



Exploring Motion Concepts to Images as Multimodal Factors in Nonverbal Language

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Received 28/11/2023 Received in revised form 25/12/2023 Accepted 31/12/2023	ABSTRACT The scarcity of research concerning the incorporation of motion as a modality within non-verbal language imagery has posed challenges in establishing comprehensive measures for evaluating the reliability of its application in content construction. In an effort to pinpoint the factors associated with the implementation of the motion concept in images, the authors undertook a series of pre-experimental research stages. Several data sets subjected to analysis were generated through pre-experimental studies, involving the formulation of questionnaire instruments employing convenience sampling techniques. The outcomes underwent significance testing utilizing Chi-Square and Single Factor analysis. Nevertheless, when delving into the application of the Motion Concept within images, certain aspects have yet to be taken into consideration. Specifically, the utilization of Stimuli and Novelty Intensity factors to shape visual elements, as well as the integration of quasi-experimental research employing more robust sampling techniques, merit attention. Additionally, the impact of cultural modalities on the application of motion concepts to imagery as one of multimodal factor in nonverbal language; necessitates

	further exploration and evaluation. Keywords: nonverbal communication, motion, muliteracy
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Introduction

"Multimodalities" refers to the use of multiple modes or forms of communication and expression to convey information, meaning, or messages. In this context, a "mode" refers to a specific method or channel through which information is transmitted. Multimodal communication recognizes that different modes can be combined to create a more comprehensive and effective means of conveying complex ideas and engaging audiences (Kress & Van Leeuwen, 2006).

Refers to Kress & Van Leeuwen (2006), Arnheim, R. (1997). and Ware (2008); here are some key aspects of multimodal communication:

1. *Modes of Communication.* Modes can encompass various forms of communication, including: Verbal (Spoken or written language), Visual (Images, illustrations, diagrams, and symbols), Auditory (Sounds, music, and spoken words), Gestural (Hand gestures, body language, and facial expressions), Spatial (Arrangement, organization, and spatial layout), Tactile (Touch or physical interactions), Olfactory (Scents and smells), Digital (Information conveyed through digital media, such as websites, apps, and multimedia presentations). C
2. *Combining Modes.* Multimodal communication involves the deliberate use of multiple modes simultaneously or sequentially to enhance communication. For example, a multimedia presentation might combine verbal narration with visual graphics, sound effects, and interactive elements.
3. *Enhanced Understanding.* The use of multiple modes can enhance understanding and engagement, as different individuals may have varied preferences for how they receive and process information. It can make content more accessible to diverse audiences.
4. *Contextual Considerations.* Effective multimodal communication takes into account the context and purpose of the message. Different situations may call for different combinations of modes. For example, a science textbook may rely heavily on visual modes to convey complex information, while a theater performance uses verbal, auditory, and gestural modes to tell a story.
5. *Digital Technologies.* The rise of digital technologies has significantly expanded the possibilities for multimodal communication. Digital platforms and tools allow for the seamless integration of text, images, video, audio, and interactive elements.
6. *Education and Research.* Multimodal communication is relevant in education, where it can enhance teaching and learning, and in research, where it can be used to present findings in engaging ways. It is also important in fields like media studies, communication studies, and design.
7. *Accessibility.* Considerations for accessibility are crucial in multimodal communication. Designing content to be inclusive ensures that individuals with different abilities and preferences can access and understand the message.

Multimodalities recognize that communication is not limited to a single mode but can involve a combination of modes to create richer, more engaging, and more effective

means of conveying information and meaning. This concept is especially relevant in our increasingly digital and interconnected world, where various forms of media and communication intersect.

Motion, as a part of gestural communication, is one of the modalities that plays a role in nonverbal communication. 'Motion' refers to the change in the position of an object from a point of initial equilibrium. An object is considered to be in motion when it changes its position, either moving away from or approaching another object. This movement of an object gives rise to various types of perceptions, including Real Movement and Apparent Movement. Apparent Movement encompasses subtypes like Stroboscopic movement, Induced movement, and Effect Autokinetics, while other types include Graphic movement and Implied Movement (Arnheim, 1997). Gregory's Cognitive Theory sheds light on the organization and interpretation of visual stimuli, suggesting that the human mind comprehends what it sees by actively seeking out familiar elements within it. The brain has an inclination to organize sensory data of objects (Safanayong, 2006). This aligns with the Huxley-Lester Model, asserting that vision and cognition are closely intertwined. Huxley's model involves the stages of sensation, selection, and perception (Safanayong, 2006). These cognitive processes come into play as viewers respond to advertisements, where stimuli depend on the advertising medium, which could encompass visuals, colors, sounds, music, motion, and various other details.

The impact of stimuli on capturing attention and initiating audience responses is also expounded in the Behavioral Theory (Reed, 2004). This perspective contends that psychological responses may change or form not solely due to shifts in beliefs and attitudes, but also through experiences and interactions with the environment. For instance, a design or image can significantly influence psychological responses without the audience even realizing the source of the influence. According to the Behavioral Theory, audience responses are molded by exposure to stimuli (Pawitra, 2001). In this context, visual objects can be structured to guide the viewer's gaze along a certain path, creating optical illusions (Reed, 2004). The preparation of visual objects as stimuli must take into account both functional and structural factors, which encompass external and internal considerations (David Krech and Richard S. Krutchfield, 1977, cited in Rahmat, 2000).

This study centers on the factors crucial for the application of the motion concept in images, with a particular focus on situational factors often referred to as determinants of attention or attention-getters. Stimuli are noteworthy for their salient features, including movement, intensity, novelty, and continuity. Addressing intensity of stimuli, Gunter Kress and Theo Van Leeuwen (2006) highlight specific modalities linked to visual aspects, which, when effectively formulated, can optimize the creation of a perceptual field.

Literature Review

"Nonverbal language," also referred to as "nonverbal communication" or "body language," encompasses the use of cues and signals other than spoken or written words to convey messages, emotions, and information during interpersonal interactions (Rakhmat, 2000). Nonverbal language plays a crucial role in communication and can significantly influence how messages are perceived and understood. It includes various forms of communication such as:

1. *Facial Expressions*. Facial expressions convey emotions and attitudes. For example, a smile is often associated with happiness or friendliness, while a frown may indicate sadness or displeasure.
2. *Gestures*. Hand and body movements can emphasize or clarify spoken words. Common gestures include waving, pointing, and using hand movements to illustrate size, shape, or direction.
3. *Eye Contact*. The way individuals use eye contact can convey interest, engagement, or even discomfort. Maintaining eye contact is often seen as a sign of attentiveness and confidence.
4. *Posture and Body Language*. The way a person stands, sits, or moves their body can communicate various messages. For instance, standing with an open posture can indicate approachability, while crossed arms might signal defensiveness.
5. *Proximity*. The distance between individuals during an interaction can communicate comfort, intimacy, or personal boundaries. Close proximity may suggest familiarity, while greater distance may imply formality or discomfort.
6. *Tone of Voice*. While not verbal in the traditional sense, the way words are spoken, including tone, pitch, and volume, can convey emotional nuances and attitudes. For example, a soft and soothing tone may convey empathy, while a loud and forceful tone may indicate anger.
7. *Touch*. Physical touch, such as a handshake, hug, or pat on the back, can convey various messages, from warmth and affection to formality and professionalism.
8. *Appearance and Dress*. Clothing choices, grooming, and personal style can communicate information about identity, culture, and social roles.
9. *Symbols and Objects*. The use of symbols, signs, and objects, such as traffic signs, emojis, or gifts, can convey specific messages or meanings.

Nonverbal language is an integral part of human communication and can complement, reinforce, or even contradict verbal messages. It's essential in both everyday social interactions and professional contexts, as it provides valuable context and depth to communication. Understanding and interpreting nonverbal cues is crucial for effective communication and building interpersonal relationships.

A pivotal case study underpinning the development of the Concept of Motion in Images is the research conducted by Erika Oppenheimer. This research builds upon Karl

Duncker's work concerning specific visual aspects that can optimally foster perceptual processes. Oppenheimer's study delves into the integration of visual elements within a well-crafted formulation to evoke the desired perceptions. The investigation, rooted in media involving movement, particularly in the context of film, revolves around the theme of "movement" or "motion".

In the realm of psychological design theory, the process of perception is closely tied to acquiring specialized knowledge about events at specific moments when stimuli activate the senses. This process involves recognizing and understanding objective objects and events through sensory input, with its psychological implications strongly influenced by experiences, education, and the broader social environment. During stimulus processing, the human brain amalgamates memories and transforms them into imaginative constructs. The brain holds dominion over the structural framework of thought and the physiological sensory system. Sensation, the foundational stage of internal attention translating stimuli, unfolds in a series of processes: stimulation, transduction, and threshold.

Both Karl Duncker and Erika Oppenheimer are proponents of the notion that the brain acts as an interpreter (Arnheim, 1997). The brain employs heuristics and algorithms to process informational signals. However, in accordance with the research by Culham, Hey, et al. (2001), it is apparent that both brains heavily rely on heuristics, which can lead to errors. These errors often stem from perceptual illusions, wherein we perceive entities that do not actually exist in the physical world. One such type of illusion pertains to the manner in which visual stimuli are collectively organized, underscoring its significance, as exemplified by the phenomenon of "contour illusory" (illusory contours). This elucidates the testing undertaken by the author, exploring the concept of motion as a stimulus that can induce a perception of motion. Notably, the concept of motion has the potential to give rise to illusory contours that imply motion in the audience's cognition. However, variations in the interpretation of visual stimuli can result from selective attention. Consequently, a comprehensive exploration of the characteristic properties and attributes of the research's variable indicators is essential for identifying tendencies in "direction" (vertical/horizontal) and "speed" (fast/slow), as facilitated by the application of the motion concept.

Research Methods

Referring to Emzir (2009), who classified experimental research designs into two groups, this study falls under the category of single-variable design within pre-experimental research, specifically the one-shot case study. As one part of experimental research, pre-experimental research is conducted to provide a rough outline of an experiment, aiming to demonstrate the measurement's strength and the scientific value of a research design. Pre-experimental research is a research activity that does not involve sample randomization and lacks adequate control over confounding variables. Therefore, the experimental outcomes, which serve as the dependent variables, are not solely influenced by the

independent variables.

The scarcity of research pertaining to the concept of motion in images as a modality within non-verbal communication has led to challenges in discerning factors that can reliably measure the extent of its application. In order to identify the factors associated with the application of the motion concept in images, this study employs a series of pre-experimental research stages. The author's analysis involves data generated through pre-experimental studies, utilizing a questionnaire as the research instrument and employing a convenience sampling technique. The obtained results were subjected to significance testing using Chi-Square analysis and ANOVA Single Factor. However, in the context of applying the Concept of Motion in Images, certain aspects have not yet been considered. These aspects encompass the utilization of Intensity Stimuli and Novelty factors as distinctive visual elements, the adoption of quasi-experimental research incorporating more robust sampling techniques, and the integration of cultural modality considerations in the application of the motion concept to images.

This research relies on Gestalt principles to interpret visual stimuli. These principles suggest that the organization of visual elements collaborates to create an impression beyond individual sensations. In this context, visual objects can be strategically arranged to guide the eye, leading to optical illusions (Reed, 2004). The preparation of visual stimuli involves considering both functional and structural factors. This means accounting for external and internal factors, as explained by David Krech and Richard S. Krutchfield (1977) in Rahmat (2000). The study explores how these principles influence the interpretation of visual information, emphasizing the collaborative nature of perceptual organization.

Table 1 The factors that must be considered in applying the concept of motion as multimodal in image (Developed from Kenneth E. anderson (1972) in Rakhmat (2000), David Krech and Richard S. Crutchfield (1977) in Rakhmat (2000), Erika Oppenheimer in Arnheim (1997), Gunter Kress and Theo vans Leeuwen (2006))

Variable	Definition	Parameter	Indicator
Attention	Mental poses when stimuli or series of stimuli stand out in awareness in response to stimuli other weakened. (Kenneth E. anderson (1972)in Grace (2000))	Movement	<i>Directions</i>
		<i>Erika Oppenheimer (in Arnheim, 1997)</i>	<i>Speed</i>
		Intensity Stimuli	Color which stand out
			Inside object image

			that stands out
		<i>Gunther Kress and Theo Van Leeuwen (2006)</i>	Layouts are stand out
		Novelty (Novelties)	Monotone
		<i>David Krech and Richard S. Crutchfield (1977)(in Rahmat, 2000)</i>	Dynamic
		Loop	Familiarity
		<i>David Krech and Richard S. Crutchfield (1977)(in Rakhmat, 2000)</i>	Suggestion

Results

The application of the concept of motion in images serves as a stimulus that activates the visual cortex, a segment of the brain responsible for processing visual stimuli, consequently leading to the process of selective attention. The formation of visual elements, which constitute the visual vocabulary, is imperative for an in-depth exploration of the concept of motion in images.

1. **Movement.** The incorporation of movement in the application of the motion concept to images has proven to be a highly effective means of capturing the audience's attention. A significant majority of respondents, over 50 percent, acknowledged their ability to perceive motion within the depicted objects, discern the direction of the object's motion, and even gauge its speed. Employing ANOVA single-factor analysis, the findings were deemed statistically significant at a 0.05 level of significance, thus supporting the notion that Movement, particularly the Direction of Motion and Movement Speed indicators, contributes as fundamental visual elements in the portrayal of motion within the context of image application.
2. **Intensity Stimuli.** Within the domain of images, colors and the prominence of image objects serve as indicators of stimuli intensity. Over 50 percent of respondents affirmed the positive reception of statements within the questionnaire, particularly those asserting that the visually prominent image object garnered the most attention. However, while the results did not exhibit statistical significance at the 0.05 level, they point toward the need for advanced testing in relation to Stimuli Intensity indicators like Color and Prominent Image Objects.
3. **Novelty and Loop/Repetition.** A stimulus that remains unchanged or repeats itself can lead to sensory adaptation, potentially result inattention blindness, where something seen goes unnoticed due to a lack of attention. In continuation of the

previous point, the third factor highlights a process in which the detection of sensory signals becomes intertwined with the decision-making process, which can be influenced by the trend in an observer's response. On the flip side, when it comes to repeated stimuli, the cognitive process involves the reception, alteration, customization, storage, retrieval, and utilization of sensory information.

There is an indication that the audience engages in pattern recognition, which involves the identification and recognition of stimuli or information in their environment. This process encompasses stimuli storage and the retrieval of stored patterns based on experiences and lessons learned during an individual's development. This is what likely elicits a sense of familiarity when individuals are exposed to certain stimuli. In the context of image presentation, the brain systematically compares each image to a mental template through a process known as mental comparison. This aligns with Gregory's Cognitive Theory, which posits that individuals comprehend what they see through mental processes in which the brain continually seeks out familiar elements and organizes sensory data.

Discussion

Indirectly, the demands of the learning process characteristics in the digital era require literacy skills as a fundamental aspect of character development aimed at achieving a high level of literacy in Indonesia. Technological advancements have led to a shift in the meaning of text, which was initially interpreted as printed words but has now evolved into multi-modal forms. Literacy competence has transitioned into multi-literacy, an extension of traditional or basic literacy. In the era of the Fourth Industrial Revolution, literacy competence has become extremely crucial. Literacy is now defined as the ability to understand various texts in various forms that go beyond reading and writing, including various text forms such as images, graphics, electronic formats, and even kinesthetic forms.

Wilbur Schramm has broadly expressed that in the communication process, a message is a statement supported by symbols, which is a combination of thoughts and feelings (ideas, information, recommendations, commands, prohibitions, complaints, etc.), where symbols can be verbal/language (spoken or written) or non-verbal (visual, signals, body language, facial expressions). In this context, ideas or concepts conveyed can be communicated in the form of images or symbols and meaningful signs; among them, motion, as a form of non-verbal language, is multiliteratives in nature.

Sensation, regarded as the initial stage of information reception, involves the rapid experience of an elementary feeling that does not necessitate verbal, symbolic, or conceptual deconstruction. It is intricately linked with sensory activities, culminating in the process of perception. This underscores the significance of modality, characterized by the organism's internal mechanism, in optimally apprehending external stimuli presented

through visual means.

It is plausible, following Gunter Kress's insights, that other components, not accounted for in this study, may require attention, with image composition (layouts) being a potential factor. This observation is buttressed by research conducted by Culham, Hey, et al. (2001), which underscores that all sensory nerves utilize nerve impulses as a form of communication, whereby the nervous system converts sensory input into coded messages.

The anatomical code, stemming from Johannes Muller's doctrine of specific nerve energy (1826), elucidates the diversification of sensory modalities based on distinct signals received by sensory organs and the corresponding neural pathways leading to the brain. In this context, signals from the eyes are converted into impulses carried by the optic nerve to the visual cortex. Notably, stimuli that are more prominent relative to others stimulate stronger responses, potentially owing to a higher intensity of stimulation. This concurs with Ware's (2008) observations concerning visual queries, emphasizing the necessity for stimuli to possess an adequate strength, termed as an 'absolute,' along with well-functioning sensory receptors and sensory nerves that effectively relay the stimuli to the brain's center of awareness for response generation.

Gibson (*Principles of Perceptual Learning and Development*, 1969) asserts that the translation of a stimulus is the result of learning experiences, where distinctive features are discovered and distinguished from patterns in comparison to other patterns. At a significance level of 0.05, the Single-Factor ANOVA test yields insignificant results for Novelty with Dynamic and Monotone indicators but significant results for Repetition with the Familiarity and Suggestion indicators. This implies that familiarity and suggestive elements can be considered factors contributing to the visual elements in the application of the Concept of Motion in images, capturing the audience's interest.

The integration of various forms of literacy, including visual literacy, basic literacy, library literacy, media literacy, and technology literacy, can support the development of a high level of literacy in individuals. This literacy potential enables individuals to integrate diverse sources of information as the foundation for packaging and subsequently disseminating information to the audience. "Connectivity" between motion and multimodalities in education should refer to the relationship or interplay between the use of motion, typically gestures or physical movements, and the concept of multimodal communication within educational settings. The connectivity between "motion" and multimodal communication in education could be breakdown as:

1. Motion in Education

- **Gestures.** In educational contexts, motion often refers to the use of gestures or physical movements by teachers, students, or presenters. These gestures can be intentional or spontaneous and are used to convey information, enhance understanding, or engage learners.

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- *Physical Demonstrations.* Educators may use physical demonstrations or movements to illustrate concepts, demonstrate experiments, or provide real-world examples.
 - *Body Language.* Nonverbal cues such as body language and facial expressions are also forms of motion that convey meaning and emotions in the classroom.
2. Multimodalities in Education
- *Multimodal Learning.* Multimodal learning recognizes that students have diverse learning preferences and styles. It involves presenting information through multiple modes, such as text, images, audio, video, and interactive elements, to cater to different learning styles.
 - *Enhanced Communication.* Multimodal approaches aim to enhance communication and understanding by combining various modes of representation. For example, a history lesson may use text, images, and a teacher's verbal explanation to convey historical events.
3. Connectivity
- *Enhanced Learning.* The connectivity between motion and multimodalities in education suggests that incorporating motion, gestures, or physical demonstrations into the teaching process can enhance the effectiveness of multimodal learning. When students see, hear, and physically engage with educational content, it can improve comprehension and retention.
 - *Engagement.* Motion can capture students' attention and engagement. It can make learning more interactive and dynamic, fostering a deeper connection with the material.
 - *Inclusive Learning.* The combination of motion and multimodal approaches can benefit diverse learners, including those with different learning styles and abilities. It allows educators to reach a broader audience.

In practical terms, this connectivity might involve a science teacher using gestures and physical movements to explain the concept of the solar system while simultaneously showing images and animations on a screen. It could also entail a language instructor incorporating gestures and body language to enhance the understanding of language nuances. Overall, the connectivity between motion and multimodalities in education acknowledges the potential synergy between physical movements and the use of multiple modes of communication to create more effective and engaging learning experiences.

Conclusion

The human ability to recognize various familiar objects is a remarkable cognitive trait. Pattern recognition, a cognitive process generally carried out effortlessly and rapidly, involves a complex interplay of sensation, perception, memory, and cognitive pursuit with the aim of recognizing patterns. In the context of recognizing patterns related to 'motion,' humans reconstruct sensory input that captures their attention. They actively select stimuli and connect sensory information with stored memories. Throughout this

process, changes in the original stimulus pattern remain recognizable, thanks to unconscious interference—a spontaneous process that integrates information to construct interpretations. Drawing upon behavioral interventions related to unconscious processes, it is evident that sensory input from the external environment can directly trigger attention-forming sensations. This discovery underscores the importance of further research on the concept of motion in images as a multi-modal phenomenon, not limited solely to the realm of education but with broad applications in various fields.

This study suggests the following recommendations for future research:

1. **Multi-Modal Exploration.** Investigate the concept of motion in images as a multi-modal phenomenon in diverse contexts beyond education, exploring its potential applications and implications in fields such as psychology, marketing, and multimedia design.
2. **Unconscious Processing.** Delve deeper into the unconscious processes involved in sensory recognition, studying how external stimuli can directly influence attention and perception.
3. **Cross-Disciplinary Collaboration.** Encourage collaboration between researchers from different disciplines, such as psychology, cognitive science, and design, to gain a more comprehensive understanding of how motion concepts impact various aspects of human perception and cognition.
4. **Educational Integration.** Explore how the concept of motion in images can be effectively integrated into educational practices, potentially enhancing learning experiences and outcomes.
5. **Practical Applications.** Investigate practical applications of the findings in real-world scenarios, such as in advertising and user interface design, to optimize the impact of motion concepts on audience engagement and perception.

By addressing these recommendations, future research can contribute to a deeper understanding of the concept of motion in images and its far-reaching implications across diverse domains.

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