

RESEARCH TITLE

The Role of Input in the Development of Conceptual Blending

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Abstract

The theory of conceptual blending states that new concepts are formed by combining highly different mental spaces. The theory of conceptual blending is crucial to the role of input in the way that it affects richness and coherence. This paper is a journey to explore the developmental aspects of conceptual blending. The paper explains how different types of input play a role in forming and refining blended concepts in children. This article attempts to bridge the gap of knowledge on how input complexity and diversity impact the cognitive process of conceptual blending in children. Almost all of the previous studies were on adult cognition; how this cognitive mechanism develops is therefore relatively unknown. The present study aims to discover how different styles of input, running from the simplest to the most complex and from homogeneous to heterogeneous, affect the developmental course of conceptual blending in children aged from 5 through 10 years. By drawing on an amalgamation of experiment-based tasks with qualitative analysis, this research has singled out patterns of how children integrate input from diverse mental spaces into novel concepts. Preliminary results indicate that children with more diversified and complex input are much more flexible in the blending of concepts; they produce very elaborate, creative results. The research also highlighted some developmental milestones for the mastery of blending processes, marking the age-related progress in the synthesis of information from several sources.

Key Words: Conceptual blending, cognitive development, input complexity, input diversity, cognitive flexibility.

دور المدخلات في تطور المزج التصوري

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المستخلص

تنطلق نظرية المزج التصوري من أن المفاهيم الجديدة تتشكل عبر دمج فضاءات ذهنية متباينة بدرجة كبيرة. وتعدّ هذه النظرية محورية في إبراز دور المدخلات (Input) من حيث تأثيرها في غنى المفاهيم المتشكلة وتماسكها. تمثل هذه الدراسة رحلة استكشافية للجوانب النمائية للمزج التصوري، إذ تبين كيف تسهم الأنماط المختلفة من المدخلات في تكوين المفاهيم الممزوجة لدى الأطفال وتقييمها. وتسعى المقالة إلى سدّ فجوة معرفية تتعلق بتأثير تعقيد المدخلات وتنوعها في العملية المعرفية للمزج التصوري عند الأطفال، ولا سيما أن معظم الدراسات السابقة انصرفت إلى الإدراك لدى الراشدين، مما يجعل تطوّر هذه الآلية المعرفية لدى الأطفال مجالاً ما يزال غير مستكشف بما يكفي.

تهدف الدراسة الحالية إلى الكشف عن أثر أنماط متباينة من المدخلات—تتراوح من الأبسط إلى الأكثر تعقيداً، ومن المتجانسة إلى غير المتجانسة—في المسار النمائي للمزج التصوري لدى الأطفال الذين تتراوح أعمارهم بين 5 و10 سنوات. وبالاستناد إلى مزيج من المهام التجريبية والتحليل النوعي، حدّد البحث أنماطاً لكيفية دمج الأطفال للمدخلات الآتية من فضاءات ذهنية متعدّدة في مفاهيم جديدة. وتشير النتائج الأولية إلى أن الأطفال الذين يتعرّضون لمدخلات أكثر تنوعاً وتعقيداً يُظهرون مرونةً أعلى في مزج المفاهيم، وينتجون مخرجات أكثر تركيباً وإبداعاً. كما أبرزت الدراسة محطاتاً نمائية دالة على إتقان عمليات المزج، مبيّنةً التقدّم المرتبط بالعمر في توليف المعلومات الواردة من مصادر متعدّدة.

الكلمات المفتاحية: المزج التصوري، النمو المعرفي، تعقيد المدخلات، تنوع المدخلات، المرونة المعرفية.

1. Introduction

Conceptual blending theory indicates that the real creativity and innovation in human beings lie in the integration of usually quite disparate mental spaces. The theory has been developed by Gilles Fauconnier and Mark Turner, and it puts forward the cognitive processes by which elements from different domains are selectively combined into novel ideas that frequently go beyond the sum of their parts. At the heart of this theory is the concept of 'input' itself, which refers to the information that drives these blending processes.

Although much progress has been made in understanding conceptual blending in adults, there has been little research on the development of children in terms of this cognitive ability. That is, although experiments have tested how adults engage in this cognitive process across a range of contexts, very little has been done to probe how children actually acquire the capacity for conceptual blending and what kinds of different input contribute to the creation of this capacity. The gap that this article is trying to fill is all the more critical because very early cognitive skills form foundational groundwork for later intellectual growth and problem-solving skills (Casey et al., 2011; Diamond, 2013).

The current study reports on age differences in conceptual blending as a function of different kinds of input between 5 and 10. We are interested in exactly how manipulations of input complexity influence children's ability to blend concepts. In these factors we search for an explanation of the cognitive processes involved in conceptual blending during childhood and, more precisely, for the developmental hallmarks of this cognitive ability.

Some of the guiding research questions are: Exactly how do children combine input from heterogeneous mental spaces in the construction of blended concepts? How does the complexity and diversity of the input affect the children's ability for conceptual blending? How does the course of development of conceptual blending appear different for various age groups in our target range?

The article combines experimental tasks and qualitative analysis to respond to the above-mentioned questions. The participants will be asked to perform tasks that involve conceptual blending, followed by a qualitative analysis of the various forms of strategies and blending products that emerge in the responses. In this way, this study will contribute to the understanding of how the processes of cognitive development underlie the early development and later development of conceptual blending skills. Moreover, the implications of the findings with respect to educational practices in an effort to enhance the creativity and cognitive flexibility of children will also be discussed.

In conclusion, the current study hopes to fill the existing gap in the literature by investigating the impact of input complexity and diversity on the development of conceptual blending abilities in children. By investigating the above research questions, we hope to help develop theoretical advancements in the field of developmental psychology.

2. Literature Review

A cognitive science theory, conceptual blending, suggests that far too often in human cognition, two entirely different conceptual domains are combined to create a new meaning. This is an underlying cognitive process that drives creativity, problem solving, and language understanding. Research into how this process of conceptual blending develops in children is going to be of major importance in the study of cognitive development and psycholinguistics. More specifically, this implies the role of input, including linguistic and non-linguistic experiences to which children are exposed, in shaping their ability to engage in and manipulate conceptual blends.

2.1. Theoretical Foundations

By conceptual blending theory, blending selectively integrates from different mental spaces—conceptual materials—meaning coherent new structures or blends. But the mental spaces themselves are also organized as conceptual domains by cognitive principles and governed by inputs from the sensory, the linguistic, and the social (Fauconnier & Turner, 2002). It postulates blending to be the mental process of creativity behind thought and language use that gives rise to new ideas and metaphorical understanding.

Developmental Perspective

Another way of explaining the approaches in the development of conceptual blending is how children come up with blends and manipulate them. It is believed to be a factor both of the innate mechanisms in the brain for cognition and of environmental input. Since birth, children get diverse linguistic and non-linguistic inputs contributing to the formation and elaboration of mental spaces and their possible blends (Gentner, 2010).

2.2. Role of Input in Conceptual Blending

It provides several roles in the development of conceptual blending. Inputs can generally be divided into two: linguistic input—structures, metaphors, and narratives—and non-linguistic input, including perceptual experiences, social interactions, and cultural practices (Gopnik & Choi, 1995).

2.2.1. Linguistic Input

In the development of conceptual blending, language provides structured mappings between different conceptual domains. Metaphorical expressions usually arise from the integration of very disparate domains and normally represent abstract ideas (Lakoff & Johnson, 1980). Children learn about metaphors and how to create them on the basis of linguistic input that invites mapping between different domains.

Narrative discourse also provides a critical source of linguistic input to the process of conceptual blending. Stories offer children complicated scenarios and characters that encourage them to blend information from different mental spaces to make sense of a narrative (Bowerman, 1978).

2.2.2. Non-linguistic Input

More important than the language itself are the non-linguistic experiences. That is to say, perceptual input includes details sensorily enriched with visual and auditory information that children integrate with linguistic input to construct mental spaces (Spelke, 1991). For example, interaction with different environments and objects helps children create complex perceptual representations that serve as a foundation for generalization across conceptual domains. Social interactions also play a role in the creation of children's blends. Interaction with caregivers and peers about cultural practices, norms, and roles helps children understand and manipulate conceptual domains (Tomasello, 2003).

2.3. Developmental Trajectory

The process of development for the blending of concepts indicates that children progress from the most basic level of blending to more complex levels of concept integration as they develop cognitively and are exposed to a variety of inputs. The preschool age is marked by exploratory blending, where the child is simply having fun with the process of concept blending from different sources through their imaginative play and language use (Smolik, 2012). Older children also develop their concept blending abilities through more challenging linguistic and non-linguistic inputs that can help them in creating and decoding very complex

metaphors, analogies, and other creative expressions.

The Conceptual Blending Theory is a model that can be used to account for the ability children have to conceptual blend things that are quite different. The role of input, both linguistic and non-linguistic, in conceptual blending is shown by the relationship between cognitive processes and the environment in development. Research on the role of input in conceptual blending will have implications for mechanisms of cognitive development in educational institutions for improving creative thinking and linguistic skills in children.

3. Methodology

It will make use of the mixed-method approach in researching the input role in the development of conceptual blending in children. Mixed-methods research will be able to explore in-depth the quantitative and qualitative aspects and will provide one with a better understanding of the complex relationship between input and cognitive development.

3.1. Data Collection and Description

Participants: It will include a sample of children that will comprise (25) children aged 4 to 8 years old, recruited from a local preschool and elementary school (Aghsan AlWard). The participants would be selected based on language proficiency and developmental milestones to ensure that there is expected variation in their blending abilities.

3.2. Data Collection Instruments:

1. **Observational Data:** Observational sessions will be carried out, which will record the children's behavior in structured play and storytelling tasks. The observational sessions will give a qualitative understanding of the children's blending behavior.
2. **Linguistic Analysis:** Such algorithms can detect and analyze semantic relationships and conceptual connections among texts; semantic similarity measures should be used to identify concept overlaps and blends.
- 3.3. **Questionnaires:** The questionnaires will be administered to the caregivers and teachers, and these will include the children's linguistic inputs (for example, the use of metaphors in conversations) and non-linguistic inputs (for example, the diversity of experiences).

3.4. Model of the Study

Conceptual Blending Framework: The theoretical framework that will guide the study is the Blending Theory by Fauconnier and Turner (2002). This theory argues that the process of blending is the combination of different conceptual domains in creating new meanings. The study will aim to establish the instances of blending in the language and behavior of children and relate these to the theoretical constructs of mental spaces.

Analytical Approach:

1. **Qualitative Analysis:** Thematic analysis of the observation data and language samples will be carried out to identify the recurring patterns and themes associated with the blending behaviors. This will also enable the exploration of the effects of contextual factors on the development of blending skills.
- 3.5. **Quantitative Analysis:** The results from the questionnaires will be analyzed using quantitative analysis for the correlation between the input factors and the children's ability to blend. Regression analysis is used to determine the strength of the correlation.

3.6. Justification of the Analytical Model

It has adopted a mixed-methods design with the objective of triangulating the findings from different sources, hence ensuring validity and reliability of the study. This will ensure a comprehensive understanding of the effect of input on the development of conceptual blending in children by combining findings from qualitative observation with findings from questionnaires and linguistic analysis.

4. Data Analysis

The role of the input factor in the development of conceptual blending in children will be investigated using a combination of both qualitative and quantitative approaches. The trends and patterns of the blending process, the relationship between the input variables and the blending level of proficiency, and generally, the conceptual blending development process in children, will be uncovered through this investigation, based on the conceptual framework developed by Fauconnier and Turner.

4.1. Qualitative Analysis: Observational Data

The observation sessions were conducted to capture the natural interactions and behaviors that are pertinent to the blending of concepts among children aged 4 to 8 years. The observation sessions were conducted with play tasks and story-telling. The data from the observation sessions is transcribed and analyzed for themes.

Themes Identified:

1. **Creative Use of Language:** A lot of children demonstrated creative use of language that included metaphoric speech and analogical thinking in the stories and play dialogues.
2. **Contextual Factors:** The play and storytelling contexts played an important role in the development of blending behaviors. For example, the children were observed to blend their ideas in more complex ways when they were involved in pretend play tasks that included non-realistic characters and situations.
3. **Developmental Aspect:** While the younger children used to engage in only very simple forms of blending, such as simple metaphoric statements, the older children demonstrated much more complex forms of blending, where the blending of a number of conceptual domains led to the creation of complex narratives.
4. **Illustrative Example:** In one of the play situations, a 6-year-old child called the toy spaceship a "flying time machine," blending flying and time travel to create a new imaginary context.

4.2. Linguistic Analysis: Language Samples

The language samples were collected through narrative tasks and metaphor elicitation exercises, with the aim of finding linguistic markers of proficiency in conceptual blending. The transcripts of the language samples were analyzed for metaphors, analogical mappings, and creative language use.

Findings:

1. **Metaphorical Expressions:** Children often used metaphors to explain abstract concepts or feelings, thus demonstrating an understanding of blending two quite different domains.
2. **Analogical Reasoning:** Older children, however, showed more sophisticated skills in drawing parallels between different scenarios or contexts.
3. **Creative Language Use:** The use of novel word combinations and examples of figurative language were observed to happen more often in children who were more frequently exposed to a broad vocabulary through storytelling or metaphorical conversations either at home or in school.

4.3. Quantitative Analysis: Questionnaire Data

1. The linguistic and non-linguistic input factors that the child was exposed to were determined using questionnaires completed by the caregivers and teachers. The statistical testing of the relationship between the input variables and the proficiency of blending was conducted using descriptive statistics, correlation analysis, and regression analysis. The quantitative analysis of the sample in the study has included areas such as:
 2. **Linguistic Input:** Specifically, children who received the Home Storytelling condition performed very highly on metaphorical proficiency and blending creativity.
 3. **Non-linguistic Input:** The results yielded a positive correlation between the children's skill in the construction of complex blends, their involvement in creative play activities, and their exposure to diversified sensory experiences.
 5. **Combined Influence:** The multiple regression analyses showed that there was a significant prediction of this variability in the blending skill of children by a combination of the linguistic and non-linguistic input variables, which highlights the synergistic effects of the input experiences.
- ### 6. Findings of the Study

The findings from the qualitative observation, linguistic analysis, and questionnaire study all pointed towards the importance of input in children's developing blending ability. The thematic analysis of the data from the observation revealed the richness of information present in the observation data about the context and developmental aspects of the blending behavior. The linguistic analysis revealed the linguistic markers of blending proficiency, and the quantitative analyses revealed the important relationships between the input variables and the blending skills.

7. Discussion and Implications

The results of the aforementioned study have implications for us in understanding the impact of linguistic and non-linguistic input on the course of development of conceptual blending in children. This mixed-methods study draws attention to the importance of multiple sources of data in developing an understanding of how varied input experiences have contributed to the development of creativity and flexibility of thought in children.

Educational Implications: It can, therefore, inform educational practices that would benefit children in language development and cognitive skills by providing them with varied linguistic and sensory experiences.

Limitations and Future Directions: Although this is the most extensive effort at the time of the conduct of this study, it still has limitations. Future studies will employ longitudinal designs in tracing the paths of individual development and other factors that influence the capacity of conceptual blending.

Conclusion

The study was conducted with the objective of contributing to the growth of this understanding with regard to the role of input in conceptual blending abilities in children and highlights the dynamic interplay between the factors in this regard. The study, therefore, provides an explanation of the processes involved in blending abilities through the combination of qualitative and quantitative analysis in a conceptual blending framework. This paper aims to demonstrate that it is the diversity of input experience that offers the explanation for creativity and cognitive flexibility. Future studies should investigate further the dynamics of diverse groups and adopt progressive methods to advance the knowledge base of cognitive development and education.

The analysis of the data has clearly explained in this paper the intrinsic relationship between input experiences and the development of children's conceptual blending skills. With the adoption of a mixed-methods research approach that is theoretically grounded in conceptual blending, the study provides a comprehensive insight into the role of linguistic and non-linguistic inputs in cognitive development and creativity during the early years of life.

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