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Ministry of Higher Education and Scientific Research
Mohammed Khider University of Biskra
Faculty of Letters and Foreign Languages
Department of English Language and Literature



Course Handout



Master One-Language Sciences

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Course General Information

Course: Psycholinguistics

Target Audience: First-year master's students of English (Option: Language Sciences)

Teaching Unit: Fundamental

Coefficient: 02

Credits: 04

Teaching Hours: 45 hours (15 weeks)

One Session (lecture) per Week: 1h 30 min

Course Delivery Mode: In-person lectures for semester one only.

1-Course Description

This course presents one of the major interdisciplinary branches of macro-linguistics: psycholinguistics. It is a one-semester (first semester) course taught once a week for first-year EFL master's students, specialising in the sciences of language. Each session lasts 1 h 30 min. It is divided into five themes to be covered over 15 weeks. Each theme spans three weeks, during which students discuss a psycholinguistics topic, complete tasks, and receive feedback.

Initially, the course defines key concepts of this field and traces its historical development. It also explains its goals, scope, and core areas. Additionally, it discusses the relationships among language, cognition, and culture from various perspectives. Moreover, it demonstrates experimental paradigms and methods that psycholinguists and language researchers use to investigate language processing. Furthermore, it analyses scholars' debates in psycholinguistic research. Eventually, this course helps students understand language not just as a set of rules, but as a mental performance.

1.1. Course Objectives

Upon completion of the course, students will be able to:

- 1-Define psycholinguistics.
- 2- Trace the historical development of psycholinguistics.
- 3- Recognise the main areas of psycholinguistics (language acquisition, language comprehension, and language production).
- 4- Discuss the relationship among language, thought, and culture from different perspectives.
- 5- Understand the experimental paradigms and techniques used in psycholinguistics.
- 6- Examine the cognitive and neurobiological mechanisms involved in language processing.
- 7- Analyse the key debates in psycholinguistic research.

1.2. Prerequisite

- Students should have knowledge acquired in years 1 and 2 of phonetics and phonology.
- Students should have basic knowledge of syntax and semantics.

1.3. Assessment

60% Final written exam; 40% Continuous assessment: review paper and presentation (group work: 7/20); homework assignments (03/20); mid-term written test (10/20).

Summative Assessment (60%)		Formative Assessment (40%)	
Final written exam	20/20	Review paper and presentation (group work)	7/20
		Homework assignments	03/20
		Mid-term written test	10/20

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Theme One: Introduction to Psycholinguistics

Objectives: By the completion of this theme, students will be able to:

- 1-Discover the relationship between language and the human mind.
- 2-Recognise what psycholinguistics is.
- 3- Review the history of psycholinguistics.
- 4-Define the goals and scope of psycholinguistics.
- 5-Understand the key areas of psycholinguistics.

Guiding Questions

- 1-Is it essential to study the mind when we study language?
- 2-What is psycholinguistics?
- 3-How did psycholinguistics emerge as an interdisciplinary branch of linguistics?
- 4-What are the goals and scope of psycholinguistics?
- 5-What are the areas of interest in psycholinguistics?

Introduction

The study of the relationship between the human mind and language dates back centuries. However, psycholinguistics first emerged in the 20th century, and modern research exploring its theoretical and experimental framework began in the early 1950s. Like any emerging field, psycholinguistics has been defined from different perspectives. It has specific goals and a clear scope, organised into four main branches that examine how babies acquire their native language and how individuals produce, comprehend, use, and sometimes lose language.

1. Definition of Psycholinguistics

The term psycholinguistics, or psychology of language, is “the study of the psychological processes involved in language. Psycholinguists study understanding, producing, and remembering language, [...]. They are also interested in how we acquire language, and the way in which it interacts with other psychological systems” (Harley, 2014, p.04). Psycholinguistics focuses on how

humans comprehend, produce, remember, and acquire language. Thus, it centres on speaking, listening, reading, writing, and language memory.

Psycholinguistics is an interdisciplinary branch of linguistics and a subfield of cognitive science. This discipline integrates insights mainly from psychology and linguistics, and partly from artificial intelligence, neuroscience, and philosophy (Carroll, 2008). It is the intersection of developmental psychology and linguistics. It examines speech and language development, as well as the mental faculties and cognitive processes involved in language comprehension, acquisition, and production. It includes topics related to phonetics, phonology, syntax, morphology, semantics, and pragmatics (Aydoğan, 2017).

According to Pfenninger and Festman (2022), psycholinguistics is a scientific field that examines how individuals learn and use language, how they store, access, and retrieve language knowledge in their mind, and how it is interconnected with general knowledge, pragmatics, and action. It depends on basic cognitive processes involved in language acquisition, learning, and use. These processes support language production skills (speaking and writing), as well as perception/comprehension (reading). They become more complex in the bilingual and multilingual brain, as they require additional cognitive functions, including language control and cognitive control.

2. History of Psycholinguistics

Historically, psycholinguistics has developed through two main stages. The first stage was led by Wilhelm Maximilian Wundt (1832–1920), who viewed language as an internal mental process, known as the cognitive view of language. He held that language begins in the mind, where a complete thought is converted into organised speech. In other words, people first think and then produce sentences, which are considered the primary units of language. Later, behaviourists opposed this psycholinguistic view, believing that verbal behaviour is acquired through environmental rewards and punishments (Carroll, 2004, 2008).

The second stage of psycholinguistic development was dominated by Chomsky, who criticised behaviourist accounts of language, integrated linguistic theory into psychological research, and claimed innate linguistic mechanisms to explain child language acquisition (Carroll, 2004, 2008). Therefore, Chomsky argued that language is innate, not acquired from the environment; rather, humans are born with a system that enables them to acquire and produce language.

Additionally, Altmann (2001) showed that psychology in general and psycholinguistics in particular boomed in the early to mid-1960s. He also demonstrated that the Chomskyan Revolution (Chomsky, 1957, 1965, 1968) emphasised that language structure is governed by rules and principles similar to those of chemistry. At the time, language was treated as an independent entity from the mental machinery underlying its production, its purpose, and the external world of its acquisition and use.

Psycholinguistics emerged when scholars recognised that language cannot be studied separately from its mental framework and social context. Since Wundt's era, this field of study has focused on language in relation to the mind. As a term, psycholinguistics was first coined by J.R. Kantor in his book *Objective Psychology of Grammar* (1936). He "attempted to refute the idea that language reflected any form of internal cognition or mind" (Altmann, 2001, p.130). In this book, Kantor denied that language influences thoughts.

Psycholinguistics was officially established with the release of a report in 1954, entitled 'Psycholinguistics: A Survey of Theory and Research Problems', on the relationship between linguistics and psychology. This report paved the way for many publications that contributed to its development (Afolayan & Bamisaye, 2014; Altmann, 2001). Later, 1957 was a turning point for psycholinguistics, due mainly to the publication of *Chomsky's Syntactic Structures rather than Skinner's Verbal Behaviour*.

In his 1959 review of Skinner's book, Chomsky argued that "no amount of conditioned stimulus-to-verbal-response associations could explain the infinite productivity (and systematicity)

of language” (Altmann, 2001, p.131). This means that Chomsky rejected the behaviourist enterprise and associationism, as they could not explain humans’ creativity and the organised structure of language. Therefore, he contended that language was founded in the mind and mental representation.

Psycholinguistics became a scientific field when psychologist George Miller bridged psychology and linguistics by introducing psychologists to Chomsky’s ideas and through his several publications with Chomsky in the early 1960s. This collaboration identified the psychological nature of language rules (Carroll, 2008). Hence, it was a shift from behaviourism toward the role of innate mechanisms in child language acquisition.

Despite Chomsky’s influential publications, the early 1980s saw less psychological interest in linguistic theory for several reasons. First, the two fields differed entirely in methodology. Linguists tend to study language rationalistically, whereas psychologists prefer empirical methods. Second, interest in phonology, semantics, and pragmatics, rather than the traditional focus on syntax, has grown. Third, recent research on language production has begun to supplement early studies in language comprehension. Fourth, interest in the brain mechanisms of language has increased because of advances in brain imaging techniques. This development has led neurolinguists to primarily examine language in patients with aphasia for more than a century (Carroll, 2008).

Ultimately, psycholinguistics has become fully fledged, and its research findings and principles have been applied in society, reading, bilingualism, and language disorders (Carroll, 2008; Miller, 1990). Therefore, it is a diversified discipline that draws ideas and insights from many fields within cognitive science to understand language.

3. The Scope of Psycholinguistics

As its name indicates, psycholinguistics combines psychology (human mind and behaviour) and linguistics (the scientific study of language origin, structure, and use). It is part of cognitive science, an emerging interdisciplinary field that studies memory, imagery, problem solving, and

language. It has developed through different schools of thought, leading to controversies on how to study language processes. It aims to study both linguistic knowledge and processes. Thus, it asks these two main questions (Carroll, 2008):

- What linguistic knowledge do individuals need to use language?
- What mental processes are involved in individuals' ordinary use of language?

Based on these questions, psycholinguistics studies the linguistic knowledge humans need to use language. This knowledge is classified into two types: implicit (tacit) and explicit. Implicit knowledge of language means performing something without being conscious of the full rules, whereas explicit knowledge refers to the processes or mechanisms involved in performing that thing. Psycholinguistics also investigates the cognitive processes, such as thinking, perception, memory, and learning, in language use. For instance, how we understand a lecture, hold a conversation, or read a book.

4. Areas of Interest in Psycholinguistics

For its areas of interest (sub-fields), Scovel (1998) mentioned four major domains of inquiry in psycholinguistics: language acquisition, production, comprehension, and dissolution.

➤ **Language acquisition:** children's ability to pick up their mother tongue so quickly and seemingly so easily (p.7). It is the process by which children can acquire their native language rapidly and effortlessly.

➤ **Language production:** the ability of individuals to use language.

➤ **Language comprehension:** humans' ability to understand what they hear and read.

➤ **Language dissolution (attrition):** language loss that can result from trauma, accidents, or genetic effects.

Practice

Task One: Say whether the following Statements are within the scope of psycholinguistics.

Statements	Yes	No
a- Psycholinguistics investigates how babies acquire their first words.		
b- Psycholinguistics analyses how languages change over history.		
c- Psycholinguistics studies how people understand sentences and texts.		
d- Psycholinguistics studies language impairment in aphasia patients.		
e- Psycholinguistics classifies languages according to word order.		
f-Psycholinguistics analyses speech errors to understand how thoughts are converted into words.		
g- Psycholinguistics investigates how linguistic knowledge is stored, retrieved, and managed in the human brain.		
h- Psycholinguistics traces the origins of word constructs.		
i- Psycholinguistics compares how bilingual individuals switch between two languages in conversation.		
j- Psycholinguistics studies the mental and neural processes involved in language production and comprehension.		

Task Two: Answer the following questions.

- 1- How do you distinguish between psychology and linguistics?
- 2-What is the main focus of psycholinguistics?
- 3-What fields of study are related to psycholinguistics?
- 4-What cognitive processes are involved in psycholinguistics?

Theme Two: Language and Thought

Objectives: By the completion of this theme, students will be able to:

- 1-Discuss the relationship among language, thought and culture.
- 2-Explain the Sapir-Whorf hypothesis and provide real-world examples of linguistic relativity.
- 3-Distinguish between linguistic relativity and linguistic determinism.
- 4- Express their opinions about this hypothesis.
- 5-Evaluate different views about the relationship among language, thought and culture.

Guiding Questions

- 1-Can humans think without language?
- 2-Do you think language completely or partly determines our thought?
- 3-What is the relationship between language, thought and culture?
- 4 -What does the Sapir-Whorf hypothesis propose about this relationship?
- 5-What are the different schools of thought views regarding this relationship?

Introduction

The interrelationship among language, thought and culture has been a central issue for philosophers, linguists, psychologists, psycholinguists, and anthropologists. Some believe language influences our culture and thought processes to some degree. However, others claim that language completely determines thought and that thought is impossible without language. As a result, many theories and hypotheses emerged to explain this relationship, including the Sapir-Whorf hypothesis, behaviourism, universalism, cognitivism, interactionism, and the neuroscientific view.

1. The Sapir-Whorf Hypothesis

Based on his research on Indigenous American languages (such as Hopi, Apache, and Aztec), Edward Sapir first proposed the Sapir-Whorf hypothesis, which his amateur, Benjamin Lee Whorf, supported. It states that language influences thought and shapes how we think, see, and

understand the world (Ramoo, 2021). It means that language does not just describe reality; it filters and structures it. This hypothesis consists of two parts: linguistic determinism and relativism.

1.1 Linguistic Determinism

Linguistic determinism is often called the strong version of the Sapir–Whorf hypothesis. It suggests that language's form and characteristics determine and limit our thought patterns and perceptions. In this respect, Sapir (1929) held that “Human beings do not live in the objective world alone... but are very much at the mercy of the particular language which has become the medium of expression for their society” (p. 209). This implies that the language people speak influences how they think, perceive, and understand the world.

Whorf assumed that “We dissect nature along lines laid down by our native languages” (1956, p. 213). This clarifies that speakers of different languages perceive and conceptualise the world differently because language structures shape thought patterns. He also compared English to the Hopi language and claimed that the English people often see time as a straight sequence with past, present, and future. However, Hopi speakers perceive time as a continuous process rather than separate fixed markers. In fact, this view was a bit extreme and was criticised by other scholars.

➤ Examples:

- A language (like Chinese, Indonesian, Malay, and Vietnamese) that has no grammatical past tense: its speakers cannot imagine and think of past events.
- Colour terms: If a language (such as English) uses one word for several shades like blue and green, speakers may struggle to distinguish them.
- Number systems: Languages (like Piraha), which have very few words for numbers, appear to limit how easily speakers can represent large exact quantities.

1.2. Linguistic Relativism (relativity)

Linguistic relativity, also known as Whorfianism or the weak form of the Sapir–Whorf hypothesis, explains that the languages we speak influence our thought but do not completely determine them. In this context, Ramoo (2021) said that “different cognitive structures emerge from

the way languages map words onto things in the real world” (p.107). This means that different languages lead their speakers to see the world differently.

➤ **Examples:**

-One community has only one word for ‘water’, while another may have several words to describe different types of water, such as rainwater, seawater, or drinking water.

-In some cultures, people use only simple terms like ‘uncle’ and ‘aunt’ to express kinship. However, others may use many specific words in this domain, depending on whether they are from the mother’s or father’s side.

-In some languages, speakers do not use ‘left’ and ‘right’ to show directions; they use ‘North’, ‘South’, ‘West’, and ‘East’.

-Arab speakers label objects with masculine and feminine structure, which may sound odd to an English speaker. This is simply because our language views are different.

These examples show that humans have no single universal way to name the world around them; each language reflects its speakers’ culture and experiences. In brief, linguistic relativity suggests that language influences how we see the world, while linguistic determinism claims that it controls how we think. Together, these two ideas highlight the powerful connection among language, thought, and perception.

2. The Behaviourist Theory

At its heart, behaviourist theory emphasises external factors and denies internal mental structures in language learning. Accordingly, the relationship between language and thought is understood as a behaviour. Skinner (1957) stated that, “The simplest and most satisfactory view is that thought is simply behaviour-verbal or nonverbal, covert or overt” (p. 449). This suggests that observable actions shape language and thought, and language learning happens through experience, repetition, rewards, and punishment. Steinberg, Nagata, and Aline (2001) supported this idea, claiming that thought is “a subvocal speech or behaviour” (p. 246). Therefore, thinking is not a

separate mental process, but it is a type of behaviour that occurs internally and cannot be directly observed.

3. The Universalist Theory

The Universalist approach implies that all humans share universal cognitive processes and that language is a medium of communication that reflects thought, but does not shape it. In this regard, Chomsky (2006) asserted that “When we study human language, we are approaching what some might call the ‘human essence,’ the distinctive qualities of mind that are, so far as we know, unique to man...” (p. 88). This view shows how language can be independent of thought and how it can be a window into the human mind, as well as the unique mental abilities that make us humans with universal, specific cognitive processes.

Similarly, Pinker (1994) argued that “People do not think in English or Chinese or Apache; they think in a language of thought” (p. 72). This statement reinforces Chomsky’s belief that thought is independent of language. In sum, the Nativist school of thought pioneered the idea that humans possess an innate “*universal grammar*” and a “*mentalese*” (mental language). Thus, thought precedes language and language merely expresses pre-existing cognitive structures.

4. The Cognitivist Theory

According to cognitivism, language is a medium for expressing abstract thought, and mental processes involved in language comprehension, processing, and production enable humans to communicate. According to Lakoff and Johnson (1980), “Our ordinary conceptual system, in terms of which we both think and act, is fundamentally metaphorical in nature” (p.03). Language and thought are mainly metaphorical. We understand and act through comparisons drawn from everyday experience, which shows that our thinking and actions are not purely logical but are shaped by conceptual metaphors from daily life. For instance, the expression (*time is money*) shows that people conceptualise abstract domains (time) through concrete experiences (money). Hence, language is considered the concrete representation of thought.

5. The Interactionist Theory

For this school of thought, social interaction shapes language. Children acquire language through communication with knowledgeable others (parents and peers). They can never utter a single word without interaction with them. This reveals that language and thought are interdependent and they actively influence each other. Within this context, Vygotsky (1986) proposed that “Thought is not merely expressed in words; it comes into existence through them” (p. 218). This argument means we do not just use language to express ideas we already have; instead, language helps us form those ideas in the first place. Without a linguistic framework, thoughts are incomplete and even impossible to organise. In brief, thought and language start as separate systems in childhood. Over time, they merge and shape one another in a continuous developmental process.

6. The Contemporary Neuroscientific View

Concerning the neurobiological relationship between language and thought, they are interconnected in the human brain. Yet they use different neural circuits. Friederici (2017) argued that language and thought overlap and are dependent on each other, but are not the same. Neuroscientifically, language processes occur in the left hemisphere, whereas cognitive tasks recruit a different distributed network called the “multiple-demand” system.

Fedorenko and Varley (2016) supported this claim with evidence from neuroimaging studies and research on neurological patients. They affirmed that language and thought are not identical, as several aspects of thought occur in regions different from those involved in language. For example, we can think about what we see or feel without necessarily using words, meaning language and thought are linked and work together when we think, listen, or speak, but they rely on different neural mechanisms.

The following table summarises scholars' different insights and interpretations regarding the relationship among language, cognition and culture. It includes key figures, their views, and their main ideas.

View	Main Idea	Key Scholars
Linguistic Determinism	Language determines thought	Sapir & Whorf
Linguistic Relativity	Language influences thought	Ramoo
Behaviourist	Thought is an internalised speech	Skinner
Universalist	Thought precedes language	Chomsky & Pinker
Cognitivist	Language mirrors cognition.	Lakoff & Johnson
Interactionist	Language and thought co-develop.	Vygotsky
Neuroscientific	Language and thought are linked, but they have distinct brain systems.	Friederici

Practice

1-Discuss the following quotes.

-« Language is our body and our breath, our world and our thought, our perception and even our unconscious. » Philippe Sollers.

-« Thought is before language and consists in the simultaneous presentation to the mind of two different images. » T. E. Hulme.

-« Thought is the bud, language the blossom and action the fruit behind it. » Ralph Waldo Emerson

2-Discuss the following questions.

-Based on the theory of linguistic relativity, what is the role of culture within the language–thought relationship?

-In your opinion, which version of the Sapir-Whorf hypothesis is widely accepted by modern linguists? Why?

-Do you agree with the hypothesis that the structure of a language affects the speaker's worldview?

Support your answer with examples.

Theme Three: Language Acquisition

Objectives: By the completion of this theme, students will be able to:

- 1-Describe the key features of First and Second Language Acquisition
- 2-Distinguish between L1 and L2 acquisition.
- 3-Identify the cognitive benefits of bilingualism.
- 4-Understand the major theories of first language acquisition.
- 5-Explain how first language develops and grows in stages.

Guiding Questions

- 1-What is first and second language acquisition?
- 2-What are the similarities and differences between L1 and L2 acquisition?
- 3-What are the cognitive benefits of being a bilingual?
- 4- What are the major theories of first language acquisition? What are their backgrounds, principles, advantages and limitations?
- 5- How do children acquire their mother tongue?

Introduction

Language acquisition is a fascinating process that psychologists and language researchers have studied over decades. Two main theories dominate the field and explain whether language is a verbal behaviour or a hard-wired process in the human brain. L1 acquisition, the primary benchmark for L2 and L3, goes through universal stages that begin with pre-linguistic communication and end with complex language structures. This theme explains these processes, theories, and stages.

1. First and Second Language Acquisition

First Language Acquisition

First language (L1) is often called native language, mother tongue, or the primary language. It is the first language that a child acquires (Gass & Selinker, 2008). First language acquisition, or

child language acquisition, is a relatively rapid, effortless process that children master around the age of four (Nunan, 2011). Consequently, it is a natural, subconscious process that occurs during the critical period (the time from birth to puberty, during which normal first language acquisition can take place).

Bilingualism

Bilingualism is a complex, dynamic, and multifaceted phenomenon. It is defined as: “the knowledge and use of two or more languages by an individual or a community” (Patten & Benati, 2010, p. 69). Thus, individuals and communities that can use two or more languages are considered bilinguals. Dörnyei (2009) divided this linguistic phenomenon into two extremes: *balanced bilingualism* and *a very broad interpretation of bilingualism*. In the first extreme, bilinguals have native-like competence in two languages, which comes from dual L1 acquisition in childhood.

Examples: * A child born in Barcelona may grow up speaking Spanish and Catalan, where both languages are spoken in the community.

*A child born in Lubbock, Texas, with Spanish-speaking parents may learn Spanish at home, but English would be the language spoken in the larger community.

In the second extreme, bilingualism refers to “the ability to produce complete meaningful utterances in two languages” (Herschensohn, 2007, p. 4). This suggests that languages (L1 & L2) do not occur simultaneously during infancy. However, the second language is acquired in adulthood. For instance, a student whose first language is Arabic studies Spanish at university. An Algerian teenager moves to Moscow and begins learning Russian after already mastering Arabic. In brief, truly balanced bilingualism rarely occurs, so the second view is more realistic since language knowledge is usually unequal.

Regarding the potential benefits of bilingualism, Dörnyei (2009) stated that bilingual children can outperform their monolingual peers in some cognitive tasks because they are trained to manage two languages earlier. This makes them better at problem-solving situations that require attention and effort to evaluate conflicting perceptual knowledge and accept the correct solution.

Additionally, bilinguals show greater creativity and flexibility. This advantage reflects that two linguistic systems allow them to view things from two angles.

Moreover, bilingualism slows down age-related cognitive decline. Research indicates that bilingual individuals maintain higher levels of cognitive control beyond 60 years. They may even have a delay in the onset of dementia by four years compared to monolingual people. Thus, they may retain a better memory as they age.

Second Language Acquisition

Second language acquisition (SLA) stands for the process of learning “a non-native language after the learning of the native language” (Gass & Selinker, 2008, p. 7). It means learning a second, third, fourth, or fifth language after establishing proficiency in the first language (L1). According to Dörnyei (2009), SLA can be naturalistic or instructed. Naturalistic SLA is an unconscious process through which learners develop their language in authentic, input-rich environments. However, instructed SLA occurs in educational settings where curricula, syllabi, and lesson plans guide learning, and human agency (such as teachers, policymakers, materials designers) plays a critical role.

In naturalistic contexts, learners tend to perform better because they are naturally urged to master the host environment language. By contrast, school learners may have to learn the language, which makes them perform worse. Overall, naturalistic SLA is embedded in real-life contexts, while instructed SLA is shaped by teacher-student roles, group norms, classroom management and goal structures, and other classroom factors.

Dörnyei (2009) stated that SLA +1 or more languages refers to L3. It is a very complex process because L2 stages and outcomes influence it. Conversely, L3 learners are generally considered experienced since they already possess the metalinguistic skills and the metacognitive strategies that monolingual learners lack. The term L3 remains unclear, since key issues related to ‘prior experience’ (how prior linguistic knowledge (schema) affects L3 acquisition) and

‘experience’ (whether it refers to the length of exposure or development of metalinguistic skills) still need further exploration and understanding.

Similarities and Differences between L1 and L2 Acquisition

The relationship between first- and second-language acquisition has long been a debate among linguists and psycholinguists. Dörnyei (2009) affirmed that they share some common features. First, both processes involve the same learners and the same target languages. This means the same individual can learn the same language as L1 or L2, but through different processes. For example, a child in Algeria acquires his L1 (Arabic) at home and later learns the same language at school as L2. Second, L1 and L2 attainment have some similar psychological processes. For instance, in both processes, learning a new word’s form (sound/spelling) requires linking it to its meaning through exposure and use. In addition, the statistical learning process occurs in both L1 and L2. Yet explicit learning mechanisms must supplement it in SLA. This indicates that both L1 and L2 learners unconsciously notice patterns in language input, but L2 learners usually need conscious instruction to learn the language.

As for the differences between L1 and L2 acquisition, Dörnyei (2009) summarised them in the following points:

-Differential success: L1 learners often reach high levels of success in their native language acquisition, which enables them to use it spontaneously in all situations. By contrast, most L2 learners do not reach the desired level of proficiency, and they should be conscious and prepared in most contexts. Therefore, L1 acquisition is invariably successful, while L2 remains relative and varies in success.

-Automatic versus optional: L1 acquisition is an automatic process driven by children’s need to communicate, feel belonging to their community, and fulfil their desire. Thus, they need to acquire, understand, and use their mother tongue. However, L2 acquisition is an optional process motivated by personal, cultural, scientific, economic, or touristic reasons.

-Homogeneity versus heterogeneity: L1 learners go through similar linguistic and psychological processes, equal physiological (biological) and mental (psychological) stages, and approximately the same time frame of acquisition. Nevertheless, L2 learners vary in these aspects based on motivation, commitment, aptitude, and intelligence.

-Knowledge of the language and knowledge of the world: During the stages of L1 acquisition, children develop cognitive and social growth together, and they gradually become capable of perceiving facts and understanding the world around them. For example, a child's knowledge of an apple develops simultaneously with its name. Conversely, L2 knowledge of the world often precedes learners' ability to express it. This implies that learners' knowledge and perception of facts are not linked to their ability to articulate them in that language.

-Expressing individuality: L1 is a fundamental component of identity since it is used and shared by all the members of the community. On the other hand, L2 is often an additional optional identity restricted to an individual or a small group within society.

-Pre-existing L1 knowledge: Children start their L1 acquisition process with no prior linguistic knowledge, whereas L2 learners already have a language learning experience that helps them learn any other language. In such cases, L1 transfer plays a major role in L2 learning and use.

-Language input and the amount of exposure: In L1 acquisition, children are exposed to the environment where they acquire natural and rich input (the language that an acquirer/learner is exposed to, in contrast to output), while L2 learners attend classes and receive limited artificial input. Hence, L2 learning involves official programs, lesson plans, textbooks, materials, guidance, and instructions.

-Implicit Learning versus explicit learning: L1 depends on the implicit learning process because it occurs automatically and unintentionally through exposure. Nevertheless, L2 requires explicit and less automatic learning, such as studying grammar rules or memorising vocabulary lists.

2. Theories of First Language Acquisition

During the 20th century, two major theories of language acquisition were proposed to understand how children acquire their first language. These theories include behaviourism and mentalism.

-Behaviourism

Behaviourism is a psychological school of thought that emerged in America in the early 20th century as a reaction against traditional grammar learning. It was founded by J.B. Watson and supported by B.F. Skinner, Leonard Bloomfield, O.N. Mowrer, and A.W. Staats, who viewed human language as a form of verbal behaviour (Demirezen, 1988). This approach focuses on how external factors, such as parents, caregivers, and family members, shape our behaviours, including language. Thus, language is a product of the environment.

E.L.T. Thorndike explored the main principle of behaviourism. He stated that learning occurs through stimulus-response associations (S-R theory). In this context, Rivers (1968) clarified that "the behaviourist theory of stimulus-response learning, particularly as developed in the operant conditioning model of Skinner, considers all learning to be the establishment of habits as a result of reinforcement and reward" (as cited in Demirezen, 1988, p.136). This idea is similar to Pavlov's experiment, which suggested that stimulus and response work together (classical conditioning).

-Classical conditioning: A type of learning where a neutral stimulus becomes associated with a naturally occurring stimulus, eliciting a learned response.

-Operant Conditioning: A type of learning where behaviours are strengthened or weakened by their consequences (reinforcement or punishment).

Based on this principle, children acquire their first language by listening to others, imitating them, and receiving rewards. This process reinforces them to gradually produce sounds, syllables, and words, and combine sentences through generalisation and analogy. For example, they use *goed* and *doed* instead of *went* and *did*. Over time, they can articulate socialised speech, which is

internalised as implicit speech, and later form adult-like utterances. In summary, behaviourism is a stimulus-response psychology (Demirezen, 1988).

According to Rivers (1968), babies learn their native language via a trial-and-error process, where correct utterances are strengthened by comprehension and approval and incorrect or unacceptable utterances are inhibited by the lack of reward, so little by little their utterances develop until they approximate the speech of the community in which they are growing up (as cited in Demirezen, 1988). Thus, language acquisition is a matter of habit formation. Children may learn complex linguistic structures by breaking them down into small habits. They are rewarded or punished for producing correct or incorrect responses, correspondingly (Hubbard et al., 1983).

Chomsky criticised behaviourist theory due to its numerous problems. First, it claims that L1 is learned through imitation and habit formation. However, children produce many utterances only once, and then they disappear forever. They also create new correct language that they have never heard before. Second, children generate utterances that adults never use. For instance, they over-regularise past tense with irregular verbs (they use *runned* and *seed* as past tense for *run* and *see*). This act is a problem of creativity rather than imitation (Nunan, 2011).

- Mentalism

Mentalism, or the innatist theory of language acquisition, was first introduced by American linguist Noam Chomsky and then developed by the neuropsychologist Eric H. Lenneberg. It emerged as a reaction to the behaviourists' view of language acquisition and opposed almost every part of its basic structure (Anastasi, 2021). This means they contradict it at all main levels, including ideas, assumptions, methods, and understanding of how humans acquire language.

Unlike behaviourists, who believed that language is learned through habit formation and conditioning (repetition and imitation of what we hear), mentalists argued that all humans possess an inborn capacity (innate mental ability) that enables them to learn any language as part of their normal biological development, which is called the Maturation Process (Anastasi, 2021). Thus,

language acquisition occurs naturally as the brain grows and matures, and not through imitation and practice.

The innate ability that enables the child to learn complex grammar and form new sentences is called the Language Acquisition Device (LAD). It is a hypothetical biological device or faculty that humans are born with, which is specifically designed for language acquisition. Ergo, it constitutes the basis for the language acquisition process, in which external factors are neglected (Demirezen, 1988). According to Cook (2003), Shormani (2012), and White (2003), this innate ability is embedded in humans' biological and cognitive nature and manifested in the concept of Universal Grammar (UG), which is a set of necessary rules and principles that characterise all human languages (as cited in Shormani, 2014). For instance, all languages have verbs, nouns, and adjectives.

For Chomsky, children internalise the linguistic structure of the language they are exposed to if they receive optimal input. Thus, this predisposition helps them understand and develop language independently, rather than through imitation and reinforcement (1965). In his article 'Review of Verbal Behaviour' (1959), Chomsky emphasised that behaviourists ignored creativity in child language acquisition and introduced a new approach to FLA, explaining that language exists in the mind before experience. In other words, he believed humans are born with a specific language learning faculty that allows them to acquire, produce, and understand language.

Similarly, Preston argued that animal behaviours can never explain human behaviours. She added that a child's ability to acquire their native language refers mainly to their innate universal grammar (1994). In this light, only humans can learn language because their mental faculties (LAD) are triggered by input (Shormani, 2012). This exposure to environmental stimuli acts as a crucial catalyst that unlocks the child's pre-programmed linguistic mechanisms. Without sufficient exposure, these innate structures remain dormant, preventing the natural development of syntax and grammar. Consequently, language acquisition relies on a dynamic interplay where innate biological capacity meets environmental experience.

Chomsky (1987) stated that children cannot acquire complex linguistic structures from the world around them. For example, they cannot form wh-questions (due to subject-verb inversion) and understand statements with different interpretations (as cited in Anastasie, 2021). In short, mentalists believe first language acquisition depends only on the mind and thought processes and not on imitation and habit formation.

As Nunan (2011) notes, the mentalist approach was criticised for three main reasons. First, the Chomskytes assume that first language acquisition is an easy, automatic, and unproblematic process. However, research reveals that children encounter many challenges while acquiring their mother tongue. The following conversation shows that the child cannot express what she wants to her mother, and she throws a temper tantrum.

Child: Me a a me a me a sec a Lawrie a dancing.

Mother: You and me and Lawrie dancing?

Child: Me, a you a, a, Jenny, Lawrie a dancing.

Mother: Dancing?

Child: Yeah. (Begins shouting.) No. No. (No.) No. Ahh.

Mother: Jumping? (No.) Dancing?

Child: Ah, ah guck.

Mother: You're stuck. Well, don't have a fit because I didn't understand you. All right, you try and say it again, Darling. You and me and Jennie and Lawrie.

Child: Dancing. Dancing.

Mother: (Tries to pronounce the word in different ways, but each time the child cries out "No".)
Where do we do it? (No.) Oh, try again. Say it again. Say it again. (Ahhh!) Don't have a fit-you'll get stuck. You mustn't slide down like that. I'm sorry I didn't understand your words.

Second, Chomsky and his followers assert that input to children is much less 'junky' than thought. Parents speak slowly and carefully, providing their babies with grammatically clear

structures. To illustrate this, the extract below shows a mother drawing her child's attention to the relationship between spoken and written forms.

Mother: What's that say? (Pointing to the name Becca written on the bottom of a child's plastic mug.)

Child: P-A Me!

Mother: P-A Me! Ha! That says B-E-C-C-A. Becca. You're a funny duck!

Finally, Chomsky claims that first language acquisition is an internal mental process. In contrast, it is a social process through which we meet our needs, feel a sense of belonging to our community, and show our identity.

3. Stages of First Language Acquisition

Although behaviourists and mentalists disagree about how humans acquire and develop their mother tongue, they share that language acquisition is a developmental process that goes through distinct stages. Yule (2006) identified the following stages in the acquisition process:

Cooing and babbling

Cooing is the first use of speech-like sounds. During their first months, children can produce vowel-like sounds, such as [i] and [u], because these high vowels are easy for the mouth to control. Around four months, they can move the back of the tongue to the back of the palate and produce velar consonants like [k] and [g], which is why it is called the 'cooing' or 'gooing' stage. At five months old, babies can hear differences between [i] and [a] vowels and [ba] and [ga] syllables. This means that the perception system develops before real speaking.

Between six and eight months, children begin the babbling stage, where they sit up and produce different consonant-vowel patterns, such as ba-ba-ba and ga-ga-ga. Later, around nine to ten months, they use intonation patterns, vary combinations like ba-ba-da-da, and produce nasal sounds and syllable sequences such as ma-ma-ma and da-da da.

In the late babbling stage, around ten or eleven months, babies start standing and producing vocal sounds to show emotions, emphasis, and imitations. They also produce more complex syllable combinations (ma-da-ga-ba). When adults react to this babbling, children learn the social role of speech. Researchers revealed that these ages of language development are approximate and vary among children. Hence, not all children coo, babble, and imitate at the same age.

The one-word stage

Between 12 and 18 months, children produce single words to name objects, such as 'cookie', 'milk', 'cat', 'cup' and 'spoon' (often pronounced [pun]), and utter forms (such as [s´]) to mean (What's that). This single form or unit, which can be a word, a phrase, or a sentence, is called a holophrastic utterance. These utterances are not only for everyday objects but also for children's wants in circumstances that extend their use, such as referring to someone's bad behaviour using their name and the word bad.

The two-word stage

Around 18 to 24 months, children start the two-word stage; they utter two different words (such as baby chair, mommy eat, and cat bad), and their vocabulary grows to over 50 words. The meaning of these phrases is entirely based on the situation. For instance, the phrase 'baby chair' could be a request (= put baby in chair), possession (= this is baby's chair), or a statement (= baby is in the chair). Most importantly, when children use these phrases, adults react as if they were real communication by giving them feedback confirming that their words work. By age two, children can produce 200 or 300 words and can be conversational partners who can understand five times or more what they can actually say.

Telegraphic speech

In the telegraphic speech stage, between two and two-and-a-half years old, children produce 'multiple-word' speech. As a result, they can produce many utterances and a variety of word forms. The main feature of this period is that children use strings of words (lexical morphemes) that lack

some grammatical inflections (articles and prepositions). For example, this shoe all wet, cat drink milk and daddy go bye-bye.

By two and a half years old, children acquire more vocabulary, initiate talk, and increase their physical activity (such as running and jumping). By three years old, their vocabulary grows to hundreds of words, and their pronunciation is similar to adults. In conclusion, adults influence children's speech development.

Practice

Task One: Are the following statements true or false? Write T/F in the space provided.

- 1-Children's first words most commonly refer to abstract ideas.....
- 2-The first language level that a child learns is syntax.....
- 3-Around two months, babies begin to produce sounds called coos.....
- 4-Babbling is the first stage of language acquisition.....

Task Two: Classify the following statements into the right column.

- Children learn appropriate sounds and words in reaction to their parents' reinforcement.
- Children are born with a language acquisition device.
- Language acquisition is a purely physical behaviour unrelated to the mind.
- Language is a complex mental process involving cognitive factors.
- Language acquisition is a mechanical habit formed through stimulus and response.
- Repetition and imitation are essential in language acquisition.
- It neglects the role of society and the linguistic environment.
- It believes that language is a simple, ordinary behaviour.
- It rejects the idea that language is innate.

Behaviourism	Mentalism

Task Three: Discuss the following statements.

1-Though behaviourism and mentalism differ in perspective, they attempt to explain the same points in child language acquisition.

2-English is John's native language. In fourth grade, his family moves to another country, where German is spoken. He learns German and becomes fluent. What is the phenomenon that John exhibits? What are its cognitive benefits?

Theme Four: Language and the Brain

Objectives: By the completion of this theme, students will be able to:

- 1- Define the concept of neurolinguistics.
- 2-Identify the parts of the brain related to language functions.
- 3-Understand the experimental methods used in psycholinguistics.
- 4-Explain the role of these methods in language research.
- 5-Distinguish between the processes of language comprehension.

Guiding Questions

- 1-What is neurolinguistics
- 2-What parts of the brain are responsible for language functions?
- 3-What does each part involve?
- 4-What are the experimental techniques used in psycholinguistics? What is their role in language research?
- 5-What are the components of language comprehension?

Introduction

Language is a complex form of behaviour in which many physiological and psychological aspects interact. Therefore, studies have emphasised the importance of the innate physiological capacity humans are born with for language production, comprehension, and acquisition. This issue has been a focus of psychology, psycholinguistics, neurolinguistics, and cognitive science. Although these disciplines differ in concepts and perspectives, they converge on the brain's central role in language processing. On this ground, this theme introduces the relationship between language and the brain.

1. Neurolinguistics

Neurolinguistics studies the relationship between language and the brain. It emerged in the 19th century to identify the specific brain region responsible for language. However, an incidental clinical event provided the first major clue to localising this area. In September 1848, Phineas P. Gage was a construction foreman charged with building a new railway line. He had an accident where an iron rod was blasted up through his upper left cheek and out of the top of his forehead. Nevertheless, he survived, and his senses and speech abilities remained intact. This proved that the front part of the brain does not control language (Yule, 2006).

2. Parts of the Brain

Over time, many studies have determined the language areas in the brain. They found that areas above the left ear are considered the centre of language functions. This can be described unless a closer look at some of the grey matter has been done. By doing so, we find that the brain consists of two parts, the left and the right hemispheres. The following picture shows a side view of the left hemisphere, where language production and comprehension processes occur (Yule, 2006).

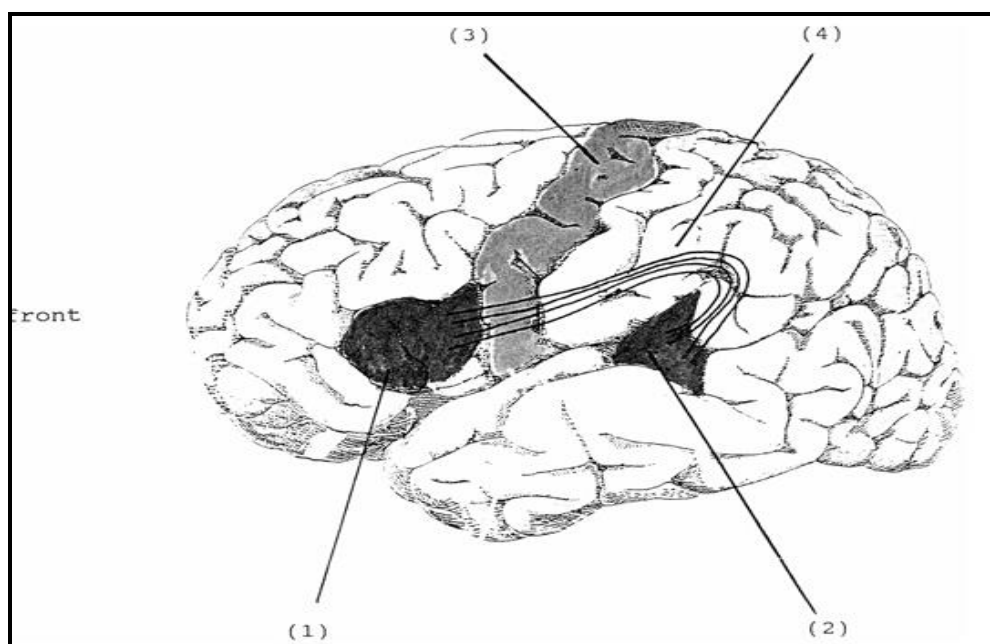


Figure 1: A Side View of the Left Hemisphere (Yule, 2006, p. 138)

The shaded parts in this picture show the main brain areas used for speaking and listening. We learned about these areas mostly by studying the brains of people who had language problems when they were alive. By examining their brains after death, scientists could see which parts were damaged and link that damage to specific language difficulties. This helped us understand which brain areas normal speakers use for language (Yule, 2006).

Broca's Area

According to the illustration of the brain above, part (1) is called Broca's area or the anterior speech cortex. This part is located in the left hemisphere and is responsible for speech production. It was named after the French surgeon "Paul Broca", who reported in the 1860s that any damage to this part of the brain leads to difficulty in producing spoken language. However, damage to the right hemisphere does not cause this effect. This finding indicates that language ability is mainly located in the left side of the brain and confirms the key role of Broca's area in speech production (Yule, 2006).

Wernicke's Area

Technically, Wernicke's area (as shown in part 2) is described as the posterior speech cortex. It is located in the left hemisphere and is primarily responsible for speech comprehension. It was named after the German doctor "Carl Wernicke", who reported in the 1870s that any damage to this part of the brain causes difficulties in understanding spoken language (Yule, 2006).

The Motor Cortex

The motor cortex (part 3 in the illustration) controls muscle movement (such as hands, feet, arms, and other organs). Its closest part to Broca's area controls the articulatory muscles of the larynx, face, jaw, and tongue. The neurosurgeons Penfield and Roberts (1959) reported in the 1950s that this part of the brain is responsible for the physical articulation of speech (Yule, 2006).

The Arcuate Fasciculus

The arcuate fasciculus is a bundle of nerve fibres that connects Broca's and Wernicke's areas in the left hemisphere of the brain. This part (4), which was discovered by Wernicke, supports word retrieval, speech repetition, production, and comprehension (Yule, 2006).kkk:

3. Experimental Methods in Psycholinguistics

Because psycholinguists have no direct tools to observe mental operations, they have traditionally used indirect measures and computational modelling in laboratory experiments to reproduce language processes and their outcomes. The main techniques include reaction-time studies, priming and masking, self-paced reading, eye-tracking, and computational modelling (Dörnyei, 2009).

Reaction-Time Studies

Reaction time measurement is widely used in psycholinguistic experimentation because it requires minimal hardware: a computer with E-Prime software. It works by exposing participants to linguistic stimuli, asking them to perform a task, and respond by pressing buttons. Reaction times are measured in milliseconds and reflect the processing and automatization level (Dörnyei, 2009). Slower response times generally indicate a higher cognitive load or increased computational difficulty during word recognition and sentence parsing. By capturing these minute millisecond delays, researchers can precisely map out real-time mental operations as they unfold.

Priming and Masking

The priming model of psycholinguistic experiments examines unconscious mental processes by exposing participants to an initial stimulus that influences later responses without awareness. It shows how prior exposure activates *semantic* or *lexical* networks (Dörnyei, 2009).

-Example for semantic area activation

If the first task is to read a long list of words that includes 'window', and the second task requires the participants to complete a word stem that starts with 'win ... ', the probability of

producing the word 'window' rather than something like 'winter' or 'winner' is significantly higher than without having had the initial reading task, even if the participants cannot consciously recall that the first list contained 'window'.

-Example for lexical system activation

When bilingual speakers are presented with texts in the target language that contain some words that also exist in their other, non-target language (e.g. the word 'list' for bilingual English-Dutch speakers, since 'list' means 'trick' in Dutch), it has been consistently found that the prime words activate the participants' non-target language system without them being aware of this.

The priming technique can help explain many psycholinguistic phenomena when accompanied by a masking method. Masking can hide stimuli while still activating brain processes. Empirically, Ellis (2005) confirmed this, showing that the flash word may not activate the word-processing cerebral networks despite the masked stimuli.

Self-paced Reading

As it controls immediate language processing, the self-paced reading method is widely used in psycholinguistic experimentation. It requires a computer on which participants read sentences word-by-word or phrase-by-phrase, with reading times recorded. This reading is generally followed by true/false or yes/no questions to check understanding. Slower reading indicates grammatical or lexical processing difficulties, allowing researchers to infer language-processing mechanisms (Dörnyei, 2009).

Eye-tracking

Psycholinguistic experimenters can depend on vision and eye movements to investigate mental operations. Eye-tracking is an accurate tool created in the 1970s to study reading and attention. It provides detailed data on the “complex trace of saccades, fixations and regressions that the eyes make while taking in a line of text ...” (Frenck-Mestre, 2005, p. 175). Eye-tracking offers rich insights into language processing in general and the reading process specifically.

Computational Modelling

In psycholinguistics, computational modelling is the best way to investigate mental representations and functions. It involves simulating mental processes using computer programs that replicate language input and output. It helps test theoretical frameworks through successive approximation. This process requires omitting errors to reach a program that approximates the real mental output. Although computational modelling simplifies neural processes, it still has limitations in scope and technical aspects. It also focuses on hypothesis-testing validity rather than generating new predictions. Despite these limitations, it remains useful for studying iterative language development processes (Dörnyei, 2009).

In addition to these behavioural methods, neurolinguists and researchers recently use high imaging technologies, such as Functional Magnetic Resonance Imaging (fMRI), Electroencephalography (EEG), and Positron Emission Tomography (PET) scans, to observe brain activity during language tasks. More specifically, these techniques address lexical, syntactic, and semantic processing problems in language comprehension and production (Esanov, 2023).

First, fMRI tracks changes in the brain's blood flow linked to neural activity. It accurately identifies the brain region responsible for this activity, but cannot provide precise timing because of the delay between that neural activity and changes in blood flow. Second, EEG records the timing of the brain electrical activity. In contrast, it cannot identify its source because of extraneous variables, including signal interaction and skull thickness. Finally, PET scans measure emissions from radioactive substances injected into the bloodstream and provide a real-time view of brain activity. They help researchers detect active brain regions while a person engages in cognitive processes such as thinking, reading, listening, and speaking (Esanov, 2023).

4. Language Comprehension

Language comprehension means how people understand what they hear or read. It involves decoding language input and building meaning depending on memory, previous knowledge, and context. In doing so, the brain engages in many interrelated complex processes, including phonological processing, lexical processing, syntactic parsing, semantic integration, and pragmatic processing (Boon, 2025).

In phonological processing, the brain decodes sounds or letters. For example, when a listener hears the sounds /d/ɒ/g/, the brain combines them into the utterance 'dog'. When a reader sees the symbols 'd-o-g', they link them to the sound /dɒg/ and to the animal. Lexical processing is the process by which the brain identifies and retrieves words' meanings in the mental lexicon. For instance, when we hear or read the word apple, we quickly recognise it as a fruit, usually red or green, and we can eat it because our brain already stores this information.

Syntactic parsing is the grammatical structure and the understanding of *who* (the doer of the action) *does what* (the action). In the following example, the dog (subject) chased the cat (object: the receiver of the action), but in (the cat chased the dog), the roles are reversed. The cat becomes the subject, and the dog becomes the object. Therefore, word order (syntax) and grammar help us understand the correct meaning.

Another component of language comprehension is semantic integration, where the brain combines word meanings to create one complete idea. For example, in the sentence 'the tired medical student drank coffee before the class', we not only understand each word separately, but the full situation (a medical student is tired and drinks coffee to stay awake before the exam). Finally, pragmatic processing means understanding a sentence in context. For instance, when someone says 'nice job', it can be interpreted in two ways: a compliment if you did something good or a sarcastic remark if you made a mistake.

Thus, language comprehension is a complex cognitive process because the brain decodes sounds or symbols (phonological processing), finds word meanings (lexical processing), analyses grammar (syntactic parsing), integrates meanings into one clear idea (semantic integration) and understands the speaker's real intention in the situation (pragmatic processing). All these parts work together so that we can understand spoken and written language naturally.

Practice

Task One: Read the following definitions and insert their corresponding terms in the space provided.

- 1.....analyses how the structure of the brain impacts language learning.
- 2.....is an experimental method used to study language processing by monitoring and recording where a person is looking and for how long.
- 3.....is a key region in the left hemisphere of the brain responsible for speech production, articulation, and language processing.
- 4..... refers to the cognitive processes involved in understanding spoken or written language. It encompasses the ability to decode linguistic symbols, recognise meanings, and construct coherent interpretations of messages.

Task Two: Briefly, compare and contrast the following concepts.

Psycholinguistics & Neurolinguistics

Broca's Area & Wernicke's Area

Task Three: Fill in the gaps with words from the box, then fill in the grid below.

use - fMRI - brain activity - tasks - EEG - waves - imaging - PET scan
--

Neurophysiological methods involve recording the 1.....of people while they engage in language-related.....2..... Examples of these methods are electroencephalography (EEG), functional magnetic resonance imaging (fMRI), and Positron Emission Tomography (PET).....3..... is a non-invasive 4..... technique that identifies active brain regions during

language tasks. 5..... is an imaging technique that tracks brain activity during language.....6..... 7..... is a test that measures brain 8..... during speech processing.

1	2	3	4	5	6	7	8

Theme Five: Language Production

Objectives: By the completion of this theme, students will be able to:

- 1- Outline the stages of speech production.
- 2-Distinguish between types of errors.
- 3-Explore the common causes, types, and symptoms of aphasia.
- 4-Analyse the latest aphasia research.

Guiding Questions

- 1-What is the difference between language production and speech production?
- 2-What occurs in each stage of language production?
- 3-What are the different types of speech errors?
- 4-What is aphasia? What are its causes, types, and symptoms?
- 5-What are the latest aphasia studies?

Introduction

Language production is a complex process that transforms intentions into verbal communication through cognitive mechanisms, linguistic knowledge, and motor control. This complexity can lead speakers to make unintended mistakes, known as speech errors, or to serious problems in brain function, called language disorders. These phenomena and language impairments help researchers understand the mechanisms of language processing and the nature of human speech and communication.

1. Language Production

Language production is an abstract and physical process by which the speaker creates and expresses meaning using spoken or written language (Richards & Schmidt, 2010). This process is sometimes confused with speech production. Language production includes both speaking and writing; however, speech production is a complex multi-stage process in which humans frame thoughts into spoken language. According to Scovel (1998), speech production involves four main stages, including conceptualisation, formulation, articulation, and self-monitoring.

Conceptualization

Conceptualisation is traditionally known as a pre-linguistic, language-neutral stage. It is the initial stage of speech production in which the speaker decides what to talk about. At this message level, both syntactic and imagistic modes of thinking occur concurrently (Levelt, 1988). It is an abstract stage concerned with concepts, not words yet. It involves the speaker determining what to say, the intention to be conceived, selection of relevant information in preparation for construction of intended utterance, and the product is a preverbal message (Menn, 2017). This indicates that the concept of referent (whom and what to mention) is activated. Consequently, these activated mental concepts and communicative intentions are organised into a structured plan that serves as the raw conceptual input for subsequent linguistic encoding.

Formulation

Formulation is the second stage of speech production where the speaker structures ideas into words, phrases, and clauses. This process involves converting the abstract representation into a linguistic structure. This stage encompasses three main processes. *Lexicalisation* is the stage in which the speaker thinks about the idea, selects words and decides how to utter them. Within this, language structuring (*syntax planning*) combines the selected words following grammatical and phonological rules to produce the desired speech. Finally, the speaker translates these combined words into sounds through *phonological encoding*. Once this internal phonetic plan is fully assembled, it is ready to be sent to the motor system for physical articulation.

Articulation

Articulation is the third stage of speech production and the starting point of speech comprehension. It is a crucial stage where words are translated into sounds and syllables. In this phase, the speech system receives thoughts and linguistic forms from the brain to execute the required movements and produce the desired sounds.

Self-monitoring (self-repair)

Self-monitoring is the final stage of speech production where the speaker edits and corrects errors at different linguistic levels, such as syntax, lexicon and phonology, loudness and precision, to convey a clear message.

2. Speech Errors

Many studies indicate that all humans sometimes struggle to get the brain and speech production to work seamlessly. Yule (2006) classifies these problems in language production and comprehension into three types: the tip-of-the-tongue phenomenon, slips of the tongue, and slips of the ear.

The Tip-of-the-Tongue Phenomenon

The tip-of-the-tongue phenomenon occurs when a speaker knows a word but fails to bring it to the surface. They usually know its pronunciation and remember its first sound and number of syllables. This phenomenon can also happen with uncommon words and names. In such cases, speakers struggle to recall these target words and replace them with other phonologically similar words. For example, ‘fire distinguisher’ is used instead of ‘fire extinguisher’ and ‘medication’ for ‘meditation’. This error is often called malapropisms after Mrs Malaprop (a character in Sheridan’s play).

Slips of the Tongue

People often make minor errors when speaking, called slips of the tongue. This type of speech error happens when a sound of one word carries over into the next one (for example, saying ‘black bloxes’ instead of ‘black boxes’), or when a sound used in one word in anticipation of its occurrence in the next word (as ‘no man numeral’ instead of ‘roman numeral’). Another kind of slip happens when the final sounds of two words are switched (such as ‘stick neff’ for ‘stiff neck’ and ‘loop before you leak’ for ‘look before you leap’). These are much less common than switching first sounds.

Some slips are more noticeable, like switching two words (such as ‘use the door to open the key’ instead of ‘use the key to open the door’ and ‘a fifty-pound dog of bag food’ for ‘a fifty-pound bag of dog food’) or the interchange of two initial sounds (like saying ‘you have hissed all my mystery lectures’ instead of ‘you have missed all my history lectures’, and ‘noble tons of soil for ‘ noble sons of toil’). These are called *spoonerisms* after William Spooner, an Anglican clergyman at Oxford University, who was famous for his tongue slips.

Therefore, a slip of the tongue is a speech error in which a sound or a word is produced in the wrong place. It shows that speech articulation has different stages, and the brain mixes them up while organising what we want to say. Overall, slips of the tongue help researchers understand how the brain works when producing language.

Slips of the Ear

Slips of the ear are another type of speech error. They occur when the listener hears something other than what was actually said. They misinterpret an auditory signal and can offer insights into how the human brain processes language. In other words, they reveal aspects of normal brain function involved in language processing. For instance, the phrase ‘gray tape’ may be heard as ‘great ape.’”

3. Language Disorders

Language disorders are communication impairments that impact the individual’s ability to comprehend, produce, and use spoken or written language (Kate, 2023). The most common categories of language disorders are aphasia, stuttering, and dysarthria.

Aphasia

Aphasia is a language disorder that causes difficulties in producing/understanding language. The reason for this disorder is usually a stroke, but it also results from head trauma, brain tumour, infection, metabolic disorder, toxicity or other aetiologies. Its types may vary based on the aphasic patient’s primary symptoms.

➤ Broca's Aphasia

Broca's aphasia, also known as motor aphasia, is a severe language disorder that affects speech production. It leads to reduced, effortful speech with slow, distorted articulation. The speech of a Broca's aphasic person often contains lexical morphemes (such as nouns and verbs), lacks functional morphemes (such as articles and prepositions) and misses inflections (such as plural -s and past tense -ed).

Therefore, this type of aphasia is characterised by agrammatic speech, since it lacks grammatical markers. For example, a patient with less severe aphasia utters the sentence (I eggs and eat and drink coffee breakfast), when asked about his/ her breakfast. In severe cases, speech is distinct, with long pauses and full of hesitations, such as (my cheek . . . very annoyance . . . main is my shoulder . . . achin' all round here). It may also be marked by difficulties in single-word articulation. For instance, (a stail . . .you know what I mean . . . tal . . .stail) instead of 'steamship'. In conclusion, Broca's aphasia severely impairs speech production and relatively preserves language comprehension.

➤ Wernicke's Aphasia

Wernicke's aphasia, also known as sensory aphasia, is a language disorder that impairs auditory comprehension. Wernicke's aphasic patients utter fluent speech, but it is difficult to understand. They use vague words even when asked direct questions. For example, I can't talk all of the things I do, and part of the part I can go alright, but I can't tell from the other people.

Anomia is a language disorder that is often associated with Wernicke's aphasia. It causes difficulties in correct word-finding. Thus, speakers describe objects or talk about their functions to overcome such cases. For instance, a person with anomic aphasia might say 'the thing to put cigarettes in' instead of 'ashtray'. Similarly, Lesser & Milroy (1993) provided an example of a speaker who said (It's blowing, on the right, and er there's four letters in it, and I think it begins with a C—goes—when you start it then goes right up in the air—I would I would have to keep racking

my brain how I would spell that word– that flies, that that doesn't fly, you pull it round, it goes up in the air) because he/she cannot produce the word 'kite' for an object in a picture.

To conclude, it should be noted that the symptoms of word-finding difficulty can happen in all types of aphasia and in other forms of language disorder, including dementia and Alzheimer's disease.

➤ **Conduction Aphasia**

Conduction aphasia is a relatively uncommon language disorder caused by damage to the arcuate fasciculus. It impairs the ability to repeat words or phrases. For example, speakers might say 'vaysse' and 'fosh' instead of 'base' and 'wash'. Thus, they perceive and understand speech but struggle to produce it.

Generally, people with conduction aphasia do not suffer from articulation or comprehension difficulties, but they often mispronounce words and have disrupted rhythm due to hesitations and pauses. Like other types of aphasia, conduction aphasia comes from damage to the left hemisphere of the brain, which controls language production and comprehension.

Stuttering

Stuttering, also known as stammering, is another type of speech disorder in which patients cannot articulate a normal flow of speech even though they know what they want to say. This makes speech full of repetitions, prolonged sounds, and interruptions or blocks. Speech-language pathologists confirm that stuttering affects all ages, particularly children between 2 and 6 years old, as they are developing their language skills. They also corroborate that this speech disorder can be treated by drug therapy, electronic devices, and self-help groups (The National Institute on Deafness and Other Communication Disorders, 2016).

Dysarthria

Dysarthria is a motor language disorder characterised by poor phoneme articulation. People with this disorder understand speech but have problems with the articulatory muscles, making it difficult to produce even words. To treat this language impairment, speech therapists use a series of

exercises to help patients control their speech muscles and language techniques (such as flip cards) to improve communication (Perrotta, 2020).

Practice

1- Complete the table below.

Speech error	Type	Original speech
1-Texas had several electrical votes. 2-The mist of May. 3-Hold me closer, Tony Danza. 4-Shake a tower. 5-For all intensive purposes.		

2-Read the text below carefully and answer the questions.

Aphasia is a disorder that results from damage to portions of the brain responsible for language. It usually occurs suddenly, often following a stroke, a gunshot wound, a brain infection, or head injury, but may also develop slowly, as the result of a brain tumour or a progressive neurological disease. Most people who have aphasia are middle-aged or older, but anyone can acquire it, including young children.

Aphasia has two broad categories: fluent and non-fluent. Other types within these groups include Wernicke's, Broca's, conduction, anomic, and global aphasia. The latter results from damage to extensive portions of the language areas and leads to severe communication difficulties. The physician recognises aphasia by testing the person's ability to understand and produce language. If he/she suspects aphasia, the patient is referred to a speech-language pathologist, who performs a comprehensive examination of the person's communication abilities.

After a brain injury, recovery occurs as the brain recovers. As a result, people with aphasia often see dramatic improvements in their language and communication abilities in the first few months, even without treatment. But in many cases, some aphasia remains following this initial recovery period. In these instances, speech-language therapy helps patients regain communication abilities.

Recently, "Virtual" speech pathologists have become flexible and convenient, allowing therapy at home through a computer. They can participate in activities, such as book clubs, stroke

clubs, technology groups, and art and drama clubs. Such experiences help them regain confidence and social self-esteem and improve their communication skills. Family involvement is often a crucial component of aphasia treatment because it enables family members to learn the best way to communicate with their loved one.

Researchers are testing new types of speech-language therapy in people with both recent and chronic aphasia to see if they can better help them recover word retrieval, grammar, and prosody. Others use drugs that affect neurotransmitters alongside speech-language therapy to improve recovery of language functions. Other research uses advanced imaging methods (such as fMRI) to explore how language processes occur in a normal and damaged brain. They also use non-invasive brain stimulation combined with speech-language therapy, which temporarily alters brain activity in the stimulated region. Recently, scientists have been studying whether this temporary alteration in brain activity might help people relearn language.

Adapted from The National Institute on Deafness and Other Communication Disorders (2017)

a-What is aphasia?

b-Who can acquire aphasia?

c-What are the causes of aphasia?

d- What are the types of aphasia?

e- How is aphasia diagnosed?

f-How is aphasia treated?

g-What research is being done for aphasia?

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Appendices

Appendix A

University of Mohamed Khider- Biskra-

Faculty of Letters and Languages

Department of English

Level: M 1-Language Sciences

Academic Year: 2025/2026

Duration: 2 hours

Student's Full Name:.....

Group:.....

First Semester Exam Paper in Psycholinguistics

Task One: Say whether the following statements are true or false. Correct the false ones (5 pts).

- 1-Psycholinguistics studies the mental processes involved in language acquisition or language use.....
- 2- Psycholinguistics deals with language as a psychological phenomenon at the level of the speaker rather than the listener.....
- 3-In the two-word stage, the child's vocabulary moves beyond fifty words.....
- 4- The anterior speech cortex is a common name for Wernicke's area.....
- 5- The use of 'fire distinguisher' instead of 'fire extinguisher' is called a spoonerism.....

Task Two: Read the definitions on the right and provide the appropriate concepts in the space provided. (03 pts)

- 1.....the idea that humans are genetically equipped to acquire language.
- 2..... is a language disorder that impairs an individual's ability to repeat spoken words or phrases.
- 3.....is a learning process where voluntary behaviours are modified by their consequences.

1-Linguistic Determinism vs. Linguistic Relativity

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Many theories explain how people acquire their first language, and each approach offers its interpretation of the acquisition process. In light of this, discuss what you see as the relationship between behavioural and mentalist approaches to the study of first language acquisition.

This image shows a single sheet of white paper with ten evenly spaced horizontal dotted lines, typical of primary school writing paper. The lines are black and extend across the full width of the page. There are no margins, text, or other markings on the paper.

[illegible]

Appendix B

University of Mohamed Khider- Biskra-

Faculty of Letters and Languages

Department of English

Level: M 1-Language Sciences

Academic Year: 2025/2026

Duration: 2 hours

Correction of the First Semester Exam in Psycholinguistics

Task One: Say whether the following statements are true or false. Correct the false ones. (5 pts)

1-Psycholinguistics studies the mental processes involved in language acquisition or language use...**False**

-Psycholinguistics studies the mental processes involved in language acquisition and language use

2- Psycholinguistics deals with language as a psychological phenomenon at the level of the speaker rather than the listener. **False.**

-Psycholinguistics deals with language as a psychological phenomenon at the level of the speaker and the listener.

3-In the two-word stage, the child's vocabulary moves beyond fifty words.....**True**.....

4- The anterior speech cortex is a common name for Wernicke's area.....**False**.....

-The anterior speech cortex is a common name for Broca's area

5- The use of 'fire distinguisher' instead of 'fire extinguisher' is called a spoonerism..... **False....**

-The use of 'fire distinguisher' instead of 'fire extinguisher' is called malapropism.

Task Two: Read the definitions on the right and provide the appropriate concepts in the space provided. (03 pts)

1- Innateness hypothesis/ theory: the idea that humans are genetically equipped to acquire language.

2-Conduction aphasia is a language disorder that impairs an individual's ability to repeat spoken words or phrases.

3-Operant conditioning is a learning process where voluntary behaviours are modified by their consequences.

Task Three: Briefly identify the differences between each pair. (4.5 pts)

1-Linguistic Determinism vs. Linguistic Relativity

The main idea of *linguistic determinism* is that language determines or strongly influences how people think. According to Whorf, speakers of different languages perceive and conceptualise the world differently because language structures shape thought patterns (e.g., Hopi vs. English concepts of time). The main idea of *linguistic relativity* is that language influences thought but does not determine it completely. Speakers of languages with gendered nouns (e.g., Spanish, German) may unconsciously attribute masculine or feminine qualities to objects.

2- First (L1) Vs. Second (L2) Acquisition

First (L1) acquisition is a subconscious process that develops naturally and automatically through implicit exposure to language, whereas *L2 acquisition or learning* is a conscious process that usually takes place in formal or academic settings through explicit instruction

3- Stuttering Vs. Dysarthria

Stuttering is a fluency disorder where the rhythm of speech is interrupted. It involves knowing what to say but struggling to get the words out. However, dysarthria is a motor speech disorder where muscle weakness causes unclear articulation. ...

Task Four: In no more than 20 lines, discuss the following topic. (7.5 pts)

Many theories explain how people acquire their first language, and each approach offers its interpretation of the acquisition process. In light of this, discuss what you see as the relationship between behavioural and mentalist approaches to the study of first language acquisition.

Answer

The behavioural and mentalist approaches to first language acquisition are often viewed as contrasting, yet they complement one another in important ways. The behavioural approach emerged in the early 20th century and was developed by B.F. Skinner. Skinner argues that children acquire language through imitation, repetition, and reinforcement. According to this view, the environment shapes language learning; adults provide models, correct errors, and reward appropriate speech, and children gradually form habits based on these external stimuli.

In contrast, the mentalist approach, pioneered by Noam Chomsky, argues that internal cognitive mechanisms drive language acquisition. Children are born with an innate ability to acquire language called the Language Acquisition Device (LAD). It emphasises the creativity of language use and focuses on mental processes and universal grammar. From this perspective, language acquisition is not just a response to external stimuli but a reflection of the child's internal cognitive abilities.

Therefore, the two approaches are complementary rather than mutually exclusive. Behaviourism highlights the importance of the environment, social interaction, and practice, while mentalism explains the underlying mental mechanisms that make language learning possible. Together, they suggest that first language acquisition results from both external input and internal cognitive processes. The environment provides linguistic models and opportunities for use, while the child's mental abilities enable the understanding and production of language.

Appendix C

University of Mohamed Khider- Biskra-

Faculty of Letters and Languages

Department of English

Level: M 1-Language Sciences

Academic Year: 2025/2026

Duration: 2 hours

Student's Full Name:.....

Group:.....

First Semester Replacement Exam Paper in Psycholinguistics

Task One: Underline the right option (10 pts).

1. The addresses the question of how the mentally represented grammar is employed in the production and comprehension of speech.

A. Processor B. Psycholinguist C. Neurolinguist D. Discourse analyst

2. is the stored knowledge that a person has about a particular concept, which enables them to interpret what they encounter in relation to that concept.

A. Mental representation B. Cognition C. Schema D. None

3. According to the strong Sapir–Whorf hypothesis, language:

A. Reflects universal cognition B. Strongly shapes thought C. Is independent of thought
D. Only influences memory

4. Who argued that humans are “at the mercy of the particular language” they speak?

A. Vygotsky B. Chomsky C. Sapir D. Lucy

5. Language ability is located in of the brain.

A. Right hemisphere B. Left hemisphere C. Both D. None

6. Which type of aphasia is characterised by speech like this: speech. . .two times...read...wr...ripe, er, rike, er, write . . .?

A. Broca's aphasia B. Wernicke's aphasia C. Conduction aphasia D. Anomic aphasia

7. When the baby can produce velar sounds /k/ and /g/ and vowels /i/ and /u/, this stage is known as:

A. Cooing B. Babbling C. Holophrastic D. Telegraphic

8. Which of these two utterances was produced by the older child?

- A. I not hurt him B. No the sun shining C. No bed D. Sleep bed

9. Bilingual individuals are better at:

- A. Relaxing and fighting anxiety B. Solving problems and reading C. Multitasking and distinguishing relevant information D. None

10. Which part of the brain connects Broca's and Wernicke's areas?

- A. Corpus callosum B. Arcuate fasciculus C. The motor cortex D. Grey matter

Task Two: Define the following concepts (4pts).

1-Input:

.....

2- Critical period:

.....

3-Aphasia:

.....

4-Language Comprehension:.....

.....

Task Three: One of the most important areas in psycholinguistics is language production because it explains how speakers transform their thoughts into spoken language. In a short composition, describe the processes that occur at each stage and how they contribute to the final spoken output (6 pts).

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Appendix D

University of Mohamed Khider- Biskra-

Faculty of Letters and Languages

Department of English

Level: M 1-Language Sciences

Academic Year: 2025/2026

Duration: 2 hours

Student's Full Name:.....

Group:.....

Correction of the First Semester Replacement Exam in Psycholinguistics

Task One: Underline the right option (10 pts).

1. The addresses the question of how the mentally represented grammar is employed in the production and comprehension of speech.

A. Processor B. Psycholinguist **C. Neurolinguist** D. Discourse analyst

2. is the stored knowledge that a person has about a particular concept, which enables them to interpret what they encounter in relation to that concept.

A. Mental representation B. Cognition **C. Schema** D. None

3. According to the strong Sapir–Whorf hypothesis, language:

A. Reflects universal cognition **B. Strongly shapes thought** C. Is independent of thought
D. Only influences memory

4. Who argued that humans are “at the mercy of the particular language” they speak?

A. Vygotsky B. Chomsky **C. Sapir** D. Lucy

5. Language ability is located in of the brain.

A. Right hemisphere **B. Left hemisphere** C. Both D. None

6. Which type of aphasia is characterised by speech like this: speech. . .two times...read...wr...ripe, er, rike, er, write . . .?

A. Broca's aphasia B. Wernicke's aphasia **C. Conduction aphasia** D. Anomic aphasia

7. When the baby can produce velar sounds /k/ and /g/ and vowels /i/ and /u/, this stage is known as:

A. Cooing **B. Babbling** C. Holophrastic D. Telegraphic

8. Which of these two utterances was produced by the older child?

- A. I not hurt him** B. No the sun shining C. No bed D. Sleep bed

9. Bilingual individuals are better at:

- A. Relaxing and fighting anxiety B. Solving problems and reading **C. Multitasking and distinguishing relevant information** D. None

10. Which part of the brain connects Broca's and Wernicke's areas?

- A. Corpus callosum B. Grey matter C. The motor cortex **D. Arcuate fasciculus**

Task Two: Define the following concepts (4pts).

1-Input: The language that an acquirer/learner is exposed to, in contrast to output.

2- Critical period: The time from birth to puberty during which normal first language acquisition can take place.

3-Aphasia: A language disorder that causes difficulties in producing/understanding language. Its causes are stroke, head trauma, brain tumour, infection, metabolic disorder, toxicity or other aetiologies. Its types are Broca's aphasia, Wernicke's aphasia, and conduction aphasia.

4-Language Comprehension: Language comprehension means how people understand what they hear or read. It involves decoding language input and building meaning depending on memory, previous knowledge, and context. In doing so, the brain engages in many interrelated complex processes, including phonological processing, lexical processing, syntactic parsing, semantic integration, and pragmatic processing.

Task Three: One of the most important areas in psycholinguistics is language production because it explains how speakers transform their thoughts into spoken language. In a short composition, describe the processes that occur at each stage and how they contribute to the final spoken output (6 pts).

Answer:

Speech production goes through four main interrelated stages: conceptualisation, formulation, articulation, and self-monitoring. First, during conceptualisation, the speaker decides what they talk about, generates the ideas, and selects relevant information for communication. For example, a student decides to ask his/her teacher for an extension on an assignment. The idea is formed: 'I need extra time to finish my paper.' Next, in the formulation stage, these ideas are turned into correct words, grammar and sentences. For instance, the student mentally prepares how to say it, selects the words and sentence structure, and organises the grammatical sequence before translating the thought into a phonetic plan.

In the articulation stage, the speaker physically (uses speech muscles) executes speech by converting linguistic representations into verbal output. In this case, the student says the sentence out loud during a conversation with their teacher. Eventually, the self-monitoring stage occurs, where the speaker evaluates and corrects their language output to ensure effective communication. For example, during the conversation, the student realises that they said 'exam' instead of 'assignment' and quickly corrects: 'Sorry, I meant assignment, not exam.'