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Article / Book Information

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（博士課程）
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論 文 要 旨

THESIS SUMMARY

系・コース： Department of, Graduate major in	Transdisciplinary Science and Engineering 系 コース	申請学位（専攻分野）： Academic Degree Requested	博士 Doctor of (Engineering)
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要旨（英文 800 語程度）
Thesis Summary (approx.800 English Words)

In Chapter 1: Introduction is the summarized the literature reviews about the effects of trash bins on waste segregation behaviors. This research proposes the improvement of waste collection performance and segregation behaviors with trash bins. The analysis methods included survey and on-site experiments. Firstly, survey questionnaires data were collected to evaluate the psychological preference. The psychological preferences were evaluated by pairwise comparison. The results of survey questionnaires were used to provide the preferred designed object. Secondly, collected wastes in trash bins were calculated to identify waste collection, capture rate, contamination rate, and effective capture rate. The results were analyzed by statistical tests to distinguish the effects on waste collection/separation performances and experimental errors.

In Chapter 2: The effect of trash bin setting conditions, the distance to trash bins along walking path gave no significant effects on waste collection and separation performances. On the other hand, the increase of distance out of walking path significantly decreased waste collection. The increase of 4 m and 8 m distance decreased total amount of waste collection about 10.9% and 30%, respectively. In contrast, the distance gave no significant effect on separation efficiencies. Threshold distance that can affect waste disposal behaviors might exist between 8 and 410 m. Separated setting of combustible waste and PET bottle trash bins in the opposite side of the original position (3 m distance) significantly decreased capture rates of these wastes while contamination rates of trash bins in the original position were significantly increased.

In Chapter 3: The effect of trash bin arrangements, the preference of trash bin arrangement gave no significant effect on waste collection and the others excluding capture rate of can. It might be interpreted focusing not on arrangement preference but on setting positions of trash bins. Cans were correctly disposed to can trash bin when can trash bin was set in the middle position. On the other hand, some of cans were incorrectly disposed to glass bottle trash bin in the middle position when can trash bin was moved to the left position. It is the same with glass bottle. It could be concluded that persons might prefer to drop recyclable wastes (cans and glass bottles) to a trash in the middle position rather than in the left/right position.

In Chapter 4: The effect of trash bin colors, it was found that yellow bin is the most preferred bin. The lowest preferred color combination performed the highest waste separation efficiencies. However, color combination preference gave no impact on waste collection. The effective capture rate linearly decreased with increase of total waste collection. The contamination rate increased with increase of proportional of the other wastes. The effective capture rate had significant correlations with the noticeability for all types of wastes. Trash bins with less noticeable color combinations would require larger attention to be found. It might contribute to waste separation encouragement. In addition, behavioral mechanism of participants was found. PET bottle is the easiest waste for correct disposal while PET bottle bin is the most easily contaminated.

In Chapter 5: The design analysis of trash bin, two types of bins were investigated including PET bottle bin with 2-dimensional shapes (2D) and combustible waste bin with 3-dimensional shapes (3D). The preferences of PET bottle bin designs were checked with various degree of visual impairments including Visual Acuity (VA), Diabetic Retinopathy (DR), Macular Degeneration (MD), and Retinitis Pigmentosa (RP). The results showed that the illustrated label designs were more preferred than letter label designs. The preference scores of slot position and shape were depended on type and

degree of visual impairment. In case of combustible waste bin design, the results showed respondents prefer slope slot, top slot, and front slot, respectively and they also prefer visibility trash bin rather than invisibility one. In addition, respondents do not prefer trash bin with lid attached.

In Chapter 6: The perceptive classification of waste mixtures, the study focuses on perceptive classification of combustible and incombustible waste. The result showed respondents are quite good understanding in waste classification. Food wastes gave the impact on the perception of respondents as combustible waste. In addition, plastic wastes are more perceptive as combustible waste than the other incombustible wastes. Female is more understanding in classification of commingled wastes than male. Younger people can classify combustible wastes from plastic wastes clearer than older people.

In Chapter 7: Overall conclusion and recommendations, the conclusions in all chapters were summarized with the recommendations. The improvement of waste collection performance is provided according to the results in previous chapters. Moreover, the results also suggest recommended trash bin designs and the improvement of waste segregation behaviors. It could be noted that the participants in the studies, demographic properties are very biased because they are mainly students. Biased demographic properties might give non-negligible impact on the results. Our experimental results risky generalized something.