Innovation, Institutional design



## Toward a more comprehensive understanding of signaling behavior

Institute of Social and Economic Research

Professor Junichiro Ishida

Researchmap https://researchmap.jp/read0116302?lang=en



## Abstract

Conveying information through observable actions, known as "signaling," is a ubiquitous phenomenon observed not only in human societies but also in animal communities. However, the analysis of signaling behavior typically requires a strong assumption called the single-crossing property. To relax this constraint, this study introduces a new condition that encompasses the single-crossing property as a special case and provides a more general analytical framework for signaling. This approach has enabled us to uncover insights into signaling behavior beyond the single-crossing property.

## **Background & Results**

While information is indispensable for individual decision-making, it is generally difficult to exchange information via verbal communication with conflicted interests because the sender often has an incentive to misrepresent the information to their benefit. In such situations, signaling provides a practical, often the only feasible, way to convey information credibly. The signaling theory has been applied in various fields, including economics, political science, and even evolutionary biology. Michael Spence, the first to elucidate the social functions and principles of signaling behavior, was awarded the Nobel Prize in Economics in 2001 for this contribution.

Although signaling is a ubiquitous and pervasive phenomenon observed in human and animal societies, understanding its theoretical implications requires a strong assumption called the single-crossing property, which imposes a type of monotonicity on the structure of preferences. Over time, researchers have become aware that this condition often fails to hold in more complex environments, e.g., those with multiple information sources. In addition, little is known about signaling when the single-crossing property does not hold, mainly because the analysis would become exceedingly complicated without this condition, limiting the further application of the theory.

To address this analytical limitation, this study introduces a new condition that encompasses the single-crossing property as a special case and provides a more general analytical framework for signaling. This framework allows us to obtain a more complete characterization of signaling behavior in the broader class of models. Our framework, in particular, gives rise to "counter-signaling," in which exceptionally talented individuals deliberately avoid signaling, elucidating its theoretical foundations.

## Significance of the research and Future perspective

This study presents the first general analysis of signaling that does not impose the single-crossing property, thereby significantly expanding the range of applications for the theory. For instance, our new framework can be applied to situations where an expert (entrepreneur, researcher, politician, etc.) engages in exploratory activities while attempting to establish their market reputation. In our knowledge-intensive society, the role of knowledge exploration by experts has become increasingly more important, and this study can potentially shed new light on hitherto neglected aspects of knowledge creation.



Fig1 An example that violates the single-crossing property (a: signaling level, t: reputation,  $\phi$ : indifference curve, D: dividing line)



Fig2 Signaling level as a function of type (θ: Decision-maker's type, S: signaling function)

 P a t e n t

 Treatise

 Chen, Chia-Hui; Ishida, Junichiro; Suen, Wing. Signaling under double-crossing preferences. Econometrica. 2022, 90(3), 1225-1260.

 Goi: 10.3982/ECTA19210

 Chen, Chia-Hui; Ishida, Junichiro; Suen, Wing. Reputation concerns in risky experimentation. Journal of the European Economic Association. 2021, 19(4), 1981-2021. doi: 10.1093/jeea/jvaa046

 U R L
 https://sites.google.com/site/junichiroishida/

 Keyword
 strategic information transmission, information asymmetry, signaling, innovation