CAN WE THINK WITHOUT LANGUAGE?

'Thinking' can be defined as a 'cognitive behavior in which ideas, images, mental representations, or other hypothetical elements of thought are experienced or manipulated' (American Psychological Association, n.d.), which includes imagining, memorizing, problem-solving, concept formation, and other related processes in cognition. The definition of 'language' varies to a greater extent across linguists but is commonly described by its purpose for communication through a structured system. The intricate interaction between language and thinking studied in psychology and linguistics has been the subject of several theories underpinning the link between the two concepts (e.g., Fodor, 1975; Whorf, 1956). The polarization of the argument can be reflected by two pioneering theories, (1) the Sapir-Whorf hypothesis, which represents the language determinism perspective, that thought is determined by language (Sapir, 1929), (2) Piaget's theory of cognitive development, which, in contrast, proposes that thought precedes language (Piaget, 1952). In this essay, I will champion a case for the latter by justifications from linguistic perspectives, mainly highlighting evidence from cognitive developmental research. In turn, I will also argue why language is unnecessary for thinking via counter-examples and discuss the relationship between language and thoughts.

The long-standing 'nature' vs. 'nurture' debate in psychology extends to the topic of language, and the extent to which language is an innate trait influences the credibility of infant studies in challenging the language determinism hypothesis. Chomsky (1975) famously proposed that children are born with the innate knowledge of linguistic rules through the natural language acquisition device (LAD) and regards language as a heritable gene specific to the human species arising from a sudden genetic mutation in our ancestors. The nativist theory further contends that language is innate to all individuals as a part of the human experience (Litchfield & Lambert, 2011). Nevertheless, recent research has challenged this nativist approach from an evolutionary aspect, evidencing language development as a continuous process involving the gradual adaptations of the neutral apparatus and specialization of mirror neurons (Stein, 2003). In this regard, the credibility of the nativist view may be limited by the inconsistency in contemporary research which opposes Chomsky’s postulation that language

emerged all at once. In the present context, the limited extent of language innateness supports that pre-linguistic infants do not possess innate language abilities and knowledge. Hence, any cognitive skills demonstrated in pre-linguistic periods can exemplify thinking without language.

Based on this assumption, thought-language-independence is exemplified by non-verbal and context-dependent communication. The used-based theory of language acquisition underpins the mechanisms of pre-linguistic communication in infant, highlighting their extensive use of gestures before acquiring verbal communication skills (Lieven & Tomasello, 2008). Mainly, infants employ communicative pointing to convey imperative and declarative motives. For example, 12-month-old children can inform their mother of the location of an object she is looking for, despite having no desire for the object themselves (Lizskowski et al., 2006). They can also form and interpret pointing gestures in the context of joint attentional frames, incorporating contextual interactions into their understanding of pointing (Tomasello et al., 2007). One might question the nature of pointing as a type of body language and criticize the present justification as supporting a language-determine-thought principle. However, the uniqueness of pointing is contained within its context-based nature, meaning that the gesture contains no information in itself but relies on the individual's own interpretation from the contextual background to be understood. Thus, pointing behaviors does not form a structured communication system and to conclude that conscious thinking involved in comprehension and purposive communication can occur without language is valid.

Examples of thinking without language are not limited to pre-verbal communication but can also be generalized to learning in children. For instance, recent empirical evidence has suggested that children are statistical learners (Romberg & Saffran, 2010), as they unconsciously extract repeated patterns from the sensory environment to form chains of reasoning. This theory can account for associative learning, such as classical and operant conditioning, which may occur under language-absent conditions (e.g., Watson & Rayner conditioned fear to rats in 9-month-old little Albert, 1920). Therefore, the formation of mental associations, such as pairing unconditioned stimuli with neutral stimuli, is non-language mediated. Pre-verbal infants have moreover repeatedly displayed abilities in extracting abstract

algebraic rules (Marcus et al., 1999), object permanence (Baillargeon, Spelke & Wasserman, 1985), reasoning about desires (Repacholi & Gopnik, 1997), and false-belief tasks (Buttelmann, Carpenter & Tomasello, 2009). These cognitive accomplishments, equally, clearly do not presuppose natural language mastery.

However, the proposed argument is not supported by a clean cut between language and thinking. In particular, the transformation from gestural to verbal communication is bounded by a critical period from age two to puberty (Lenneberg et al., 1967). Language deprivation during this period can result in cognitive delays, mental health difficulties (Hall, 2017), permanent brain structure alternation (Cheng et al., 2019), and impaired language outcomes (Friedman & Russo, 2015). The influence of language over cognition is evident. As exemplified, decades of research into language acquisition and deprivation have shown the intertwined connection between language and cognitive development. It is, however, essential to recognize the difference between an influential relationship and a determining relationship; to claim that language influences thinking is not the equivalent to claiming language is necessary for thinking.

In context, early language deprivation does not mark the endpoint of cognitive development. Susan Schaller's nonfiction book "A man without words" (2012) describes the case study of a Mexican man – Ildefonso, who successfully mastered simple arithmetic reasoning and sign language despite being born deaf and deprived of early exposure to language. In fact, he was able to recall to Schaller the earlier events in his pre-linguistic times. Further corroboration from behavior analytical research confirms that having the right nurturing conditions, such as an appropriate environment, can foster the development of verbal abilities even past the critical period (Fernández, De Souza, Carando., 2017). Evidently, the effects of language deprivation can be overcome, and a lack of language does not certify a permanent deficiency of cognitive abilities. Therefore, the significance of language in impacting thinking is not decisive but confined to an influencing level.

Given the above-deducted relationship between language and thought, without a doubt, language is a tool for thinking. Approximately 71-83% of people will read the title "Can we

think without language" with an instant echoing inner voice (Heavey & Hurlburt, 2008). For these individuals, the most common example of thinking with language is likely to be through the internal monologue – a phenomenon where a person inner speaks in a silent voice that cannot be heard by external observers (Hurlburt, Heavey & Kelsey, 2013). The internal monologue has roles in reducing psychological distress (Heavey & Hurlburt, 2008), aiding rehearsal in working memory (Baddeley, 1992), planning, and problem-solving (Vygotsky et al., 1986). However, according to Hurlburt and Heavey (2008), this phenomenon is only, on average, 23% present and may take form as 'unworded inner speech', where the individual gains understanding and comprehension of verbal stimuli through their rhythm and production rather than language. Essentially, language is partially involved in thinking as it benefits cognitive demands but does not serve as a requirement for thinking. If thinking is entirely dependent on language, to suggest that individuals experience a state of blankness during periods without inner speech will be unreasonable.

Another form of inner experience, "unsymbolized thinking," can exemplify the appearance of non-linguistic thinking. The overarching term describes "an experience of an explicit, differentiated thought that does not include the experience of words, images, or any other symbols' (Hurlburt & Akhter, 2008, p. 1366). Although research into this phenomenon is scarce, a decade of descriptive experience sampling (DES, see review Hurlburt, 2006) research has established unsymbolized thinking as a quarter of waking experience and one of the five most common inner experiences (Heavey & Hurlburt, 2008; Hurlburt & Heavey, 2002). The authenticity of the phenomenon has further been confirmed by combined results from magnetic resonance imaging and DES, demonstrating general consistency in self-reported unsymbolized thinking and corresponding brain regions activation (Hurlburt et al., 2015). Ultimately, unsymbolized thinking serves as a standard example of how we can think without language, which unexpectedly occurs more frequently than is believed.

In summary, I demonstrate language is not a necessary condition for thinking by reviewing (1) the nature-nurture controversy in language, (2) pre-linguistic cognitive skills, (3) the surmountable effects of language deprivation, (4) the nature of unsymbolized thinking.

Essentially, language and thinking are correlated, but the role of language maintains in aiding cognitive functioning rather than determining. To elaborate in the contemporary context, advancements in artificial intelligence (AI) have lent them mastery over language. The extensive database supporting AI functioning contains more language and knowledge than the average person possesses. However, does that give them more freedom over thoughts? Not to the public knowledge. The human brain is often compared to a computer by cognitive psychologists. However, a difference lies within humans' inborn ability and self-motivation to learn (Twomey, 2017), which a computer does not possess. The innate trait allows us to ultimately think, comprehend, and make sense of the world in a non-linguistic way.

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