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The Influence of Cognitive Load on Pragmatic Inference in ESL Learners: A Psycholinguistic Perspective

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ABSTRACT

This study investigates the impact of cognitive load on pragmatic inference ability in English as a Second Language (ESL) learners from a psycholinguistic perspective. While pragmatic competence—essential for interpreting implied meanings like indirect speech acts and implicatures—is known to be challenging for L2 learners, the cognitive mechanisms underlying these difficulties, particularly under constrained processing conditions, remain underexplored. Adopting a within-subject experimental design, 30 intermediate-to-advanced ESL learners completed a pragmatic inference task (interpreting 15 dialogue-based items) under two conditions: low cognitive load (single task) and high cognitive load (dual-task with concurrent digit memorization).Results revealed a significant decline in pragmatic inference accuracy under high cognitive load (mean score: 9.1/15) compared to low load (mean score: 12.4/15), supported by a paired samples t-test ($t(29) = 9.87$, $p < .001$). Qualitative feedback confirmed heightened perceived difficulty and cognitive strain during the dual-task condition. A weak positive correlation ($r = 0.29$) suggested limited mitigation of load effects by self-reported proficiency.These findings demonstrate that cognitive load substantially impairs ESL learners' pragmatic inferencing, underscoring the role of working memory limitations in L2 pragmatic processing. The study bridges cognitive psychology and L2 pragmatics, advocating for pedagogical and assessment designs that minimize extraneous cognitive demands to support pragmatic development.

Introduction

Pragmatic competence the ability to interpret language meaningfully within context is essential for successful communication in a second language (L2). One of its most intricate components is pragmatic inference**,** which involves interpreting meanings that go beyond the literal or surface level. This can entail implicature, indirect speech acts, presuppositions and so forth implied or context-based intentions. These inferential skills imply that the learners have to read between the lines using contextual-based cues, communal knowledge, and societal norms to determine what is meant instead of what is stated (Taguchi & Roever, 2017; Yus, 2021).

The pragmatic inference is especially hard to learn, in the case of L2 learners. In contrast to vocabulary or grammar, which can be explicitly taught and tested in a regular way, the pragmatic knowledge can be a more implicit part of sociocultural practices through which it can be learned most frequently in a natural communication situation (Ishihara & Cohen, 2020). Learners may struggle to recognize subtle forms of indirectness or implied meaning, especially when they are unfamiliar with the cultural background or discourse conventions of the target language. These challenges are amplified in academic or high-stakes communication settings, where misinterpretation of pragmatic cues can result in communication breakdowns or misunderstandings.

Importantly, the ability to interpret pragmatic meaning is not only a linguistic skill but also a **cognitive one**. According to Cognitive Load Theory (CLT)**,** first proposed by Sweller (1988) and elaborated by Paas, Renkl, and Sweller (2003), the human cognitive system has a limited capacity for simultaneously processing and storing information. When individuals engage in **dual-task situations**, such as interpreting implied meaning while also managing another cognitive task (e.g., memorizing a sequence of numbers), performance on one or both tasks is likely to decline. This is because working memory becomes overloaded, leading to reduced accuracy or slower processing.

For ESL learners, this cognitive strain is even more pronounced. Non-native speakers must dedicate more attentional resources to lower-level processing such as decoding unfamiliar vocabulary, parsing complex syntactic structures, and recognizing non-native phonological patterns (Kormos, 2006; Robinson, 2011). Consequently, fewer resources remain available for higher-order pragmatic interpretation. As a result, inferencing in L2 contexts may be more vulnerable to disruption under cognitively demanding conditions.

While some psycholinguistic studies have explored how cognitive load affects pragmatic reasoning, much of this research has been limited to native speakers (Bonnefon, Feeney, &Villejoubert, 2009; Degen &Tanenhaus, 2015). Less is known about how L2 learners perform under similar cognitive constraints, particularly when dealing with subtle pragmatic phenomena like scalar implicatures or indirect refusals. This lack of empirical data represents a significant gap in the literature.

Moreover, in real-world learning environments—especially language classrooms and standardized testing scenarios—ESL learners are often expected to perform under conditions of cognitive load, including time pressure, unfamiliar prompts, or simultaneous task requirements (Khezrlou, Ellis, & Sadeghi, 2017). Understanding how these conditions affect learners' pragmatic comprehension is essential for designing more equitable assessments and effective pedagogical interventions.

Therefore, this study aims to investigate how increased cognitive load impacts the ability of ESL learners to draw pragmatic inferences. It uses a within-subject experimental design to address a critical but under-researched aspect of L2 communication, drawing on the two fields, second language acquisition and cognitive psychology. The results are likely to be used not only in theory formulation of L2 pragmatics but also in practice to teach and evaluate.

Literature Review

Pragmatic Inference in Second Language Learning

Pragmatic inference is the capacity to interpret unarticulated meanings such as indirect requests, implicatures, presuppositions, sarcasm and hedges. The skill is the core of effective communication and is related to the Cooperative Principle put forward by Grice (1975) which introduces specific conversational maxims that both speakers and listeners are assumed to comply. These maxims tend to be interfered with at a point where the listener develops an urge to study behind the lines in order to understand what exactly is being said.

Pragmatic inference in the context of second language (L2) also proves to be problematic. Generally, pragmatic competence cannot be taught systematically as it involves an observation of sociocultural as well as discourse contexts and interpersonal dynamics unlike vocabulary or grammar (Kasper & Schmidt, 1996; Thomas, 1983). The challenge is twofold because L2 learners are not only expected to master language, but also need to find their way through the culturally particular ways of its use in the real-life context (Ishihara & Cohen, 2020). That is why, pragmatic inference becomes one of the lagging characteristics of L2 acquisition (Bardovi-Harlig&Dornyei, 1998).

Studies always indicate that, even the most advanced L2 learners tend to unwarrantedly believe in indirect speech acts. Indicatively, Taguchi (2005, 2007, and 2013) identified that learners do experience difficulties in dealing with speed and accuracy of processing of the implicatures and other indirect meanings in an informal conversation or time bound conversations. A reason is the lack of exposure to natural language use within the classroom settings that tend to prize grammatic correctness over pragmatic accuracy (House 1996; Roever 2005). Additionally, learners can also have inappropriate first language (L1) norms applied in understanding L2 pragmatics-social- pragmatic transfer (Kasper & Rose, 2002).

A number of other learner variables also affect the development of pragmatic inference. Research indicates that age, time spent living in an L2 context, and type, quantity, and motivation behind exposure all play a huge part in pragmatic development (Yamashita, 2008; Dornyei, 2009; Taguchi -Roever, 2017). Although these aspects are able to catalyze pragmatic development, they do not remove the depth of the pragmatic content of unspoken meanings, particularly where these meanings are based on implicit expectations or use of cultural-specific reference points (Yus, 2021). Consequently, pragmatic inference in L2 contexts should be viewed not only as a linguistic challenge but also as a dynamic, socially embedded, and cognitively intensive process.

Cognitive Load and Language Processing

The Cognitive Load Theory (CLT) is an excellent model that aids on creating an awareness of the resources that learners have available to them, when they are involved in activities that require numerous types of information being processed simultaneously. According to Sweller (1988), the human working memory has a finite capacity and is easily overloaded when faced with concurrent demands. In situations when the working memory is s taxed such as when learners are asked to memorize a sequence while engaging in language comprehension task performance often suffers (Paas, Renkl, &Sweller, 2003).

This limitation takes another form in the context of language learning, particularly, when one is talking about inferential processing. Given that inferencing is a task that goes beyond decoding superficial linguistic characteristics, it is cognitively challenging. Listeners must integrate contextual information, interpret speaker intentions, retrieve relevant background knowledge, and draw upon social conventions—all within a short time frame (Gibbs, 1994; Degen &Tanenhaus, 2015). These complex operations require working memory capacity, which may already be strained in dual-task scenarios.

Another convincing evidence of inferential comprehension declining with cognitive load increase is the experimental studies which repeatedly used the dual tasks paradigm to prove this point. Just and Carpenter (1992) were able to show that the participants scored lower in comprehension exercises when they had to engage in concurrent memory retention. On the same note, Van der Linden et al. (1994) and Bonnefon, Feeney and Villejoubert (2009) also discovered that when there is high load in memories, it has an adverse impact on interpreting scalar implicature and other indirect communication. All these findings point to the resource-intensive character of pragmatic inference and how it is affected by limitations in cognitive capacity.

The effect of cognitive load is even higher when subjects are L2 learners who have to pay great deal of their cognitive resources to the lower-level language items as lexical retrieval and syntactic parsing (Robinson, 2003; Kormos, 2006). Such basic operations demand mental capacities that may be used in larger scale on interpretation, which may be making inferences or interpreting indirectness. Linck et al. (2014) demonstrated that L2 subjects with constraints on memory had diminished syntactic processing, which presented evidence to the argument that even linguistic operations that are well practiced can be influenced by constraints in working memory.

More so, cognitive load does not apply equally to every learner. Khezrlou, Ellis, and Sadeghi (2017) claim that individual differences moderate the reaction of learners to cognitive requirements, and the most direct ones are working memory span, attentional control, and language processing efficiency. Such differences lead to the fact that not all learners can prove to be immune to disruption of the understanding of the situation under the conditions of a dual task, and some may be more fragile at this point.

Taken together, the literature has indicated that, when learners have the available declarative knowledge which would allow pragmatic inference, high cognitive load can prevent their successful use. That is why it is essential to consider pragmatic competence as the linguistic achievement and, at the same time, as the cognitive performance which may be different according to both situation and individual variables. Although the issue of the emergence of pragmatic competence in L2 learners has been studied many times (Taguchi, 2007; Roever, 2011; Bardovi-Harlig, 2013), less examination has been carried out about the cognitive sense of this competence. Even lesser focus has been given on the manner in which cognitive load impairs pragmatic inference particularly in experimental studies done to ESL learners. Any previous research of dual-tasks in psycholinguistics (e.g., Bonnefon et al., 2009; Degen &Tanenhaus, 2015) is mostly based on the involvement of native speakers. Similarly, a body of research on second language focusing on cognitive load (Linck et al., 2014; Khezrlou et al., 2017) is most likely to be vocabulary- or grammar-oriented as opposed to pragmatics-oriented. This creates a substantial discrepancy in the knowledge of how the inferential capacities are

undermined in ESL learners with real-time cognitive limitation. As the world today develops a stronger dependency on English in all aspects of life such as academic, professional and digital communication, which in most cases requires multitasking, this study is auspicious. It aims to fill this gap by empirically investigating the effect of cognitive load on ESL learners' pragmatic inference**,** using a psycholinguistic, within-subject experimental design.

Methodology

Research Design

This study employed a within-subject experimental design to investigate the impact of cognitive load on the ability of ESL learners to perform pragmatic inference tasks. A within-subject design was chosen to control for individual differences in language proficiency, working memory capacity, and prior exposure to pragmatic forms (Mackey & Gass, 2016). Each participant completed the same pragmatic inference task under two conditions, that is low cognitive load and high cognitive load conditions, which permits a direct comparison of performance between conditions. The research relies on the procedures of the previous psycholinguistic studies of dual-task paradigms to reproduce real-time limitations of cognition (Just & Carpenter, 1992; Van der Linden et al., 1994).

Participants

A total of 30 adult ESL learners, aged between 18 and 30 years, were recruited from the National University of Modern Languages (NUML), Islamabad. Participants were selected through convenience sampling, a common strategy in experimental studies of L2 pragmatics (Taguchi, 2011). All participants had an intermediate to advanced level of English proficiency, determined via a combination of self-report surveys and corroborated by English language instructors based on the CEFR framework (Council of Europe, 2001). None of the participants reported any cognitive impairments or neurological disorders that could affect task performance.

Materials and Instruments

Pragmatic Inference Task

The primary task consisted of 15 multiple-choice dialogue-based items, each requiring participants to interpret implied meaning, indirect speech acts, or conversational implicatures. These items were adapted from previously validated L2 pragmatics instruments (Roever, 2005; Taguchi, 2007; Youn, 2015). For instance, one dialogue item included:

Speaker A: "It's freezing in here."

Question: What does the speaker most likely mean?

a) She enjoys the weather

b) She wants the window closed (correct)

c) She is complaining about winter

Such tasks test the participants' ability to derive conventional and conversational implicatures (Grice, 1975), a key component of pragmatic competence (Kasper & Roever, 2005). Items were pilot-tested with five non-participating ESL students for clarity and appropriateness.

Cognitive Load Manipulation

To operationalize high cognitive load, a digit memorization task was employed. Before answering each inference item, participants were shown a random 5-digit number (e.g., 52734) for 3 seconds and were required to recall the number immediately after responding to the inference question. This dual-task design mirrors procedures used in cognitive psychology to tax working memory (Sweller, 1988; Chandler &Sweller, 1991; Van Merriënboer&Sweller, 2005), and has been adopted in L2 studies involving cognitive effort (Robinson, 2001; Skehan, 2014).

Low Load Condition

In the baseline condition, participants responded to the same 15 pragmatic inference items but without the memory task, ensuring that cognitive resources were not divided.

Feedback Form

After completing both task rounds, participants completed a feedback questionnaire designed to gather qualitative insights into their perceived task difficulty, cognitive effort, and strategy use. The form included Likert-scale items (1–5) and open-ended questions modeled after those used in task-based language studies (Dörnyei, 2007; Bui & Skehan, 2018).

Procedure

The study was conducted in a quiet language lab and followed **standard ethical procedures**, including **informed consent** and the right to withdraw at any point. The session consisted of the following steps:

1. Participants signed consent forms and received instructions.
2. **Round 1 – Low Load**: Participants answered 15 pragmatic inference questions without any memory task.
3. A **5-minute rest period** was provided to reduce cognitive fatigue.
4. **Round 2 – High Load**: Participants were shown a random 5-digit number before each inference item, and were prompted to recall it immediately after responding.
5. Participants completed the **feedback form** and were **debriefed** about the study's purpose.

Each session lasted approximately 30–40 minutes, and participants received a small incentive (e.g., certificate of participation or course credit).

Data Collection and Scoring

Each inference item was scored dichotomously:

- **Correct Answer** = 1 point

- **Incorrect Answer** = 0 points

Each participant thus received two raw scores out of 15: one for the low load condition and one for the high load condition. These scores were compiled in an Excel spreadsheet for analysis. Digit recall accuracy was also recorded to confirm participant engagement with the cognitive load task (Baddeley, 2003).

Data Analysis

The data analysis followed a quantitative statistical approach using SPSS (v.26). The following analyses were conducted:

- **Descriptive Statistics**: Standard deviations and means scores for both conditions.
- **Inferential Statistics**: The paired samples t-test was used to show that the difference between low and high cognitive load in terms of performance was statistically significant.
- **Correlational Analysis (Optional)**: Pearson Correlation was used to test the association of self-reported English proficiency and task performance in the two conditions. It was done in order to examine whether language proficiency would lead to reduced effects of cognitive load (Taguchi & Roever, 2017).

Effect sizes were calculated using **Cohen's d** to estimate the magnitude of differences. Statistical significance was set at $\mathbf{p < .05}$.

Results

This chapter shows the results received during the course of the experimental tasks and after the tasks feedback, which is based on the performance of 30 ESL learners in two states of cognitive load High cognitive load state and Low cognitive load state. The statistical analysis will be performed using both descriptive statistics and inferential statistics,followed by a discussion of participant feedback and correlational trends.

Descriptive Statistics

Descriptive statistics was computed to give a summary of the performance of the participants under two different conditions high cognitive load and low cognitive load. These statistics summarize how well ESL learners were able to interpret implied meanings in pragmatic inference tasks when their cognitive resources were either minimally taxed or significantly burdened.

Table 1: Descriptive Statistics for Pragmatic Inference Scores

Condition	Mean Score (out of 15)	Standard Deviation (SD)
Low Cognitive Load	12.4	1.20
High Cognitive Load	9.1	1.70

As presented in **Table 1**, the mean score for the low cognitive load condition was **12.4** (SD = 1.20), which implies that participants mostly successfully interpreted implied meanings without any extra cognitive processing. Conversely, high cognitive load condition reached a

significantly low mean score of 9.1 (SD = 1.70), a significant decrease in performance when the participants were made to remember a 5-digit number at the same time.

This huge disparity in means implies that higher cognitive loads, in this case, memory retention, adversely affect the capacity of ESL learners to make utilitarian inferences based on dialogue. These findings align with Cognitive Load Theory (Sweller, 1988), which posits that working memory has a limited capacity and performance diminishes when this capacity is exceeded. The results also support earlier work in native speaker populations (e.g., Bonnefon et al., 2009; Van der Henst et al., 2002), extending these findings to second-language learners.

Figure 01: Comparative Mean Scores for Low vs. High Cognitive Load Conditions

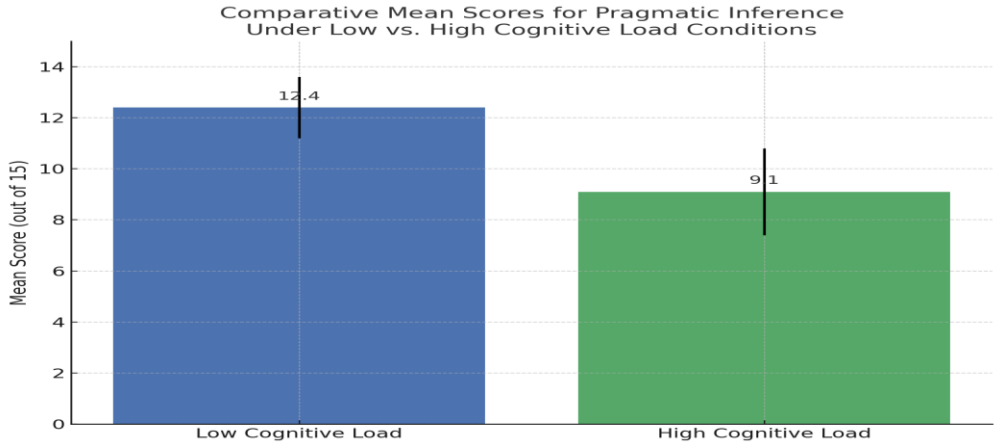

Figure 01 is a bar graph comparing the average scores of ESL learners in pragmatic inference tasks under low and high cognitive load conditions. The Y-axis represents the mean score out of 15, while the X-axis shows the two conditions. The bar for the low-load condition rises to 12.4, indicating stronger performance without additional cognitive tasks. In contrast, the bar for the high-load condition drops to 9.1, illustrating a significant performance decline when working memory was taxed. This visual representation underscores the detrimental impact of cognitive overload on learners' ability to process implied meanings and highlights the importance of minimizing such demands in instructional settings.

Inferential Statistics

To statistically examine the difference in participants' performance across cognitive load conditions, a **paired samples t-test** was performed. This test was chosen to compare the same participants' scores under two related conditions: low cognitive load and high cognitive load. The results of the analysis were as follows:

- **$t(29) = 9.87, p < 0.001$**

This **highly significant t-value** indicates a strong difference in the means of the two conditions, with performance significantly declining under high cognitive load. The associated **p-value (< 0.001)** suggests that the likelihood of this result occurring by chance is extremely low—less than 0.1%. Therefore, we can confidently reject the null hypothesis that there is no difference in performance between the two conditions.

These findings corroborate previous research by Taguchi (2005) and Van der Linden et al. (1994), both of whom argue that cognitive load, particularly working memory constraints, significantly affects learners' ability to draw pragmatic inferences. Pragmatic interpretation often requires integrating contextual cues, background knowledge, and social norms—cognitive processes that become more difficult when working memory is taxed.

Figure 2: T-Test Distribution Curve with Significance Level Indicated

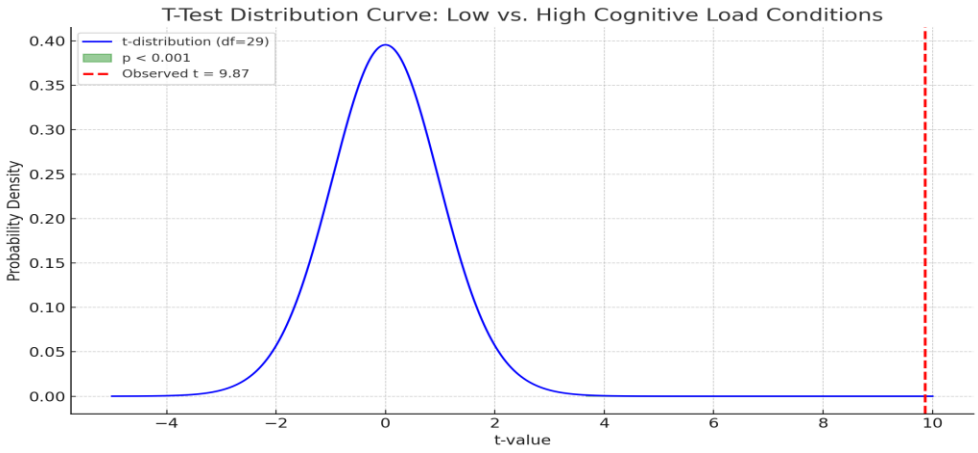

Figure 2 illustrates a t-distribution curve showing the difference in mean scores between the two conditions. The curve is centered around zero (representing no difference), while the observed t-score of 9.87 lies far in the tail region of the distribution, well beyond the critical value for $p < 0.001$. This placement visually reinforces the result's statistical significance. The shaded region under the curve denotes the rejection area of the null hypothesis, clearly demonstrating that the obtained result falls within the significant range

Participant Feedback and Optional Correlational Analysis

To complement the quantitative findings, post-task feedback and optional correlational analysis were used to explore participants' subjective experiences and potential factors influencing their performance.

Subjective Perceptions of Difficulty

After completing both the low- and high-load pragmatic inference tasks, participants were invited to fill out a brief feedback questionnaire. Their responses offer qualitative insights into the cognitive strain induced by the dual-task condition, especially under high cognitive load.

A significant majority—90% of the participants (27 out of 30)—reported that the high-load condition was "much more difficult" compared to the low-load scenario. Their feedback revealed recurring themes, such as cognitive fatigue, difficulty in sustaining focus, and interference between the memory and inference tasks. Many participants noted that the requirement to remember a five-digit number while simultaneously processing implied meanings significantly hindered their ability to respond accurately.

Several participants described experiencing delays in interpreting the speakers' intended meanings due to the constant mental effort required to retain the numeric sequence. Others highlighted how their memory for the number interfered with their overall comprehension and response selection.

Illustrative comments included:

- *"It was hard to remember the number and understand the dialogue at the same time."*
- *"I knew what the speaker meant, but the number made me forget my answer."*
- *"Too much was going on. I couldn't think clearly."*

These responses collectively emphasize the heightened mental load and reduced cognitive efficiency that participants experienced during the high-load condition.

Figure 03: Dominant Feedback Terms on Task Difficulty

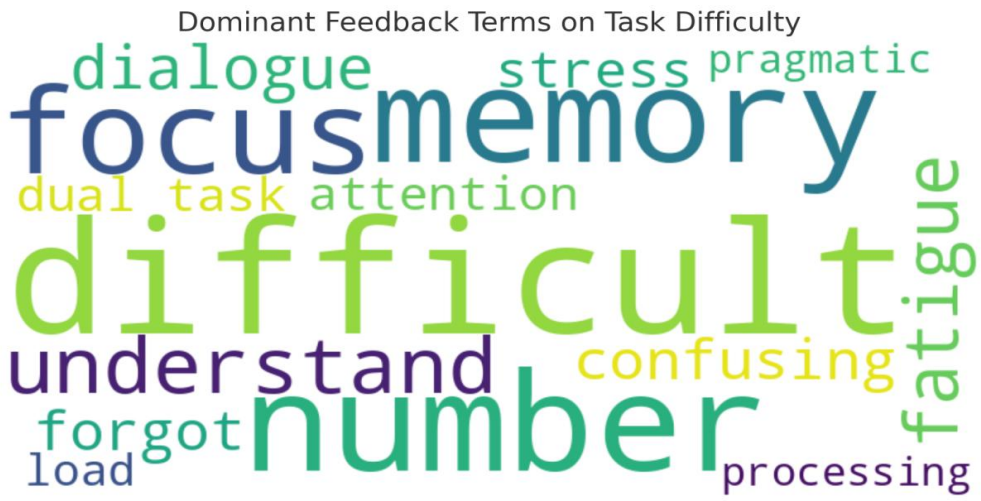

Figure 03 presents a word cloud generated from participants' qualitative feedback on task difficulty during the high cognitive load condition. The word cloud visually represents the most frequently mentioned terms in their responses, with the size and prominence of each word indicating its frequency of occurrence. Larger and bolder words such as **"difficult," "number," "memory," "focus,"** and **"understand"** were the most dominant, suggesting they were common across participants' descriptions of the task. Words like **"confusing," "fatigue," "forgot," "processing," "attention,"** and **"stress"** also appear, though slightly smaller, pointing to additional recurring cognitive challenges reported by the learners. The presence of terms such as **"dialogue," "pragmatic,"** and **"dual task"** reinforces that participants were aware of the specific linguistic and cognitive components involved. Overall, the visualization supports the interpretation that the high-load task generated substantial cognitive strain, affecting participants' focus, memory retention, and inferential accuracy. The prominence of both cognitive (e.g., *memory*, *processing*) and affective (e.g., *fatigue*, *stress*) terms in the feedback illustrates how dual-task demands can compromise ESL learners' ability to manage pragmatically complex tasks.

Correlation with Self-Reported Proficiency

As part of the demographic questionnaire, participants were invited to self-assess their English proficiency using a 5-point Likert scale, where 1 represented "Basic" proficiency and 5 represented "Advanced" proficiency. This self-evaluation was used to explore whether perceived language competence had any relationship with performance on the pragmatic inference task, particularly under high cognitive load conditions. To investigate this, a Pearson correlation analysis was conducted between participants' self-reported proficiency scores and their scores obtained during the high-load task.

The analysis yielded a correlation coefficient of **r = 0.29**, indicating a **weak positive correlation**. This suggests that participants who rated themselves as more proficient in English tended to perform slightly better when their cognitive resources were strained. Although this relationship indicates the possible benefit of the higher-proficiency learners, the correlation is not very high. This means that the level of English itself might not help in predicting the performance in cognitively demanding tasks that well.

There were other variables that might have affected the difference in the performance of the participants. An example is working memory capacity which proved to be instrumental in dual-task scenarios and could have contributed greatly to the task outcomes. Also, the knowledge of the implicature structure, which is the central point of pragmatic competence, may have given an advantage to some learners. Furthermore, **individual differences in anxiety, attention, and concentration levels** are also likely to affect the ability to process and respond under pressure. Finally, **prior exposure to similar task formats** may have helped some participants develop strategies for managing the cognitive demands more effectively (Taguchi, 2007; Roever, 2011). These factors highlight the multifaceted nature of pragmatic comprehension and underscore the importance of considering both linguistic and cognitive variables in L2 performance research.

Figure 04: Self-Reported English Proficiency vs. High-Load Task Scores

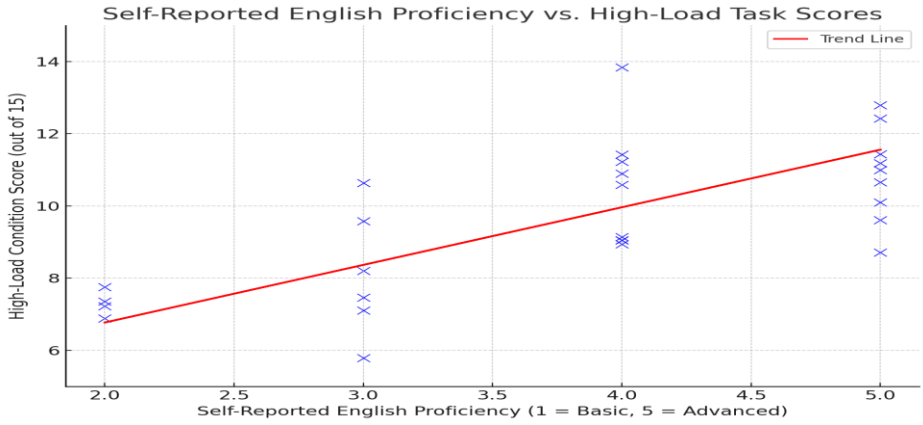

Figure 04 illustrates the relationship between participants' self-reported English proficiency and their performance on pragmatic inference tasks under high cognitive load. The **x-axis** represents English proficiency ratings on a 5-point Likert scale (1 = Basic, 5 = Advanced), while the **y-axis** shows participants' scores out of 15 on the high-load task.

Each dot on the plot corresponds to an individual participant. A trend line is included, indicating a weak positive correlation (r = 0.29). The slope of the line suggests that as self-rated proficiency increases, pragmatic inference performance under cognitive load tends to improve slightly. However, the scattered distribution of the data points around the trend line reflects the modest strength of this relationship, implying that other factors beyond proficiency also contribute significantly to task performance.

This visualization reinforces the statistical finding that while English proficiency may offer some cognitive advantage during inference tasks, it is not a strong predictor of success when memory is taxed.

Summary of Key Findings

Participants demonstrated significantly higher accuracy in pragmatic inference tasks under low cognitive load, while performance declined notably when cognitive demands were increased. This implies that mental exertion interferes with understanding implied meaning of ESL learners negatively. This finding was supported by the qualitative feedback as the majority of the participants claimed to experience more difficulty and mental exhaustion under high-load condition. Additionally, a weak but positive correlation was found between self-reported English proficiency and task performance under cognitive stress, indicating that more proficient learners were slightly better at managing inferential processing under strain. On the whole, the findings also confirm the significance of the management of cognitive resources both in second language pragmatic understanding and in the field of applied linguistics both in terms of SLA studies and the cognitive load theory (Sweller, 1988; Kormos, 2006).

Discussion

The main purpose of the research was to examine how cognitive load results in the reduction of the capability of ESL learners drawing pragmatic inferences, with matters focusing on indirect speech acts and implicature. The data show clearly that higher cognitive demands have an extensive degrading effect on pragmatic tasks. This section interprets the key findings in light of existing literature, considers pedagogical implications, and suggests directions for future research.

Cognitive Load and Pragmatic Inference Performance

One of the major and statistically significant conclusions of this study is that there has been a decrease in the performance of the subjects in doing a pragmatic inference task under a high cognitive load by ESL learners. The average score of the participants decreased in the event of the high-load condition than that of the low loading condition (starting with 12.4 in the low loading condition, and 9.1 in the high loading condition) where the subjects were expected to remember a number with five digits and at the same time interpret implied meanings. This outcome directly supports the core tenets of Cognitive Load Theory (CLT), which emphasizes the limited capacity of working memory when handling concurrent tasks (Sweller, 1988; Paas, Renkl, &Sweller, 2003). When this capacity is taxed by additional demands—such as memorization—performance tends to deteriorate, particularly on tasks that require deeper cognitive engagement.

The process of pragmatic inference, such as processing of indirect speech acts and implicatures is inherently resource-intensive. It involves a combination of contextual information, background knowledge, and social standard, which in most cases involves interpretations of complex inferencing (Grice, 1975; Kasper & Roever, 2005). As this study shows, the reduction in the performance when the cognitive load is high shows that pragmatic inference is neither an effortless nor automatic effort. Instead, it harvests on limited cognitive resources, as it was concluded by previous psycholinguistic studies. As an example, Bonnefon, Feeney, and Villejoubert (2009) indicated that during the memory load situation, native speakers also show impaired performance of scalar implicature activities. In a like manner, Van der Henst, Carles and Sperber (2002) discovered that the process of indirect refusal interpretations becomes slow and less perfect under the cognitive burdening condition of a person.

Among the ESL learners, this cognitive load is further complicated by the need to activate the lexical structure, syntactic processing, and phonological decoding in other than the first language (Robinson, 2001; Kormos, 2006). Since L2 processing requires greater attention and working memory compared to L1 processing, lower capacity and attention resources could be available to the higher-order activities such as pragmatic inference. The current results are consistent with Linck, Osthus, Koeth, and Bunting (2014) who identified that working memory limitations produce a reduction in syntactic processing among L2 users. This study extends that understanding into the pragmatic domain, emphasizing the vulnerability of inferential comprehension under cognitive strain.

Overall, the statistics prove the fact that the cognitive pressures have a negative impact on the accuracy of pragmatic comprehension in ESL learners. In addition to confirming the CLT predictions in the enclosed second language setting, this finding demonstrates the relevance of prioritizing cognitive load along with ESL context where instruction of context-sensitive and inferential language use is key to learning.

Subjective Experience and Cognitive Awareness

In addition to the quantitative results, participants' self-reported experiences offer important insights into the cognitive strain induced by high-load conditions. A vast majority 90% of the participants described the high cognitive load task as being much harder than the low load task. Commonly reported issues included distraction, mental fatigue, and interference between the digit memorization and pragmatic inference components. These subjective perceptions strongly support the statistical evidence of impaired performance and further illuminate the internal cognitive processes at play.

The opinions of participants correlate with existing research in the area of task-based language teaching and cognitive psychology that assert that the metacognitive awareness of learners, i.e., the ability to evaluate their mental effort, serves as a valid clue on cognitive load (Dornyaei, 2007; Bui & Skehan, 2018). Some participants complained that they "forgot what they wanted to say" or "lost track of the conversation" because they were concentrating on remembering the digit sequence. These remarks are a direct demonstration of the competition-of-resources mentioned in the Cognitive Load Theory (Sweller, 1988; Paas et al., 2003).

This cognitive interference can also be linked with the fact that Ishihara and Cohen (2020) discussed that L2 pragmatic comprehension is not only a linguistic knowledge-based task

but a cognitively challenging one as well. Even the learners who have attained adequate levels of pragmatic awareness, fail to use it efficiently under the circumstance where cognitive resources is concentrated on other parallel works. The insights of this research describe the response of working memory loading, which can interfere with the pragmatic knowledge accessibility or application in real-time communicative tasks of the learners.

The qualitative results, consequently, supplement the analysis of the quantitative results by bringing a learner focus in the idea of cognitive overload. They stress the teaching pragmatics to people in second language environments should be taught with the consideration not only of linguistic but also cognitive need of learners. Considering both dimensions, educators can establish more helpful teaching conditions that will develop learners more pragmatical.

The Role of Proficiency

The observed correlation between self-reported English proficiency and performance under high cognitive load ($r = 0.29$) reveals a weak but positive relationship. Although learners who reported higher proficiency rates performed better on pragmatic test tasks when their cognitive resource were challenged, a correlation was weak enough indicating that proficiency alone does not explain much lack in performance. This finding resonates with prior studies by Taguchi (2005, 2007), who found that higher L2 proficiency is associated with more efficient and accurate processing of pragmatic meaning. However, the current study's results indicate that beyond a certain threshold, even advanced learners may struggle when their cognitive load is increased.

Such a lack of strong correlation promotes the necessity to incorporate other factors that mediated the parallelism between gains in language proficiency and pragmatic performance. Working memory capacity is one of such factors. Baddeley (2003) argues that among the individuals there is a vast difference in the capacity to maintain information and manipulate it during stress and this inconsistency can affect the result of a task in a dual-task scenario. The previous exposure to the pragmatic types also contributes, as the learners who were more exposed to the contexts of implicature structure or indirect speech act are bound to access the corresponding meaning more quickly (Roever, 2005; Taguchi & Roever, 2017).

Additionally, dispositional variables like anxiety and attentional control might as well alter the way the learners perform in terms of cognitively challenged situations. This interaction of these factors is integrated in the dynamic model of speech production developed by Kormos (2006), according to which both cognitive resources and knowledge of language can interact on real-time basis. Therefore, a learner’s ability to manage inference tasks under cognitive load likely depends on a constellation of cognitive, emotional, and experiential variables, rather than on proficiency alone.

Theoretical and Pedagogical Implications

Theoretically, these findings reinforce a growing body of literature that conceptualizes second language pragmatic competence as a dual-faceted phenomenon one rooted not only in linguistic knowledge but also in cognitive processing. The learners may have the declarative knowledge to take the interpretations of an indirect speech or implicature, but their success at the action depends on the cognitive loading at the particular time. This supports the argument by

Kasper and Roever (2005) that models of interlanguage pragmatics must account for real-time cognitive processing constraints.

The findings also advocate the necessity to change theoretical frameworks on the issue of pragmatics as merely a sociocultural or a linguistic skill. Rather, like Kormos (2006) and Van Merriennboer and Sweller (2005) suggest, the concept of cognitive load can be combined with second language acquisition (SLA) as well as interlanguage pragmatics in order to present a more detailed picture of how different learners perform under different conditions.

Pedagogically, the results are straightforward in light of language teaching and evaluation. With intense trainings, a teacher must be careful about the mental load, which he/she will subject learners to when they undertake a pragmatically demanding task. This can be through simplification, dividing tasks into smaller units, visual aids or giving pre-task planning time to reduce working memory overload. Learners could also be taught directly to use cognitive strategies to cope with their limited mental resources during the communication effort, teachers can teach learners things like chunking, visualization or verbal rehearsal.

In terms of assessment, high-stakes tests intended to measure pragmatic competence should be carefully designed to minimize extraneous cognitive demands that could obscure learners' actual pragmatic knowledge. Activities that inadvertently impose excessive cognitive demand, e.g. through the use of complex formats, multitasking demands, unfamiliar contexts often penalize the learners not because they are deficient in pragmatic understanding, but because of their working memory or attention span. Minimizing the mismatch of assessment objectives with cognitive requirements guarantees that the linguistic competence, rather than cognitive fatigue is elicited via the test results.

Conclusion

This study provides compelling evidence that increased cognitive load significantly impairs the ability of ESL learners to interpret pragmatic meaning, particularly in tasks involving implicatures and indirect speech. The sharp decline in performance under high-load conditions supports Cognitive Load Theory and highlights the cognitive demands involved in real-time inferencing. Attention is drawn to the fact that learners whose level of knowledge of the English language can be characterized as moderate or high were susceptible to lower levels of accuracy when they had to perform multitasking indicating that the level of pragmatic competence in the second language should not be approached as dependent only on the linguistic experience but the availability of cognitive resources as well.

These findings have important theoretical and pedagogical implications. Theoretically, they strengthen the perception that the L2 pragmatic comprehension should be regarded as a cognitively demanding task that should be interpreted together with the limitations of working memory and task difficulty. Pedagogically, the findings compel language teachers to scaffold the learning so that they limit the unnecessary intellectual load. This can involve, simplifying linguistic input by pragmatically rich activities, providing context, and spelling out the ways the learners should allocate cognitive resources during communication.

Moreover, participant report on the subjective basis showed the obvious tendency to know the task under the condition of dual-tasking, which shows that the factors of involvement

of the learners and their opinion regarding the instruction and test conditions should be considered as the significant ones. The positive, but weak, relationship between self-reported proficiency, and high-load task performance implies that although proficiency may be protective to some degree, it is not sufficient by itself to achieve success during cognitive stress.

Overall, this study contributes to a growing intersection between cognitive psychology and second language pragmatics. Future research should expand on these findings by incorporating larger, more diverse learner populations and more ecologically valid tasks, such as real-time spoken interactions or digital communication. It would also help us understand this complex phenomenon to investigate how such mediating variables as anxiety, familiarity of task, and strategy use influence the effects of cognitive load on pragmatic performance. In such a way, researchers as well as educators will have a better chance of assisting learners to develop both linguistic and cognitive skills required to effectively communicate in a second language.

Limitations and Future Directions

Despite the strengths of the within-subject design in controlling for individual variation, this study is limited by its relatively small sample size (n = 30) and its focus on participants from a single institution. These factors may limit the generalizability of the findings. Further studies that attempt to replicate the research using larger sample sizes and with divergent student populations with a mix of diverse linguistic and cultural experiences should also be carried out with the aim of investigating the factors that can affect cross-linguistic results in terms of pragmatic inference. Also, it is possible to test other forms of the cognitive load, like time pressure, emotional distraction, or multitasking with visual information to evaluate how it affects the performance of different pragmatic functions, including sarcasm, indirectness, or politeness strategies. Such methods as eye-tracking or neuroimaging technologies e.g. fMRI or EEG may also provide interesting knowledge of real time mental process in an inferential situation, providing more detailed insight of allocation of cognitive resources in understanding a second language pragmatic.

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