

PRESS RELEASE

Audiovisual Temporal Asynchrony Differentially Affects Perceptions of Material Properties and Action Quality

— Japan Women's University Graduate Student Receives the *i-Perception* Early Career Best Paper Prize —

Mayuka Hayashi, a second-year doctoral student in the Graduate School of Integrated Arts and Social Sciences at Japan Women's University (Bunkyo-ku, Tokyo; President: Satoko Shinohara), and Professor Waka Fujisaki from the Department of Psychology in the Faculty of Integrated Arts and Social Sciences* experimentally investigated how temporal discrepancies between visual and auditory information affect perceptions of material properties and the quality of human actions.

The results revealed that, even when participants experienced the same audiovisual stimuli, temporal discrepancies between video and sound affected judgements of material properties (hardness) and action quality (skilfulness) differently. Furthermore, substantial individual differences were observed in how audiovisual temporal asynchrony affected judgements of material hardness, while these individual patterns remained relatively stable when assessed again approximately 1 year later.

The findings have been published in the journal *i-Perception*. Hayashi, the first author of the paper, received the journal's **Early Career Best Paper Prize** for this work.

Key Points

- Temporal discrepancies between video and sound affected judgements of material properties and action quality differently.
- Judgements of action quality corresponded relatively closely to audiovisual temporal correspondence, whereas judgements of material properties appeared to involve factors that could not be explained by temporal correspondence alone.
- Substantial individual differences were observed in the effects of audiovisual temporal asynchrony on judgements of material hardness, but these individual patterns remained relatively stable approximately 1 year later.

Overview

In everyday life, we often see an object while simultaneously hearing the sounds it produces. For example, when handling food or interacting with an object, we combine information from vision and hearing to judge material properties, such as whether something seems hard or soft,



PRESS RELEASE

as well as the quality of an action, such as whether a movement appears to be skilful or awkward.

When the timing of video and sound is misaligned, we may notice that something is unusual. However, it is unclear how such temporal discrepancies affect our perception of material properties and action quality.

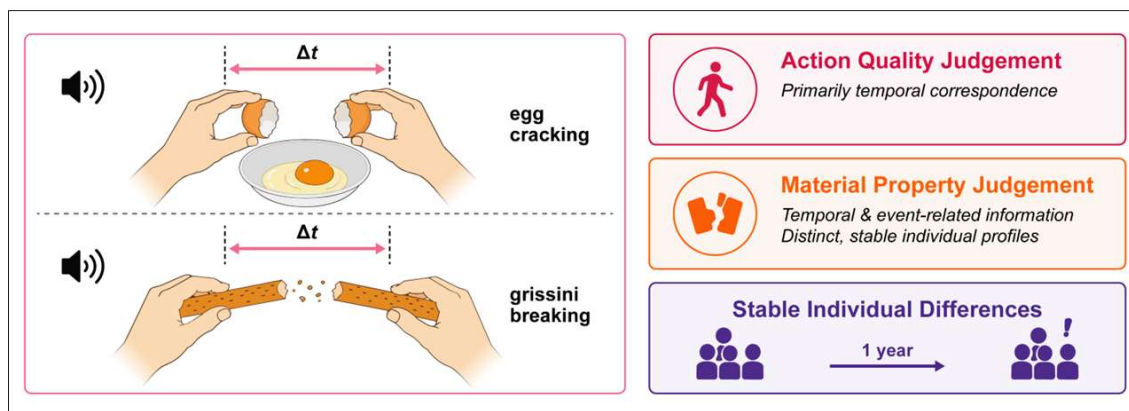
In this study, the researchers experimentally manipulated the temporal relationship between video and sound. Participants judged whether the video and sound appeared to be simultaneous and which came first, while also evaluating material properties (hardness) and action quality (skilfulness).

The results showed that judgements of action quality changed in a manner that corresponded relatively closely to the temporal relationship between video and sound. In contrast, the effects of the same audiovisual temporal discrepancies on judgements of material properties varied substantially across individuals.

When 11 participants from the first experiment were tested again approximately 1 year later, their individual patterns in how audiovisual temporal asynchrony affected judgements of material hardness were found to be relatively stable.

These findings suggest that when integrating visual and auditory information to perceive an event, people do not simply rely on whether the timing of video and sound matches. Instead, the information used may differ depending on what aspect of the event is being judged.

Audiovisual Temporal Asynchrony Differentially Influences Material Property and Action Quality Judgements: Evidence for Stable Individual Differences in Material Perception



PRESS RELEASE

Figure 1. Overview of the study (Graphical Abstract)

Graphical Abstract reproduced from the original article.

Source: Hayashi, M., & Fujisaki, W. (2026). Audiovisual temporal asynchrony differentially influences material property and action quality judgements: Evidence for stable individual differences in material perception. *i-Perception* 17(5), 1–19.

<https://doi.org/10.1177/20416695261495447>

© The Author(s) 2026, published by SAGE Publishing, licensed under CC BY-NC 4.0.

(1) What Previous Research Has Established

Previous studies of audiovisual temporal correspondence have extensively examined the range of temporal discrepancies within which video and sound are perceived as simultaneous, and the temporal order in which visual and auditory events are perceived.

In everyday events, however, we perceive more than temporal correspondence. At the same time, we may perceive the type of material an object appears to be made of and the quality of an observed action.

However, it remains unclear how temporal discrepancies between visual and auditory information affect perceptions of material properties and action quality, and how these effects relate to the perception of audiovisual temporal correspondence.

(2) Aims and Key Findings

The present study compared the perception of audiovisual temporal discrepancies with perceptions of material properties and action quality using the same stimuli, to investigate what kinds of information underlie these different judgements.

The results revealed that audiovisual temporal discrepancies affected perception differently depending on what participants were judging. Judgements of action quality were relatively closely related to audiovisual temporal correspondence, whereas substantial individual differences were observed in the effects of audiovisual temporal asynchrony on judgements of material properties.

However, when the same participants were tested again approximately 1 year later, individual patterns of changes in material hardness judgements caused by audiovisual temporal asynchrony remained relatively stable.

These findings indicate that audiovisual temporal asynchrony affects judgements of material properties in characteristic patterns that differ across individuals.



PRESS RELEASE

(3) Research Methods

The researchers created a series of stimuli using videos and sounds of everyday actions, shifting the timing of the sound forwards or backwards relative to the video.

Participants performed a **simultaneity judgement (SJ)** task, in which they judged whether the video and sound appeared to be simultaneous, and a **temporal order judgement (TOJ)** task, in which they judged whether the visual or auditory event occurred first. Additionally, participants made judgements about material properties (hardness) and action quality (skilfulness).

By comparing these judgements using the same audiovisual stimuli, the researchers examined the relationship between the perception of audiovisual temporal correspondence and the perception of material properties and action quality. The same participants were also tested again approximately 1 year later to examine the stability of individual patterns in how audiovisual temporal asynchrony affected judgements of material hardness.

(4) Broader Implications

The results of the study demonstrated that audiovisual temporal correspondence does not affect all perceptual judgements in the same way.

In everyday life, we perceive objects and events by combining information from multiple senses. The findings suggest that, even when people experience the same audiovisual information, the information used may differ depending on what they are judging. The results also suggest that individual differences in the effects of audiovisual temporal asynchrony on material perception are relatively stable over time.

These findings may contribute to a better understanding of how we integrate information from multiple senses and how individual differences in our ways of perceiving the world arise.

(5) Future Research

Future research should examine a wider range of materials and events to identify which audiovisual information contributes to perceptions of material properties and action quality.

Further investigation is also needed to understand why the effects of audiovisual temporal asynchrony on judgements of material hardness differ across individuals.



PRESS RELEASE

(6) Researcher's Comment

Mayuka Hayashi

Second-year doctoral student in Psychology, Japan Women's University

In this study, we found substantial individual differences in how audiovisual temporal asynchrony affects judgements of material hardness, and these individual patterns remained relatively stable approximately 1 year later. I hope that our findings contribute, even in a small way, to a better understanding of the differences in how we perceive the world, which we rarely notice in everyday life. I am honoured and delighted to have received this award. I would like to express my sincere gratitude to the editors of *i-Perception* for recognizing our work, as well as to Professor Fujisaki, who has guided and supported me in my research since my undergraduate years, and to everyone who has supported me throughout my research journey. This award is a source of great encouragement, and I hope to continue developing my research.

(7) Glossary

Audiovisual temporal asynchrony: A temporal discrepancy between visual and auditory information, such as when the sound of an event occurs earlier or later than the corresponding visual event.

Simultaneity judgement (SJ): A judgement about whether visual and auditory events are perceived as occurring at the same time.

Temporal order judgement (TOJ): A judgement about whether the visual or auditory event is perceived as occurring first.

About the Early Career Best Paper Prize

The *i-Perception* **Early Career Best Paper Prize** recognizes papers whose first authors are early-career researchers who are either pursuing a PhD or are within 5 years of completing their PhD. Prize-winning papers are selected by the journal's editors following acceptance for publication.

For this study, **Mayuka Hayashi**, a second-year doctoral student in the Graduate School of Integrated Arts and Social Sciences at Japan Women's University and first author of the paper, received the Early Career Best Paper Prize.

(8) Article Information

Journal: *i-Perception*

Title: Audiovisual Temporal Asynchrony Differentially Influences Material Property and Action Quality Judgements: Evidence for Stable Individual Differences in Material Perception



PRESS RELEASE

Authors and Affiliations:

Mayuka Hayashi — Graduate School of Integrated Arts and Social Sciences, Japan Women's University

Waka Fujisaki — Faculty of Integrated Arts and Social Sciences, Department of Psychology, Japan Women's University

Publication date (local time): October 27, 2026

Article URL: <https://journals.sagepub.com/doi/10.1177/20416695261495447>

DOI: [10.1177/20416695261495447](https://doi.org/10.1177/20416695261495447)

(9) Funding

This research was supported by **JSPS KAKENHI Grants 22K03198 and 26K06694**.

*The Department of Psychology in the Faculty of Integrated Arts and Social Sciences is scheduled to be reorganized into the Department of Psychology[※] within the newly established Faculty of Human Sciences[※] in April 2028, subject to approval by relevant authorities.

The Faculty of Human Sciences[※] will consist of two departments: the Department of Psychology[※], succeeding the current Department of Psychology in the Faculty of Integrated Arts and Social Sciences, and the Department of Human Development[※], succeeding the current Department of Child Studies in the Faculty of Human Sciences and Design. As Japan Women's University's first faculty established through collaboration across existing academic disciplines, it will provide an interdisciplinary education that integrates perspectives from both the humanities and the sciences.

Through a scientific understanding of human beings and an educational approach that connects theory with practice, the faculty aims to cultivate professionals who are committed to understanding people, supporting people, and empowering people, while contributing to the sustainable development of society.

※tentative name, under planning



PRESS RELEASE

Japan Women's University was founded as Japan's first organized institution of higher education for women, and celebrated its 120th anniversary in 2021. It is the only private women's university with a faculty of science, and is a women's comprehensive university with an educational environment that integrates the humanities and sciences. The Faculty of Architecture and Design opened in 2024, followed by the opening of the Faculty of Food Science last year and the renaming of two departments within the Faculty of Humanities this year. Continuing our university reforms, new faculties are scheduled to open in 2027 (Faculty of Economics), 2028 (Faculty of Fashion Design [tentative name, under planning] and Faculty of Human Sciences [tentative name, under planning]), and 2029 (Faculty of Science and Technology [tentative name, under planning], expanding upon the Faculty of Science). For more information, please visit <https://www.jwu.ac.jp/>.



Japan Women's University
Corporate Planning Department Public Relations Division
Address: 2-8-1 Mejirodai, Bunkyo-ku, Tokyo 112-8681, Japan <https://www.jwu.ac.jp/>
Phone: 03-5981-3163 e-mail: n-pr@atlas.jwu.ac.jp
Facebook: @Official.JWU Instagram: @japan_womens_university X: @JWU_official

