要 旨

複合現実環境における情報選択性の検討

坂本 慎昂

　私たちが外界から情報を得る手段の中では視覚がその情報取得の多くを占めているが，目に入る全ての情報を処理しているわけではない．視覚系の並列処理には限界があるため，その範囲内で有用な情報を選択することが必要である．この情報取得の取捨選択に重要な役割を担っているのが視覚的注意である．近年スマートフォンの利用の増加に伴い，AR 技術を用いたアプリケーションも多く登場し，AR がより身近なものとなった．今後 AR 技術が発展すると，現実世界に多くの AR による情報が呈示されることが考えられる．その際に私たちは実物体と AR 物体が呈示される複合現実環境の中から有用な情報を選択する必要が生じてくる．

　本研究では HMD を使用して複合現実環境を構築し，情報選択の注意特性を検討した．課題には周辺刺激を無視しながら目標刺激を同定することが求められるフランカー課題を用いた．この課題において目標刺激と周辺刺激が異なる条件の反応時間とそれらが等しい条件の反応時間が周辺刺激の効果（フランカー効果）であり，この値が小さい場合は目標刺激が周辺刺激の影響を強く受けずに目標刺激を同定できていることになる．

　実験の結果，フランカー課題を実物体と AR 物体が混在する複合現実で行う条件において一日目と二日目の日にちの違いによる効果がみられた．一日目には目標刺激が AR 物体となる条件の方がフランカー効果が小さくなるが，二日目には目標刺激が実物体となる条件の方がフランカー効果が小さくなる結果となった．実物体と AR 物体には，照明光による反射特性や陰影に違いがある．一日目は実物体が目標刺激の場合，周辺刺激の AR 物体に注意が向いてしまうことで反応時間が遅くなるが，二日目にはその妨害が減少することで一日目と比べて反応時間が速くなると考えられる．また有彩色の目標刺激と周辺刺激が共に AR の条件

においても日にちの効果がみられた．複合現実の条件とは異なり，目標刺激と周辺刺激が一致している条件の反応時間にも日にちによる反応時間の効果がみられたため，一日目は有彩色の顕著性が高いオブジェクト自体に注意が向き，オブジェクト内部の記号の情報にアクセスしにくかったと考えられる．

Abstract

Information selectivity in mixed reality environment

Yoshitaka Sakamoto

In the means of obtaining information of the outside world, the visual information occupies much. However, it is impossible to process all of the information projecting to the eyes. Since parallel processing of the visual system has limitations, it is necessary to select useful information within the limit. In the information selection, visual attention plays an important role. With the recent increase in the use of smart-phones, many applications using augmented reality (AR) technology appeared and AR has become more familiar. As AR technology develops, it is conceivable that more information by the AR will be additionally presented in the real world. At that time, we need to select useful information from the mixed reality environment where real objects and AR objects are presented.

In this study, we constructed a mixed reality environment using head mounted display and examined the property of attention in information selection. A flanker task paradigm was used in this study. The task requires the observers to identify the target stimulus while ignoring the peripheral stimulus. In this paradigm, the difference of reaction time between the condition in which the target and peripheral stimulus was different and the conditions in which these stimuli were same, are considered to be the effect of the peripheral stimulus (flanker effect). When this value is small, the target stimulus is considered to be not influenced much by the peripheral stimulus and the target stimulus can be identified efficiently.

The results showed different effects of the flanker on the first and second day in the

mixed reality condition in which real objects and AR objects are combined. On the first day, the condition that the target stimulus was a AR object and the flankers were real objects showed smaller flanker effect while on the second day, the condition that the target stimulus was a real object and flankers were AR objects showed smaller flanker effect. The real objects and the AR objects have different characteristics of reflection and shadows due to different illumination light. On the first day, when the real object was the target stimulus, the reaction time might be delayed as attention was captured to AR objects in peripheral, but on the second day the obstruction effect by the flankers decreased. Compared with the first day, the reaction time became faster. In addition, the effect of the day was also found in the condition that both the target and the flanker were both AR objects which had chromatic color. Unlike the condition of mixed reality, the effect of reaction time due to the day was also observed in the reaction time of the condition under which the target stimulus and the peripheral stimuli were same. On the first day, the object with high chromatic color saliency captured attention to the object itself and it might be hard to access the information of the symbol inside the object.

key words   Visual Attention, AR, Mixed Reality, Information Selecivity, Flanker Task