.

2.3 Judgment and choice

In article A Perspective on Judgment and Choice, the author, Daniel Kahneman shows the two choice making systems: intuition and reasoning system (Figure 12).
As indicated in Figure 12, the process of System 1 is fast, automatic, effortless, associative, implicit, and often emotionally charged; it is also governed by habit and is therefore difficult to control or modify. The operation of System 2 is slower, serial, effortful, more likely to be consciously monitored and deliberately controlled; it is also relatively flexible and potentially rule governed.

In order to get people’s impression of shoe materials, image is considered as the best stimulation to trigger people’s intuition judgment, because visual experience is the most important sense to human being. Thus, material image is the main tool used in surveys in this thesis. As Daniel Kahneman mentions that reasoning system is also involved in judgment. These reasons definitely have a relationship with people’s perspective. Therefore, in surveys, people were also asked to answer questions to express the reasons why they prefer certain materials.
Daniel Kahneman shows that another function of system 2 is that it can monitor the quality of both mental operation and overt behavior. The reason why people choose is not only used to analyze their perspective, but also to evaluate the correctness of their intuition selection.
Chapter 3 Study on the relationship between shoe materials and basketball player’s perspective

3.1 Description

The purpose of this study is to find the relationship between material and people. This study attempts to discover which factors influence people’s material preference. It is hypothesized that the skill level of basketball players is an important and valuable factor that affects people’s material preference.

On one hand, this will be valuable for a shoes designer to consider about the correspondence of materials and players, and this will make the design work more efficient and accurate. On the other hand, the customer could benefit from these findings since they can buy the shoes that fit their taste exactly and they can even customize the shoes by giving the material description for the system to identify the materials that relate to this description.

3.2 General interview

The purpose of general interview was to determine the variety of words people use to describe the feeling they get from different materials. A good organization for the
words could lead to a clear and logical analysis to the feeling in regard to the respective materials in further research.

Some athletic shoes material images were randomly selected. Seven interviewees were randomly selected and asked to describe their feelings as they viewed the material images. The resulting words are shown in figure 13.

Over 80 unique words were gathered through the interview process. The list of word was then reviewed and 50 were eliminated because they had very similar meaning.

![General Interview Feedback Visualization](image)

Figure 13. General Interview Feedback Visualization

Some words have negative feelings, such as, dangerous, ugly, and uncomfortable.
Some are positive, such as, designed, comfortable, and strong. Some words represent the basic characteristics and some reflect people’s emotions. The list appears massive since the words are randomly arranged without rules. When people were asked to describe material images, often the first words they came up with were soft/hard, or smooth/rough. Almost every person mentioned these words during their interview. These four words reflect the most basic physical attributes without any personal emotion. Because of this, these four words were selected to generate the variables for a cross quadrant analysis map. The X-axis was used to define the degree of softness, and the Y-axis defined smoothness (Figure 14).

Figure 14. Cross Quadrant Analysis Map
3.3 Online quantitative survey for material distribution

The sample size of the general interview above is not big enough to conduct feeling distribution analysis. Another version of the material feeling survey was done online, and 16 people participated. This survey was published electronically by using Survey Monkey and Facebook. This survey was anonymous and consisted of two parts: The first part contained questions about basic information, such as, age, gender, and how much time is spent playing basketball. In the second part, the participants were shown 40 material images in black and white (Figure 15). They were asked to answer three questions about each material image.

![Figure 15. Material sample images](image)

Q1: How soft or hard does this material appear to be?

Q2: How smooth or rough does this material appear to be?
Q3: Please select at least 5 words that you think best describe this material

![Image of material online survey](image)

Figure 16. Material online survey (Degree section)
The answers to question 1 and 2 could show a degree of softness/smoothness from each interviewee. Word selection could help to represent the people’s feeling to each material.

In total, 18 people responded to all the questions of the survey. There were 9 males and 9 females. Of the participants, 13 people stated they play basketball between 0 – 5 hours per week, 4 chose 5-10 hours, 1 chose 10-15, and 0 responded as playing more than 15 hours. This data shows that most of the people who finished the
online survey were only casual basketball players. Their feedback could be considered the viewpoint of people who play only for recreation.

The responses were related to the given degrees of style. When the mean of the answers were obtained, feelings of hard and rough were in the positive side, and feelings of soft and smooth were in the negative side. For example:

\[
\begin{align*}
\text{very soft} &= 3, \\
\text{soft} &= 2, \\
\text{slightly soft} &= 1, \\
\text{not so soft and not so hard} &= 0, \\
\text{slightly hard} &= -1, \\
\text{hard} &= -2, \\
\text{very hard} &= -3.
\end{align*}
\]

Each material had its own coordinates of valuing degrees of softness and smoothness: X was the degree of softness and Y was smoothness. Material images were placed onto a cross quadrant analysis map by using their coordinates. The whole distribution of material images can be seen in Figure 18.
Figure 18. The visualization of material sample image distribution in cross quadrant analysis map

As mentioned above, people were asked to select at least 5 words to describe their feelings toward each material sample. The top 3 responses of each material image could be considered as the most popular feelings for each material. All these words were listed on a corresponding graph and were placed on the same coordinates as the images in figure. The words were also color-coded in Figure 19.
Figure 19. The visualization of words distribution in cross quadrant analysis map

There are some obvious tendencies in the cross quadrant analysis map by scoping the words, which were color-coded. For example, soft and rough materials, which were located in the lower, left area, gave people comfortable, lightweight, and fit feelings; as we can see those words repeat most in this area. It is no wonder that people said the material that looks like leather will give them a comfortable feeling.
Figure 20. The visualization of words distribution in cross quadrant analysis map (Lower left)

The most interesting finding was in quadrant C (lower left).
Figure 21. The visualization of words distribution in cross quadrant analysis map

(Lower right)

There are relatively more negative words used to describe some specific materials in quarter C, which are unexpectedly used on professional, high class and super star basketball shoes. Meanwhile, people had very different judgments in regard to a single material in this quadrant. For example, material_23 gave people ugly, odd, and wild feelings.
Material_7 and material_8 seem to be very tricky; some people gave very positive responses, such as quality and expensive. However, some did not feel very comfortable with these two materials and gave these words: odd, uncomfortable, and aggressive.
Figure 23. Material sample_7

Figure 24. Material sample_8
It turned out that the material that looks hard and rough did not fit the taste of people who do not play basketball a lot. However, this kind of material is also widely used on high class, professional basketball shoes nowadays. People who do not play basketball a lot dislike the material that looks hard and rough, which represent uncomfortable feelings. This strange phenomenon leads to a question: How would the responses differ between high-level skill players and low-level skill players?

3.4 Face to face survey about tastes of players with different skill levels in basketball.

The purpose of the following survey is to find out the responses from basketball players with different basketball playing levels. This survey consisted of two parts. The level of playing basketball will be a factor that affects people’s perspectives in reviewing the materials on basketball shoes, so it is important to define “level.” Some questions in the first part of the survey were asked so that the answers could be quantified as the “level” of each player. For example, three questions were asked:

1. *What percentage do you play full court versus half court?*

2. *How many days you play basketball in a typical week?*

3. *How intense are you when playing a basketball game?*
Responses for these three questions showed how much time each person takes to play basketball and the significance of this sport to each single person. High-level skill players take lots of time and work hard to improve sporting skills, though talent plays an important role somehow. Time is a measurement to reflect the level of playing basketball. Professional players who consider basketball their work spend most of their daily time to practice and play against other athletes. If people just play for fun or are just shooting around, they will not play with a very high intensity because their goal is not to win the game. Therefore, the second factor affecting their level could be the intensity of game play.

There were 20 material samples printed in black and white in the second part of this survey. These 20 materials were selected from the 40 material samples, which were used to conduct the previous survey. This was done so 40 material samples would generate too many questions for interviewee to finish the survey because of limited time and patience. These 20 materials were selected from categories. Five materials that could represent the characteristics of each quadrant were selected.
Interviewees were asked to select three material samples that they think they would buy and wear as a shoe. At the very beginning, people were asked to select the materials they like most. The interesting point was, some who did not play basketball at all actually selected the materials that were expected as higher...
basketball players’ choices. The reason why they selected high-level players’ choices was because they thought the materials are very appealing and unique. However, when asked if they would wear shoes with this kind of materials, their answers were “No.” Thus, if people really want to buy and wear the shoes, they think the shoes fit their style.

People were also asked to write down three words to describe their feelings when they were looking at the material samples they selected. The words could confirm the accuracy of the findings in the previous survey.

3.5 Result and analysis

It turned out that the words people used to describe the material dovetailed nicely with the feelings of each material sample in the previous survey.

The three questions asked in the last survey generated three points of data: 1) the percentage of playing full court/half court, 2) days playing basketball game in a typical week, 3) percentage of intense game play. The method used to generate the level was to multiply these three pieces of data together and then get a result. If the number of the result is close to 1.00, it means the level is extremely high; conversely it means an extremely low level of playing basketball if the number is close to 0.00.
Material samples were categorized by quadrants with two main physical (visual) attributes of material: softness and smoothness. These two variables divide into four categories of materials:

- **Quarter A**: upper right (smooth and soft)
- **Quarter B**: upper left (smooth and hard)
- **Quarter C**: lower left (rough and hard)
- **Quarter D**: lower right (rough and soft)

The level of playing skill and the distribution of materials in the cross quadrant were put together to analyze the relation between a player’s level and feelings to material.

![Figure 26. Material preference survey feedback chart](image)

20 people were interviewed for this survey and they are reordered by level (E1-E20) (Figure 26). No clear tendency was found in quadrants a, b, or d, except in quadrant c. Responses were colored in Figure 27. Larger numbers were colored darker red and
small were lighter. It shows the strong change in each quadrant as the color goes
darker and darker when the level is increasing. There are almost zero responses from
0.0000 to 0.2057.

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**Figure 27. Responses color coding (quadrant c)**

All the data shows people with higher levels prefer to choose more materials located
in quadrant c, and people with lower levels are not fans of quadrant c material.

**3.6 Hypothesis**
The clear tendency of the selection shows that people who play basketball a lot will prefer to wear shoes with material that looks hard and rough. The material that looks hard and rough gives people an aggressive and unique feeling based on the feeling distribution on the cross quadrant analysis map. Furthermore, the materials with these appearances are widely used on expensive, high class and super star signature shoes in recent years.

All these significant findings in surveys lead to the hypothesis of this thesis: Compared to the lower level basketball players, the \textbf{players with high-level skills in basketball} prefer to choose athletic shoes with material with a \textbf{higher texture contrast, and that is more aggressive and unique looking.}
Chapter 4: Shoes Rendering Test and Conclusions

4.1 Test

Shoe rendering is the best way to represent the materials to interviewees. Because the side view is the most common view people glance over on shoe displays and online, it is natural for subjects to view them in this way. Furthermore, side views could offer the best view of the combination of shoe material rather than top view or any other views, because the side view could offer the biggest surface area.

The purpose of the test is to determine people’s feelings toward materials with different texture contrast. To conduct material texture tests, the criteria of texture contrast needed to be defined first. Texture of material is the arrangement of concave-convex variation. Each concave-convex could be considered as one unit. The different degree density of concave-convex will lead to varied texture experiences. For example, if there are about 30 units in the square (3cm*3cm), people will feel that these piece are high contrast. If the amount of the unit is more than about 1000 in this square, people will perceive flat and smooth texture. When the amount is under 3, people will not feel a significant texture contrast.
People’s feeling toward a pair of shoes does not just come from one or two materials; the feeling is the result of the general composite emotion from the combination of all the materials on the shoes. Only 2 shoes are made with just one piece of material in the 40 material samples, and over half of them are made with 3-4 materials. It is not practical and common if a pair of shoes is manufactured with just one material. Therefore, each shoe rendering should consist of more than one material. The shoe side view was made to show three parts of the upper material, and to do material rendering within these three areas.

In order to eliminate the effects of color, all material samples that were used to do rendering were black and white. Material sample images were selected after evaluating the degree of texture contrast. High contrast materials were used to render shoes to look aggressive and unique. If 3 high contrast materials are all used on one shoe render, it means this shoe render is expressing extreme hard and rough characteristics. If 3 materials that are low texture contrast were used on one shoe render, then this is an extremely smooth and soft shoe, which looks very comfortable and normal. The shoes that were categorized as medium texture
contrast were rendered by some combination of both high texture looking materials and low texture looking materials.

Figure 29. Three high-contrast materials represent high-contrast look (Shoe render_20)

Figure 30. Three low-contrast materials represent high-contrast look (Shoe render_05)
There was a total of 12 shoe renders with different degrees of texture contrast. The reason to do so many renders was to avoid the bias to one specific render, and people could have a large enough volume to select more than two renders for each category. This could decrease the chance of any extreme cases, where certain renders are chosen more than others, by asking the survey takers to choose more than one.

The render test has two sections. The first section asked questions which were the same as those in the third survey to get people’s information about playing basketball, defining that interviewee’s level of playing. In the second section, people were asked to categorize the 12 shoe renders to three set areas:

- Set 1: Shoes that look highest texture contrast, most aggressive and unique looking.
- **Set 2**: Shoes that look middle texture contrast.
- **Set 3**: Shoes that look lowest texture contrast, normal and comfortable looking.

After finishing the categorizing, interviewees were also asked to select three shoes that they think they will buy and wear. A brief explanation of why they chose those three materials was also required.

### 4.2 Result analysis

The level calculation method was the same as that used in the previous survey. The playing level was represented by the result of multiplying these three data points: percentage of playing full court, days that each interviewee played basketball per week, and the intensity of playing. In total, 22 interviewees’ responses were received.

The selections of shoes were color-coded. Each interviewee was asked to select three shoes, so there would be four kinds of answers for each set. 0 means people do not select any shoes in this set; 1 means people select one shoe from this set; 2 means people select two shoes from this set; 3 means all selections are from this set. The bigger number was colored darker, smaller was colored lighter.

Response for high contrast group generates the colors in this chart (Figure 32). It
shows relatively more responses on the bottom of this chart. Meanwhile, higher-level players used up all their chances to select materials from the high-contrast group. This phenomenon proves that people with higher level playing basketball do prefer the high contrast looking materials.

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**Figure 32. Feedback color-coding (High contrast)**

Another chart shows clearer tendencies to prove the hypothesis as well (Figure. 33). These 22 interviewees were categorized to 3 groups by levels: Interviewees’ levels in the first group is higher than 0.3643. The second group is between 0.3643 and 0.1200, and the last group is lower than 0.1200. The numbers mean the total responses from the interviewees for each material set. The numbers were
color-coded. The darkest green locates the area that represents the responses from high-level skill players to the high contrast material. It means high-level skill players select high contrast material more than medium and low, because the responses to medium and low are just 4 and 3. The chart shows additional finding if analyzed at a different angle. To the high contrast materials, high-level skill players gave more responses than those from medium and low-level players.

![Figure 33. Feedback color coding to three material sets from three groups of people](image)

All these proved the accuracy of the hypothesis very well. However, there is additional information represented from this data.

Irregularity distribution could be found from the group of medium-level interviewees. The tendency is not strong and clear for medium-level interviewees’ selections to high texture contrast material. There is no significant preference to each set of materials, since there are 7 responses to high contrast, 6 to medium, and 8 to low.
There is another interesting finding from low-level group. Low-level players offered more responses to high and medium contrast materials than those to low contrast materials. The players with a low-level of playing expressed their strong desires to high contrast materials, though the responses are less than those from high-level players.

After analyzing the feedback from the test, the possible explanation was found. The reason from interviewee to choose aggressive and unique shoes is almost the same: outstanding uniqueness. The material with an aggressive look and unique feeling always attracts a lot of attention in basketball games. Lower level players want to catch audience’s attention and the attractive looking shoes always satisfied this requirement. What is more, the outstanding looking shoes could give a low-level player confidence and motivation to play. Higher level players want to be the center of playground and they are really confident with their playing skills, so they want to wear outstanding shoes to catch people’s eyes to watch their show. The perspective of middle-level players is more practical. They consider more about practicability aspects of basketball shoes, such as comfort, air permeability and flexible rather than fancy looks.
Chapter 5: Conclusion

5.1 Findings and discussion

Surveys showed people with high-level skill in basketball prefer high-contrast texture material on shoes, and low-level players prefer low-contrast material. In the following test, 12 shoe renders were grouped to three sets: high-contrast shoe, middle-contrast shoe, and low-contrast shoe. Each interviewee was asked to select three renders from all these 12. The result of the test confirmed the findings from the survey showing a clear tendency for more selections to high-contrast materials from high-level basketball players, and fewer positive responses to low-contrast materials from middle and low-level players. The result also showed low-level players expressing relatively more desire for high-contrast materials compared to those from middle-level players.

The surveys in this thesis revealed the relationship between people’s perspective and their basketball shoe material appeal. The test and analysis result validated the correctness of this relationship. For this reason, considering this relationship more could offer significant contribution to the shoe design process. Shoe designers could select material to target users more efficiently by referring to the corresponding
relationship, and reducing the risk of design failure due to inappropriate material selection. The methodology that was used to study perspective and material appeal could be applied to other fields, as a material selection assist in design process.

5.2 Limitations and Repercussions

It is important to mention that the surveys and tests presented in this work only covered texture, which represents only one aspect of material. This allowed the research to be more focused and come to a more clear result. The method used to conduct the research could be easily transferred to other aspect. The well-match relationship between people’s feeling toward athletic shoe materials could be the root of further research in this area.

Because the renderings of the shoes in the tests reflect the aesthetic sensibilities of the designer who created them, there is likely some bias in the presented designs. This could lead to the aesthetic differences when interviewees were looking at them. In the test, shoe renderings were presented only in side by side orientations, and shown only in side view. This led to texture experiences loose and details missing. The loss of detail and experience affected the result, but the influences are believed to have been minimal.
References


Appendices

Appendix 1

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Figure 1. Nike Zoom Kobe 7 Normal version

Figure 2. Nike Zoom Kobe 7 Elite version

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Figure 6. Selection by synthesis (by Michael F. Ashby, Kara Johnson)

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Figure 11. This image shows the corresponding relationship between colors, words, and Objects (by Shigenobu Kobayashi)

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Figure 18. The visualization of material sample image distribution in cross quadrant analysis map

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Figure 20. The visualization of words distribution in cross quadrant analysis map

(Lower left)

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(Lower right)

Figure 22. Material sample_23

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Figure 25. Material preference survey

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Figure 32. Feedback color-coding (High contrast)

Figure 33. Feedback color-coding to three material sets from three groups of people
Appendix 2

Online quantity survey for material distribution (personal information)

1. What is your gender?
   - Female
   - Male

2. In a typical week, about how many hours you take to do sports?
   - 0–5
   - 5–10
   - 10–15
   - >15

3. What sport do you play?
   - Badminton
   - Baseball
   - Basketball
   - Football
   - Jog
   - Soccer
   - Tennis
   - Training
   - Volleyball
   - Other (please specify)

4. How many pairs of sport shoes you bought in the past two years?
   - <3
   - 3–6
   - 6–9
   - >9

5. What’s your purpose to buy sport shoes?
   - Just for sport
   - Just for daily life
   - both sport and daily life
   - Other (please specify)
6. When choosing a pair of sport shoes, which of the following factors matter to you most?

- Price
- Materials
- Form
- Function
- Brand
- Other (please specify)

7. What kind of material do you like most in sport shoes? (use some words to describe).
Online quantity survey for material distribution (material feeling for material_01)
**10. Please select at least 5 words to describe this material. (Material Sample_1)**

- Activity
- Aggressive
- Amateur
- Arrogant
- Bright
- Cheap
- Clear
- Comfortable
- Dangerous
- Dashing
- Delicate
- Designed
- Disgusting
- Ductility
- Exclusive
- Expensive
- Fashion
- Firm
- Fit
- Fragile
- Future
- Geometric
- Heavy
- High-Tech
- Horrible
- Light Weight
- Luxury
- Mild
- Nature
- Odd
- Old
- Ordered
- Outdoor
- Personal
- Pliability
- Professional
- Protection
- Quality
- Relaxation
- Sharp
- Sprightly
- Strong
- Tenacious
- Thick
- Tight
- Ugly
- Uncomfortable
- Unique
- Ventilate
- Vulgar
- Warm
- Wild
- Young

Other (please specify)


Online quantity survey for material distribution (some personal information result)
In a typical week, about how many hours you take to do sports?

Answered: 18  Skipped: 0

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davy thesis survey

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Plasticity
Aggressive
Mild
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Doxing
FaxHun
Sharp
Clear
Horrible
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Nature
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Wild
Amateur
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Total Respondents: 18
Appendix 3

Face to face survey about tastes of players with different skill levels in basketball (questions).

Shoes Material Survey

Davy Chen
Industrial Design
davychendesign@gmail.com

#1. Your email or phone number:

#2. Your Name:

#3. Your Gender: F / M

#4. Do you play basketball full court / half court, if both, how many percent of each?

Full court: _____%  Half court: _____%

#5. Do you play basketball everyday / somedays, if somedays, how many of each week?

_____ / 7

#6. How much intensity do you pay when you are playing basketball?

_____%
Please select 2 materials you think you will choose as your shoes material, and use three words to describe the feeling to these two materials.
Face to face survey about tastes of players with different skill levels in basketball (result).

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Appendix 4

Shoe renders
Appendix 5

Shoe renders test result

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