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**Introduction**

Experimental psychologists have employed key features of major techniques and methods to establish quantitative relationships between perceptual and sensory experience and physical stimulation. These methods and techniques provide the quantitative relation between sensory-perceptual experience and physical dimension (environmental stimulation). Many studies have revealed the importance of comparative, very young infants or animal-based research in exploring the complexities in nature of what they perceive.

**Aim of the study**

The studies reveal the major contribution of very young infant or animal based studies in providing food for thought (no facts but hypotheses) about the human development in mind and brain. In a more related study, the author examines the importance of inter-sensory (multimodal) redundancy in constraining and guiding early perceptual learning in mammalian and avian species. The study aimed at utilizing coordinated studies of very young human infants and non-human animal, guided by Golieb’s pioneering vision, to begin to identify patterns of perceptual processing and selective attention that are common across species in early development.

**Study design**

The study used a comparative, convergent –operations approach to development research. The study also attempted to study about the development of inter-sensory perception. Finally, the study researched about selective attention, stimulus properties, and perceptual learning all contributing to mind or brain development. Animal research provide the opportunity to uses different research methods and techniques including experiential augmentation and experiential deprivation, not generally possible with human subjects. This was possible considering that the aim of our study was examine human developments in brain and mind. Gottlieb used his work to demonstrate the importance of using animals in researching behavioral, perceptual, or social development is to ability to modify the timing, type or the amount of experience available to the infant or embryo. This study was designed from a collaborative framework between human and animal studies that has formulated interrelated questions, forged a common language, and designed overlapping procedures that would produce the results that can be readily translated across the domains.

**Psychophysical measures or methods used**

This technique of study design can provide the required coordination and cooperation across levels of methods, analysis, and laboratories to produce a wide and deeper understanding of the development process even without the need to use many resources and research programs. Human infant studies are limited in design and they are labor intensive and are also sensitive to influences of context, task, stimuli, and measures, small changes in procedures, and infant state. Therefore, the design of this study considered the fact that he findings of infant experiments normally require replication across different conditions compared to adult-based approaches. Convergent findings across human and animal infants can generate a stronger argument to suggest that research findings from human infants are not caused by extraneous variables or are not task-specific. The design of this study, for example, used joint human and animal-based research to investigate the development of inter-sensory perception through variety of experiments across subject sample, (2-8 month-old human infants vs. bobwhite quail chicks), stimuli (naturalistic objects vs maternal assembly call), task (visual discrimination vs. auditory learning), procedure (infant control habituation vs. two choice auditory test), response system (visual fixation vs. locomotion), and developmental stage (infants vs neonates and embryos).

In real life situations, the decisions made as a result of weak stimuli contribute to special problems for the notion of traditional threshold. This raises questions as to whether our decisions are exclusively based on the sensory effects of stimuli or whether our decisions are influenced by certain psychological biases within us. This also explains how psychological factors may influence infants to make certain decisions or to learn about a certain event or activity.

The aim of the study was clearly achieved by obtaining converging results across such broad differences. This gives us enough confidence to believe that our findings have achieved the topic and themes of early development in mind and brain that can be generalized across a variety of response systems, procedures, tasks, species, and developmental stages. It also saves our time and energy in testing and replication across diverse conditions with human infants because the animal based approach has revealed the possible comparable processes. Thus this study design on using convergent animal-human approach can prove to be useful and efficient way for uncovering the basic developmental themes and principles even in human beings.

This study was also designed to research on the inter-sensory perception in infants. The animal findings on inter-sensory perception has triggered several questions about the nature of human infant perceptual processing, selective attention, and learning. The idea of using animal-human based research has helped to achieve our aim of understanding the development of inter-sensory capacities as well as the influence of early social interaction on perceptual organization and relevance of timing sensory experience during perinatal development of the organism. The animal-based approach has revealed that the interconnected in different and complex ways in a manner that manipulating one sense modality such as visual experience can affect auditory, visual and auditory functioning.

The study design encompasses selective attention, stimulus properties, and perceptual learning. The study suggests that multimodal stimulation provides redundant and nonredundant information to the sensory systems. Redundant information covers properties of events and objects (amodal properties). The study evaluated the importance of detecting of amodal relations for organizing early development of perception because it helps the naïve infant to determine which sensory stimulation pattern belong together and the ones that don’t relate. Other studies related to this study demonstrate that young infants have adept perception of amodal stimulation.

The converging evidence from both human and animal based approaches demonstrate the relevance of denning the conditions that attenuate and facilitate perceptual processing and selective attention of redundant (amodal) stimulus properties. This enhances the understanding of how perception help to apply natural learning contexts and develop natural multimodal environment. The study designed inter-sensory redundancy hypothesis to generate an organizing conceptual framework to understand how infant perception and attention of properties of events and objects develop in a natural multimodal environment. The inter-sensory redundancy analyses knowledge gained from research on animal and human infants behavior with findings from physiological and neural level of analysis.

**Limitation of the study**

This procedures and tasks of the study was designed to provide valuable data about the converging evidence across developmental periods, species, and properties of events that predict the inter-sensory redundancy. However, it is also important to highlight some of the methodological limitations as identified in the study, both to consider the impacts of the research conclusions with some caution as well as suggesting potential future prospects of the study in the area. All the studies on human development are almost cross-sequential or cross-sectional with just a few being longitudinal. Although these studies are still useful, there aspects of cognitive development that require to be understood through longitudinal approaches such as understanding the development patterns that are not related to individual differences.

Another limitation of his study is that an observer can only deduce the mechanisms the underlying perceptions of the infant not knowing that and referring to the minds of infants as “black boxes”. However, the psychological responses of the infants have been used for many years to deduce stimulus-detection thresholds. Nonetheless, such inferences only depend on the observer-chosen statistical normality criteria. Stimulus-detection thresholds are also exaggerated. The overestimated stimulus-detection thresholds can make infants to be misdiagnosed as hearing imparted thus seeking to implant electronic devices.