An examination how colors and content of the box affect carrying task

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ABSTRACT

Despite we bring the stuffs with the same weight, in some case we might feel it heavier than the actual weight, and in other case vice versa. Thus, perception of weight would be influenced not only by physical weight but also by "something". As the "something", we focused on the colors and the attributes. In previous literature, it was found that brightness of color would affect the perception of weight, and that the attribute would also influence the perception of weight. Therefore, it could be said that the above two factors, i.e. colors and attributes, would be in the same schema. Considering based on the findings obtained by the previous research, the influences of both brightness and attributes to human performance could be similar influence of physical weight. The purpose of this research is to validate this hypothesis.

Keywords: Weight, Importance, Lightness, performance, work efficiency, Metaphor

1. Introduction

Despite we bring the stuffs with the same weight, in some case we might feel it heavier than the actual weight, and in other case vice versa. Thus, perception of weight would be influenced not only by physical weight but also by "something". Schneider and Nishikawa et al considered the "something" and revealed that importance and lightness are affecting perception of weight. Both importance and lightness affect physical weight, it is considered that there is in common. However, in the above-mentioned research, each focuses on importance only or lightness only, and discussions on common Characteristic have not been made (Figure 1). Honda and others thought that importance and lightness were judged by the degree of weight, and thought that degree was evaluated by the same framework of weight. As a result of the experiment in this hypothesis, Importance and lightness influence perception of weight, and it was revealed that the combination of the two affects even greater influence on the perception of weight (Figure 2).

In other words, it was revealed that perception of weight can be controlled by changing importance and lightness of objects. Considering that people act on the basis of perceived information from the outside world, it is considered that importance and lightness can also control human performance by using the knowledge obtained in the above experiment.

2. Purpose of this research

In this research, the purpose is to examine whether importance and lightness affect performance by adding performance to Fig. 1 and Fig. 2 (Figure 3). Experiment 1 considers whether lightness of object affects perception of weight, fatigue and work efficiency with reference to existing researches. In Experiment 2, consider what influence is given to perception of weight and performance when importance is added to lightness.
3. Results

3.1 Experiment 1 method
The experiment is the transportation work of the box. The subject's task was to lift 20 boxes each of white and black and then carry it for 10 meters and stacking to make a round trip. The measurement items are the weight of the box (subjective estimation), work efficiency, transportation method, how to stack and place, heart rate, and degree of fatigue (subjective evaluation). The experiment participants included 40 people of our department of conceptual design (20 males, 20 females, average age 21.7 years old).

3.1.1 Experiment 1 Results and discussion
Figure 4 shows the weight results of subjective estimation, and Figure 5 shows the results of fatigue. The participants perceived the black box to be heavier than the white box (p<0.05). Also, black boxes tended to tire more than carrying white boxes (p<0.08).

Figure 4. Weight estimation
Figure 5. Degree of fatigue

Figure 6 shows the result of placing the box. A black box takes longer than placing a white box (p=0.01). Considering using the results of the hearing, black tends to be deliberately carried in terms of performance. That is, in Experiment 1, it was revealed that lightness has an influence both in weight perception and in performance aspect.

Figure 6. Time to put cardboard box

3.2 Experiment 2 method
In addition to the method of Experiment 1, a personal computer was put in each box, and information of the personal computer was conveyed to experiment participants. Information is directly related to ourselves and what we are still using now is "important" information. And experiments were conducted by defining what was used in the past without being related to self as "not important" information. Measurement items are the same as in Experiment 1. The experiment participants included 40 people of our department of conceptual design (20 males, 20 females, average age 21.8 years old). There, a total of 4 patterns of [black × important information], [white × important information], [black × non-important information], and [white × non-important information] were combined, respectively, combining color and metaphor.

3.2.1 Experiment 2 Results and discussion
Figure 7 shows the weight results of subjective estimation.

Figure 7. Weight estimation

Weight perceived that it is heavier for metaphor to have important information (W=p<0.05, B=p<0.01). Both lightness and importance affected perception of weight, but the importance was more strongly affected. And there was also a tendency to consciously carry it carefully. From the interview, those who did not have important information had a tendency to decrease attention. Furthermore, [important + black] was the heaviest, perception, [not important + white] was perceived most lightly, and it was found that each has an influence on performance. That is, it shows the synergistic effect of lightness and importance.

4. Conclusion

Through this research, it is important that the brightness of the object affects perception of weight, fatigue, and work efficiency, and that importance is given to the object also affecting perception of weight and performance. It became clear that it is revealed that the weight framework affects perception of weight and performance. Future plans will clarify whether it can be applied to other performances such as purchasing power and evacuation behavior depending on the weight framework. And by deepening this research, we think that it will be useful for more effective management and product.