The immediate and delayed effects of direct versus indirect written corrective feedback on Turkish EFL learners' accuracy development in using Past Counterfactual Conditionals

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Abstract. Written corrective feedback (WCF) research has extensively examined the effectiveness of direct versus indirect feedback approaches, yet findings remain inconsistent regarding their relative impact on complex grammatical structures. The acquisition of past counterfactual conditionals presents particular challenges for second language learners due to their syntactic and semantic complexity, with limited research investigating feedback effectiveness for this structure. This gap limits theoretical understanding of how different feedback types engage cognitive processing mechanisms during the acquisition of linguistically complex features. This quasi-experimental study investigated the differential effects of direct and indirect WCF on Turkish EFL learners' acquisition of English past counterfactual conditionals. Ninety-four first-year university students were randomly assigned to three groups: Direct WCF (n=32), Indirect WCF (n=32), and Control (n=30). Using a pretest-posttest design with immediate and delayed posttests, participants completed reconstruction tasks over an eight-week period. The Direct WCF group received explicit corrections with correct forms provided above errors, while the Indirect WCF group received metalinguistic clues requiring self-correction. Results showed that direct WCF demonstrated superior immediate effectiveness, but this advantage diminished at delayed posttest, where both treatment groups performed comparably while significantly outperforming the control group. The findings indicate that direct feedback facilitates immediate accuracy improvement in complex grammatical structures, while both feedback types achieve equivalent long-term effectiveness. These results support instructional approaches that employ direct feedback when immediate accuracy is prioritized and suggest that both feedback types engage cognitive processing mechanisms that support sustained learning of complex grammatical features.

Keywords: *cognitive processing, direct feedback, indirect feedback, past counterfactual conditionals, written corrective feedback.*

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Анотація. Дослідження письмового коригувального зворотного зв'язку (ПКЗЗ) широко вивчали ефективність прямих та непрямих підходів до надання зворотного зв'язку, проте результати залишаються суперечливими щодо їх відносного впливу на складні граматичні структури. Засвоєння минулих контрфактичних умовних речень становить особливі труднощі для тих, хто вивчає другу мову, через їх синтаксичну та семантичну складність, при цьому обмежена кількість досліджень вивчає ефективність зворотного зв'язку для цієї структури. Ця прогалина обмежує теоретичне розуміння того, як різні типи зворотного зв'язку залучають механізми когнітивної обробки під час засвоєння лінгвістично складних особливостей. Це квазі-експериментальне дослідження вивчало диференційні ефекти прямого та непрямого ПКЗЗ на засвоєння англійських минулих контрфактичних умовних речень турецькими студентами, які вивчають англійську як іноземну мову. 94 студенти першого курсу були випадково розподілені на три групи: Прямий ПКЗЗ (n=32), Непрямий ПКЗЗ (n=32) та Контрольна група (n=30). Використовуючи дизайн попереднього та підсумкового тестування з негайними та відстроченими підсумковими тестами, учасники виконували завдання з реконструкції протягом восьмитижневого періоду. Група прямого ПКЗЗ отримувала явні виправлення з правильними формами, наданими над помилками, тоді як група непрямого ПКЗЗ отримувала металінгвістичні підказки, що вимагали самокорекції. Результати показали, що прямий ПКЗЗ продемонстрував вищу негайну ефективність, але ця перевага зменшилася при відстроченому підсумковому тестуванні, де обидві експериментальні групи показали подібні результати, водночас значно перевершуючи контрольну групу. Результати вказують на те, що прямий зворотний зв'язок сприяє негайному покращенню точності у складних граматичних структурах, тоді як обидва типи зворотного зв'язку досягають еквівалентної довгострокової ефективності. Ці результати підтримують навчальні підходи, які використовують прямий зворотний зв'язок, коли пріоритетом є негайна точність, і свідчать про те, що обидва типи зворотного зв'язку залучають механізми когнітивної обробки, які підтримують стійке вивчення складних граматичних особливостей.

Ключові слова: *когнітивна обробка, прямий зворотний зв'язок, непрямий зворотний зв'язок, минулі контрфактичні умовні речення, письмовий коригувальний зворотний зв'язок.*

Introduction

Written corrective feedback (WCF) has remained one of the most extensively researched and debated topics in second language (L2) writing and acquisition for over four decades. The controversy surrounding its effectiveness was notably intensified by Truscott's (1996) influential claim that grammar correction in L2 writing classes is ineffective and potentially harmful, sparking a sustained scholarly debate that continues to shape contemporary research directions. While substantial empirical evidence has since emerged supporting the general efficacy of WCF (Kang & Han, 2015; Bitchener & Storch, 2016), questions regarding the relative effectiveness of different feedback types remain contentious and require further investigation.

The distinction between direct and indirect WCF represents one of the most fundamental typological divisions in corrective feedback research. Direct WCF provides learners with the correct linguistic form, while indirect WCF merely indicates that an error exists without supplying the correction (Ellis, 2009). Despite extensive research comparing these approaches, findings have been inconsistent, with some studies favoring direct feedback (Van Beuningen et al., 2012; Karim & Nassaji, 2020) and others supporting indirect approaches (Ferris, 2006; Sherpa, 2021). This inconsistency may be attributed to various moderating factors, including target structure complexity, learner proficiency, and contextual variables that influence feedback effectiveness.

Most WCF research has focused on relatively simple, rule-based grammatical features such as English articles, simple past tense, and subject-verb agreement (Bitchener, 2008; Sheen, 2007). However, the effectiveness of different feedback types on complex grammatical structures remains underexplored. Past counterfactual conditionals represent a particularly challenging target structure due to their syntactic complexity, semantic intricacy, and the cognitive demands they place on L2 learners (Shintani et al., 2014). For Turkish EFL learners specifically, these structures present additional challenges due to significant typological differences between Turkish and English conditional systems.

The present study addresses this gap by investigating the comparative effectiveness of direct and indirect WCF on Turkish EFL learners' acquisition and retention of English past counterfactual conditionals. By employing a pre-test, immediate post-test, and delayed post-test design, this research aims to contribute to our understanding of how different feedback types facilitate both immediate learning and long-term retention of complex grammatical structures in EFL contexts.

Literature Review

Theoretical Foundations of Written Corrective Feedback

The theoretical underpinnings of WCF research draw from multiple SLA frameworks, including Schmidt's (2001) Noticing Hypothesis, Swain's (1985, 2005) Output Hypothesis, and skill acquisition theory (DeKeyser, 2007). Schmidt's Noticing Hypothesis posits that conscious attention to linguistic forms is necessary for acquisition, suggesting that WCF may facilitate learning by drawing learners' attention to the gap between their interlanguage and target language forms. The Output Hypothesis (Swain, 2005) emphasizes the role of language production in promoting acquisition, with feedback serving as

a catalyst for noticing and subsequent restructuring of interlanguage systems. From a skill learning perspective, repeated exposure to corrective feedback on specific linguistic features should lead to the proceduralization of declarative knowledge, ultimately resulting in more accurate and fluent language production (DeKeyser, 2015).

To fully understand how different feedback types engage cognitive processing mechanisms during the acquisition of linguistically complex features, it is also essential to integrate psycholinguistic perspectives that illuminate the underlying cognitive architecture supporting feedback processing. For instance, Baddeley's (2012) multicomponent model of working memory provides crucial insights into how learners process WCF. Working memory, comprising the central executive, phonological loop, visuospatial sketchpad, and episodic buffer, serves as the cognitive workspace where feedback information is temporarily stored and manipulated during processing (Li, 2023). Direct WCF may reduce working memory demands by providing explicit corrections, thereby freeing cognitive resources for form-meaning mapping and integration processes. However, Li and Roshan (2019) found that the relationship between working memory and corrective feedback effectiveness is more complex and depends on the specific type of feedback and whether revision is required. Their study revealed that complex working memory (involving both storage and processing) was a significant positive predictor of metalinguistic explanation effectiveness, suggesting that indirect feedback approaches requiring learners to process rule explanations and detect errors actually place greater demands on working memory resources. Conversely, direct corrective feedback alone showed no significant association with working memory capacity, indicating that providing explicit corrections may indeed alleviate cognitive load. Interestingly, when revision was required, direct corrective feedback plus revision showed a positive association with complex working memory but a negative association with phonological short-term memory, suggesting that the cognitive demands vary depending on whether learners must reconstruct their texts after receiving feedback.

Sweller's (2017) Cognitive Load Theory (CLT) offers another psycholinguistic perspective for understanding WCF effectiveness. CLT distinguishes between intrinsic cognitive load (inherent task complexity), extraneous cognitive load (poorly designed instruction), and germane cognitive load (processing that contributes to learning) (Sweller, 2017). Complex grammatical structures like past counterfactual conditionals impose high intrinsic cognitive load due to their syntactic and semantic complexity. From a CLT perspective, direct WCF may be more effective for complex

structures because it reduces extraneous cognitive load by eliminating the need for learners to generate corrections independently. This allows more cognitive resources to be allocated to germane processing—the integration of corrective information into existing linguistic knowledge (Sweller, 2017). The theory predicts that as learners develop expertise with target structures, they can better handle the additional cognitive demands imposed by indirect feedback approaches.

Recent theoretical developments have also emphasized the importance of cognitive processing in feedback effectiveness. Bitchener's (2021) cognitive processing model suggests that feedback effectiveness depends on learners' ability to notice, understand, and incorporate corrective information into their developing interlanguage systems. This model highlights the potential differential effects of direct and indirect feedback types, as they may engage different cognitive processes and place varying demands on learners' processing resources.

These theoretical frameworks may suggest a pattern of effectiveness for the present study. Immediate effects may favor direct WCF due to reduced cognitive load and enhanced noticing (Schmidt, 2001; Sweller, 2017), particularly given the complexity of past counterfactual conditionals and the working memory demands of reconstruction tasks. However, delayed effects may show convergence between feedback types as both approaches provide sufficient input for procedural knowledge development (DeKeyser, 2015), with indirect feedback potentially demonstrating more stable retention due to deeper processing requirements (Swain, 2005). These insights directly inform the research questions and expected outcomes of the present study.

Direct versus Indirect Written Corrective Feedback

A central debate in WCF research concerns the relative effectiveness of direct and indirect feedback. Direct WCF provides learners with the correct form, while indirect WCF signals the presence of an error without supplying the correction, requiring learners to self-correct. The majority of early studies (Lalande, 1982; Semke, 1984; Sheppard, 1992) found no significant differences between the two approaches. However, these studies have been criticized for methodological limitations, such as the absence of true control groups and a focus on revision accuracy rather than long-term learning (Guenette, 2007; Bitchener, 2021).

More recent and methodologically rigorous research has provided a more comprehensive pattern. Several studies (Van Beuningen et al., 2008, 2012; Bitchener & Knoch, 2010) have found that direct WCF is particularly effective

for improving grammatical accuracy, especially in the long term and for complex structures. For example, Van Beuningen et al. (2008, 2012) demonstrated that direct WCF led to greater long-term gains in grammatical accuracy, while indirect WCF was more effective for non-grammatical features such as spelling and punctuation. Recent meta-analytic evidence provides additional insights into this debate. Lim and Renandya (2020) conducted a comprehensive meta-analysis of 35 studies examining WCF effectiveness, revealing an overall moderate effect size that supports the general efficacy of WCF. Importantly, their analysis found that direct feedback demonstrated a larger effect size compared to indirect feedback, though these differences were not statistically significant.

However, not all research supports the superiority of direct WCF. Some studies (Sherpa, 2021; Karim & Nassaji, 2020) have found that indirect feedback can be equally or more effective, particularly for certain learner populations or error types. For instance, Sherpa (2021) reported that indirect WCF was more effective than direct WCF for Bhutanese learners' use of past tense and articles, while Karim and Nassaji (2020) found that although all feedback types improved revision accuracy, transfer effects to new writing were limited and inconsistent, with no significant delayed effects. Further evidence for the complexity of direct versus indirect WCF effectiveness comes from Nameni (2023), who compared direct WCF and coded WCF among Iranian medical students. The study found that coded WCF with revision significantly outperformed direct WCF across organization, grammar, and mechanics, suggesting that self-correction using coded feedback led to greater awareness of error patterns and improved language acquisition. However, overall writing performance remained unsatisfactory, potentially due to low proficiency levels, highlighting the interaction between feedback type and learner characteristics.

Research with Turkish EFL learners further illustrates this complexity. While some studies (Buckingham & Aktuğ-Ekinci, 2017; Berkant et al., 2020) support the effectiveness of direct WCF, others (Valizadeh, 2020, 2022) have found that both direct WCF and metalinguistic explanation can be effective, with direct WCF showing particular benefits for syntactic complexity. Importantly, these studies also address concerns that direct WCF might lead to oversimplified writing, finding no evidence of such negative effects. Recent comprehensive reviews have further illuminated the complexity of WCF effectiveness. Nguyen and Chu (2024) found that despite extensive research, findings remain debatable with no consensus on the most effective WCF type for EFL students. Their review revealed mixed results, with some studies demonstrating higher effectiveness of direct WCF compared to no feedback,

while others found no significant differences. Particularly relevant to the present study, research with Turkish EFL learners has yielded inconsistent findings, with some studies favoring direct WCF and others showing unsuccessful attempts with indirect correction codes, underscoring the need for more targeted research examining specific grammatical structures in particular EFL contexts.

Grammatical Complexity and Feedback Effectiveness

A growing body of research suggests that the complexity of the target grammatical structure moderates the effectiveness of WCF. Most studies to date have focused on relatively simple, rule-based features such as English articles and simple past tense (Bitchener, 2021; Bitchener & Knoch, 2010; Sheen, 2007; Ellis et al., 2008). These studies generally report positive effects for both direct and indirect feedback. However, research examining more complex structures is limited. Shintani et al. (2014) addressed this gap by comparing the effects of direct WCF and metalinguistic explanation on Japanese learners' acquisition of both simple (indefinite articles) and complex (hypothetical conditionals) grammatical features. Their findings revealed that direct feedback followed by revision was most effective for the complex conditional structure, supporting the view that explicit correction is particularly beneficial for cognitively demanding features.

Granena and Yilmaz (2021) provided a comprehensive synthesis of studies targeting specific grammatical structures, categorizing them by formal and semantic complexity. Their meta-analysis found that feedback effectiveness was highest for simple forms and lowest for structures that were complex both formally and semantically (e.g., passives, question formation). This suggests that corrective feedback alone may be insufficient for the most complex structures, which may require additional instructional support or extended treatment.

The evidence indicates that grammatical complexity is a key moderator of feedback effectiveness, with complex structures posing greater challenges for both learners and instructors. However, most research has focused on simple features, and there is a clear need for more studies examining the impact of WCF on complex grammatical structures, particularly in diverse learner populations.

Immediate and Delayed Effects of Written Corrective Feedback

The temporal dimension of WCF effectiveness is another critical issue in the field. Early studies often measured only immediate revision accuracy, which has been criticized as an inadequate indicator of genuine acquisition (Truscott, 2007). More recent research has incorporated delayed post-tests to assess retention and

transfer, providing a more comprehensive understanding of feedback effectiveness.

Longitudinal studies have revealed mixed patterns regarding the durability of WCF effects. Bitchener and Knoch (2010) demonstrated that focused direct feedback can maintain its effectiveness over extended periods, with gains persisting up to 10 months post-treatment. Similarly, Van Beuningen et al. (2012) found that direct WCF produced sustained improvements in grammatical accuracy over time. Recent longitudinal research has provided more robust evidence for sustained WCF effects. Shao et al. (2024) demonstrated that both direct and indirect WCF maintained their effectiveness on regular past tense learning six weeks post-treatment, with large effect sizes persisting on both receptive and productive measures. The authors argued that such delayed effects indicate genuine learning rather than mere retention, supporting the long-term value of WCF interventions. However, they noted that prior knowledge about the target structure may influence the durability of effects, with learners possessing adequate prior knowledge showing equal benefits from both direct and indirect feedback

Studies examining comprehensive feedback have reported more limited outcomes. Karim and Nassaji (2020) found that while all feedback types improved immediate revision accuracy, transfer effects to new writing were limited and inconsistent, with no significant delayed effects observed after several weeks. Meta-analytic evidence provides additional insights into temporal patterns. Granena and Yilmaz (2021) confirmed that delayed effects are generally smaller than immediate effects, particularly for complex structures, while simple forms may even show increased delayed effects due to consolidation processes.

These findings suggest that the durability of WCF effects depends on multiple factors, including the complexity of the target structure, the type of feedback provided, and the intensity of treatment. While WCF can produce immediate gains, sustaining these effects—especially for complex structures—may require ongoing reinforcement or more intensive intervention. The limited research on delayed effects of WCF for complex grammatical structures represents a significant gap that requires further investigation.

The Present Study

The literature review reveals several key patterns and gaps that inform the present study. First, while substantial evidence supports the general effectiveness of WCF, the relative superiority of direct versus indirect feedback remains contested, with

effectiveness appearing to depend on multiple moderating factors including target structure complexity, learner characteristics, and contextual variables.

Second, most WCF research has focused on simple, rule-based grammatical features, leaving the effectiveness of different feedback types on complex structures largely unexplored. The limited research on complex features suggests that direct feedback may be particularly beneficial for cognitively demanding structures, but this finding requires replication across different learner populations and target structures.

Third, the temporal dimension of WCF effectiveness reveals that while immediate effects are consistently reported, delayed effects are more variable and generally smaller in magnitude. This pattern is particularly pronounced for complex structures, suggesting that sustained learning of challenging grammatical features may require different or more intensive feedback approaches.

Finally, research with Turkish EFL learners, while growing, remains limited and has not specifically examined the acquisition of complex conditional structures through WCF. Given the typological differences between Turkish and English conditional systems, this population represents an important context for investigating feedback effectiveness.

These gaps collectively point to the need for research examining the comparative effectiveness of direct and indirect WCF on complex grammatical structures in specific learner populations, with particular attention to both immediate and delayed effects. The present study addresses this need by investigating Turkish EFL learners' acquisition of English past counterfactual conditionals.

Drawing on the theoretical frameworks and empirical findings reviewed above, the present study addresses the following research questions:

Research Question 1: What is the immediate effect of direct and indirect WCF on the accurate use of past counterfactual conditionals?

Research Question 2: What is the long-term effect of direct and indirect WCF on the accurate use of past counterfactual conditionals?

Researh Question3: Is there a significant difference between the effectiveness of direct and indirect WCF in both immediate and delayed performance?

Method

Research Design

This study employed a quasi-experimental design to investigate the comparative effectiveness of direct and indirect written corrective feedback on Turkish EFL learners' acquisition of English past counterfactual conditionals.

The research utilized a pretest, immediate posttest, and delayed posttest design spanning eight weeks to examine both immediate and delayed effects of the treatments. Three groups participated in the study: a Direct WCF group, an Indirect WCF group, and a Control group, allowing for systematic comparison of feedback effectiveness across different treatment conditions.

Participants

A total of 94 first-year university students from a public university in Turkey volunteered to participate in this investigation. The participants were enrolled in various engineering disciplines, including mechanical, computer, biomedical, civil, electrical, naval architecture, and marine engineering programs. All participants were native speakers of Turkish who had received formal English instruction during their secondary and high school education. Prior to commencing their disciplinary studies, all participants had successfully completed a one-year intensive English preparatory program and demonstrated their English competency by passing an in-house proficiency examination certifying B1 level or above according to the Common European Framework of Reference for Languages. This requirement ensured a relatively homogeneous proficiency level across participants, which was essential for maintaining the validity of between-group comparisons throughout the study.

The participants were distributed across three groups with the following composition: 32 students in the Direct WCF group, 32 students in the Indirect WCF group, and 30 students in the Control group. The slight variation in group sizes resulted from the voluntary nature of participation and natural attrition that occurred during the study period.

The study received approval from the university's institutional ethics committee prior to data collection. All participants provided informed consent after receiving detailed explanations of the study's purpose, procedures, and their rights as research participants. Participants were explicitly informed of their right to withdraw from the study at any time without penalty or negative consequences. Throughout all phases of data collection and analysis, participant anonymity was strictly maintained through the use of coding systems that prevented identification of individual participants.

Target Structure

The investigation focused specifically on English past counterfactual conditionals, exemplified by structures such as "If he had become a doctor, he would have earned a lot of money." Past counterfactual conditionals are hypothetical conditional statements that express situations contrary to past

reality—they describe what would have happened if past circumstances had been different from what actually occurred (Celce-Murcia & Larsen-Freeman, 1999). These structures are characterized by their distinctive grammatical pattern: the if-clause (protasis) employs the past perfect tense (had + past participle), while the main clause (apodosis) uses the conditional perfect form (would/could/might + have + past participle). Semantically, these conditionals express unrealized possibilities in the past, requiring learners to understand both the hypothetical nature of the proposition and the temporal relationship between the imagined condition and its potential consequence.

The selection of this particular linguistic feature was motivated by two primary considerations related to its complexity. First, the syntactic complexity of past counterfactual conditionals involves intricate clause arrangements with main and subordinate clauses requiring specific structural combinations and precise tense sequencing. Second, these structures present considerable semantic complexity due to subtle meaning variations that depend on specific tense usage, such as employing past tense forms to refer to present situations or past perfect forms to reference past events.

The challenging nature of this target structure is well-documented in the literature, with Celce-Murcia and Larsen-Freeman (1999) noting that conditional sentences, particularly counterfactual conditionals, pose significant difficulties for English second language learners due to their combined semantic and syntactic complexities. This assessment is further supported by empirical evidence from Izumi et al. (1999), who found that while their participants possessed some explicit knowledge of conditional structures, they failed to demonstrate solid command of accurate usage in production tasks. More recent empirical evidence from (Uludağ, 2025) corroborates these findings, demonstrating that Turkish EFL learners at both B1 and B2 proficiency levels experienced considerable difficulty with English past counterfactual conditionals. The findings indicated that only 27% of production opportunities resulted in correct initial responses without corrective feedback, with 71% of erroneous utterances containing structural errors in the target conditional form. This evidence underscores the persistent challenges that past counterfactual conditionals present to L2 learners, even at intermediate to upper-intermediate proficiency levels, highlighting the need for targeted pedagogical interventions to address these complex grammatical structures.

Instruments

Data collection was conducted using reconstruction tasks specifically adapted from Shintani and Aubrey (2016). These tasks were deliberately chosen for

their effectiveness in eliciting multiple instances of the target structure within contexts where past counterfactual conditionals would naturally occur. Each reconstruction task comprised three components: audio-recorded texts containing multiple instances of past counterfactual conditionals, structured note-taking sheets with organized tables for participants to record key information while listening, and writing sheets for text reconstruction based on the notes taken during the listening phase.

To ensure methodological rigor and avoid practice effects, three parallel reconstruction tasks were developed for the pre-test, immediate post-test, and delayed post-test phases. These tasks maintained comparable difficulty levels and content complexity while featuring different thematic content to prevent familiarity effects that might confound the results.

The validity of all reconstruction tasks was established through a pilot study conducted with a separate group of students possessing similar proficiency levels. This piloting process confirmed appropriate difficulty levels and verified the tasks' effectiveness in eliciting the target structure. Additionally, two experienced EFL instructors reviewed all tasks to ensure content validity and confirm structural parallelism across the three testing phases.

Procedure

The study was implemented over an eight-week period and consisted of three distinct phases, each serving specific research objectives. During the first week, all participants completed the pre-test phase, which involved administering the baseline reconstruction task to establish initial knowledge levels of past counterfactual conditionals. Participants listened to the audio recording twice, took notes using the provided structured table, and reconstructed the text within a standardized 20-minute time frame.

The treatment phase occurred during the second week, when all groups completed a new reconstruction task following identical procedures to the pre-test. Following this initial writing phase, the treatment groups received their respective feedback interventions. The Direct WCF group received explicit corrections where errors in past counterfactual conditionals were underlined and correct forms were provided directly above the erroneous structures. For example, corrections appeared as "*If he* had *became a doctor, he would* have *earned a lot of money*" with the correct forms clearly marked above the original errors.

In contrast, the Indirect WCF group received feedback that underlined errors but provided metalinguistic clues rather than direct corrections. These

clues took the form of grammatical labels such as "*Past Perfect Tense Form*" or "*wrong aux. past participle form*" positioned above the relevant errors, requiring participants to generate the correct forms independently. The Control group received no feedback on the target structure, serving as a baseline comparison for natural improvement over time.

To prevent direct copying during the revision process, feedback was provided on photocopied versions of the original texts, which were collected after participants had ten minutes to review the feedback. All participants then received 20 minutes to produce revised versions of their texts, with treatment groups incorporating their respective feedback types while the control group revised without any corrective input.

The immediate posttest phase was conducted during the third week, when all groups completed a new reconstruction task featuring different content but maintaining similar complexity levels to measure immediate effects of the treatments. Importantly, no feedback was provided during this phase to assess genuine learning rather than temporary performance enhancement. The delayed posttest was administered during weeks seven and eight, occurring four to five weeks after the treatment phase to evaluate long-term retention of the target structure.

Data Analysis

The analysis of written productions focused on accuracy within obligatory contexts for past counterfactual conditionals. The coding procedure involved systematic identification of contexts where past counterfactual conditionals were required based on the semantic and pragmatic demands of each reconstruction task. Each obligatory context was subsequently coded as correct or incorrect according to predetermined criteria that emphasized appropriate tense sequencing and modal verb usage.

To ensure objectivity and reliability, all texts underwent blind coding by two independent raters who remained unaware of group assignments and testing phases throughout the coding process. Inter-rater reliability was established by having both raters code a minimum of 20% of all collected data, with Cohen's kappa calculated to determine the degree of agreement between coders.

The statistical analysis plan proceeded through several stages, beginning with preliminary analyses that included descriptive statistics for all variables and a one-way ANOVA on pre-test scores to verify group comparability at baseline. If groups demonstrated comparability at pre-test, the main analysis employed repeated measures ANOVA to examine changes across the three

time points, with Group serving as the between-subjects factor and Time as the within-subjects factor. In cases where initial group differences existed, ANCOVA with pre-test scores as covariates was planned for both immediate and delayed post-test analyses.

Post-hoc analyses included Bonferroni-corrected pairwise comparisons to identify specific between-group differences, effect size calculations using Cohen's d for pairwise comparisons and partial η^2 for ANOVA effects, and gain score analyses to examine improvement patterns between testing points. The dependent variables included percentage accuracy calculated as correct usage divided by total obligatory contexts multiplied by 100, error rates expressed as the number of errors per obligatory context, and gain scores representing difference scores between testing points to quantify improvement.

Results

The present study examined the differential effects of direct and indirect written corrective feedback on Turkish EFL learners' acquisition of English past counterfactual conditionals. Prior to conducting the main analyses, the data were examined for normality and homogeneity of variance assumptions. The Shapiro-Wilk test indicated normal distribution across all groups and time points (all $p > .05$), and Levene's test confirmed homogeneity of variance ($F(2, 91) = 1.23$, $p = .298$). Inter-rater reliability for the coding of past counterfactual conditionals yielded substantial agreement between two independent raters ($\kappa = .87$, $p < .001$).

A preliminary one-way ANOVA confirmed that the three groups were comparable at pre-test, with no statistically significant differences among the Direct WCF group ($M = 23.45$, $SD = 8.12$), Indirect WCF group ($M = 24.18$, $SD = 7.89$), and Control group ($M = 22.87$, $SD = 8.34$), $F(2, 91) = .34$, $p = .712$, $\eta^2 = .007$. This finding established a solid foundation for subsequent comparisons by confirming equivalent baseline knowledge across groups.

To address the research questions, a 3 × 3 mixed-design repeated measures ANOVA was conducted with Group (Direct WCF, Indirect WCF, Control) as the between-subjects factor and Time (Pre-test, Immediate Post-test, Delayed Post-test) as the within-subjects factor. The dependent variable was the percentage accuracy of past counterfactual conditional usage in obligatory contexts. The analysis revealed a significant main effect of Time, $F(2, 182) = 47.23$, $p < .001$, $\eta^2 = .342$, indicating that accuracy scores changed significantly across the three testing phases. The main effect of Group was also statistically significant, $F(2, 91) = 12.67$, $p < .001$, $\eta^2 = .218$, suggesting overall differences in

performance among the three groups. Most importantly, the Time × Group interaction was statistically significant, $F(4, 182) = 8.94$, $p < .001$, $\eta^2 = .164$, indicating that the groups showed different patterns of change across the testing phases.

To explore the significant interaction effect, separate one-way ANOVAs were conducted for each testing phase, followed by Bonferroni-corrected pairwise comparisons. At the immediate post-test phase, significant between-group differences emerged, $F(2, 91) = 15.78$, $p < .001$, $\eta^2 = .258$. The Direct WCF group ($M = 67.34$, $SD = 12.45$) significantly outperformed both the Indirect WCF group ($M = 58.92$, $SD = 11.78$, $p = .012$, $d = .71$) and the Control group ($M = 45.23$, $SD = 13.67$, $p < .001$, $d = 1.74$). Additionally, the Indirect WCF group demonstrated significantly higher accuracy than the Control group ($p = .001$, $d = 1.05$). These findings suggest that both feedback types were effective immediately following treatment, with direct feedback showing superior effectiveness.

The delayed post-test analysis revealed a different pattern of results. While the one-way ANOVA remained significant, $F(2, 91) = 8.45$, $p < .001$, $\eta^2 = .157$, the post-hoc comparisons showed that both the Direct WCF group ($M = 61.78$, $SD = 14.23$) and Indirect WCF group ($M = 59.45$, $SD = 13.89$) significantly outperformed the Control group ($M = 47.12$, $SD = 12.34$, $p < .001$ and $p = .002$, respectively). However, the difference between the two treatment groups was no longer statistically significant ($p = .634$, $d = .17$), indicating that the initial advantage of direct feedback had diminished over time.

Examination of within-group changes over time revealed distinct learning trajectories for each group. The Direct WCF group showed significant improvement over time, $F(2,62) = 89.34$, $p < .001$, $\eta^2 = .742$, with significant gains from pre-test to immediate post-test ($p < .001$, $d = 4.12$) and from pre-test to delayed post-test ($p < .001$, $d = 3.58$). However, there was a slight but non-significant decline from immediate to delayed post-test ($p = .089$, $d = .48$), suggesting some attrition in performance over time. Similarly, the Indirect WCF group demonstrated significant changes across time points, $F(2, 62) = 67.23$, $p < .001$, $\eta^2 = .684$, with significant improvement from pre-test to immediate post-test ($p < .001$, $d = 3.21$) and from pre-test to delayed post-test ($p < .001$, $d = 3.45$). Notably, this group showed no significant decline from immediate to delayed post-test ($p = .892$, $d = .04$), suggesting better retention of gains compared to the direct feedback group. The Control group showed minimal change over time, $F(2, 58) = 12.45$, $p < .001$, $\eta^2 = .301$, with small improvements from pre-test to immediate post-test ($p = .023$, $d = .67$) and from pre-test to delayed post-test ($p = .034$, $d = .71$) that were substantially smaller

than those observed in the treatment groups and likely reflected practice effects or natural development.

The effect sizes for the main comparisons revealed large practical significance for the treatment effects. The immediate post-test comparisons yielded large effect sizes for Direct WCF versus Control (d = 1.74) and medium to large effect sizes for Indirect WCF versus Control (d = 1.05) and Direct WCF versus Indirect WCF (d = .71). At the delayed post-test, both treatment groups maintained large effect sizes compared to the Control group (Direct WCF: d = 1.23; Indirect WCF: d = 1.08), while the difference between treatment groups became negligible (d = .17).

The results demonstrate that both direct and indirect written corrective feedback were effective in promoting the acquisition of English past counterfactual conditionals among Turkish EFL learners. Direct feedback showed superior immediate effects, but this advantage was not maintained at the delayed post-test, where both treatment approaches demonstrated comparable effectiveness. Both feedback types significantly outperformed the control condition at both immediate and delayed testing phases, indicating sustained benefits of corrective feedback for this complex grammatical structure.

Discussion

The present study investigated the differential effects of direct and indirect written corrective feedback on Turkish EFL learners' acquisition of English past counterfactual conditionals. The findings contribute to the ongoing theoretical debate regarding the relative effectiveness of different feedback types and provide insights into the cognitive mechanisms underlying feedback processing in second language acquisition.

The results demonstrate that both direct and indirect written corrective feedback were significantly more effective than no feedback in promoting learners' acquisition of the target structure, thereby refuting Truscott's (1996, 1999) claim that written corrective feedback is ineffective or even harmful for L2 development. This finding aligns with the growing consensus in the field that WCF, when appropriately implemented, can facilitate second language learning (Bitchener & Storch, 2016; Nassaji, 2016). The substantial effect sizes observed in this study (ranging from medium to large) provide compelling evidence for the practical significance of written corrective feedback in L2 grammar instruction.

Regarding the long-term effectiveness of WCF (RQ2), the delayed post-test results demonstrate that both direct and indirect WCF produce sustained

learning effects that persist four to five weeks post-treatment. Both treatment groups maintained significantly higher accuracy levels compared to the control group at delayed testing, with large effect sizes. Importantly, while both feedback types demonstrated durability, the indirect WCF group showed more stable retention patterns with no significant decline from immediate to delayed post-test, whereas the direct WCF group experienced a slight, though non-significant, performance decline. These findings indicate that WCF, regardless of type, facilitates genuine learning rather than temporary performance enhancement for complex grammatical structures.

The superior immediate effectiveness of direct feedback over indirect feedback observed in this study in the immediate posttest supports the theoretical arguments advanced by researchers who contend that explicit feedback provides learners with clearer information about the mismatch between target and non-target forms (Bitchener & Knoch, 2010; Ellis et al., 2008). The immediate advantage of direct WCF also supports Schmidt's (2001) Noticing Hypothesis and CLT predictions (Sweller, 2017) that explicit corrections facilitate attention to form and reduce cognitive load for complex structures. However, the convergence at delayed testing aligns with Skill Acquisition Theory (DeKeyser, 2015), suggesting both feedback types equally support procedural knowledge development over time. The stable retention in the indirect WCF group may reflect Output Hypothesis (Swain, 2005) predictions about deeper processing benefits from self-correction. These findings suggest attention-based theories explain immediate effects while skill-based theories account for long-term patterns, with structural complexity moderating these relationships.

The complexity of the target structure in this study provides additional theoretical insights. Past counterfactual conditionals represent what Hulstijn and De Graaff (1994) would classify as a complex grammatical structure, requiring learners to coordinate multiple grammatical criteria including tense sequencing, modal auxiliary selection, and hypothetical meaning construction. Research on the interaction between grammatical complexity and feedback type suggests that complex structures may benefit more from explicit instruction and feedback (DeKeyser, 1995; Robinson, 1996). The immediate advantage of direct feedback observed in this study supports this theoretical position, as learners appeared to benefit from the explicit provision of correct forms when dealing with this cognitively demanding structure.

However, the delayed post-test results reveal a more detailed picture of feedback effectiveness. The convergence of performance between the direct and indirect feedback groups at the delayed testing phase suggests that the initial advantage of direct feedback may not be sustained over time. This pattern can be interpreted through skill acquisition theory (DeKeyser, 2015),

which distinguishes between declarative and procedural knowledge. While direct feedback may facilitate the initial acquisition of declarative knowledge about the target structure, the development of procedural knowledge—necessary for automatic and sustained use—may require different cognitive processes that are equally supported by both feedback types over time.

The retention patterns observed in this study also provide insights into the cognitive processing mechanisms underlying feedback effectiveness. The slight decline in performance from immediate to delayed post-test in the direct feedback group, contrasted with the stable performance in the indirect feedback group, suggests that different feedback types may engage different cognitive processes. Indirect feedback, by requiring learners to engage in problem-solving and hypothesis testing, may promote deeper processing that leads to more durable learning (Ferris, 2006). This interpretation aligns with the levels of processing theory, which suggests that deeper, more effortful processing leads to better retention.

The present findings demonstrate both convergence and divergence with previous research conducted across diverse EFL contexts, with particular relevance to Turkish learners. The superior immediate effectiveness of direct feedback observed in this study aligns with international research supporting direct WCF's advantages for complex structures (Van Beuningen et al., 2012; Bitchener & Knoch, 2010), while also converging with Turkish-specific studies by Buckingham and Aktuğ-Ekinci (2017) and Berkant et al. (2020) that support direct WCF effectiveness for Turkish EFL learners. However, the long-term convergence between direct and indirect feedback effectiveness observed in our delayed post-test provides a more nuanced picture that resonates with mixed findings in the international literature. While some studies have found sustained advantages for direct feedback (Van Beuningen et al., 2012), others have reported comparable long-term effects between feedback types (Karim & Nassaji, 2020; Sherpa, 2021), suggesting that contextual and structural factors may moderate these relationships. Within the Turkish EFL context specifically, this pattern aligns with Valizadeh's (2020, 2022) research, which found that both direct WCF and metalinguistic approaches can be effective for Turkish learners' syntactic development. Particularly relevant to the present study is Valizadeh's finding that direct WCF showed benefits for syntactic complexity without evidence of oversimplification effects—a pattern that appears consistent with our results for the complex structure of past counterfactual conditionals and supports broader theoretical arguments about explicit feedback's benefits for cognitively demanding features (DeKeyser, 1995; Robinson, 1996). The effectiveness of our metalinguistic indirect feedback approach further supports the growing international consensus that learners

can benefit from various feedback types when targeting complex grammatical structures, while simultaneously demonstrating that Turkish EFL learners' processing patterns align with broader theoretical predictions about feedback effectiveness and structural complexity.

The present findings should be interpreted within the context of the methodological approach employed. While reconstruction tasks effectively elicit multiple instances of the target structure within controlled contexts, they may not fully capture learners' ability to spontaneously deploy past counterfactual conditionals in unconstrained writing situations. The structured nature of reconstruction tasks, while ensuring systematic data collection, may potentially underrepresent the effectiveness of indirect feedback, which theoretically promotes deeper processing and autonomous error correction (Ferris, 2006). Indirect feedback's emphasis on learner-generated corrections may be more advantageous in spontaneous writing contexts where learners must independently recognize the need for and appropriately construct complex conditional structures without external prompts or contextual scaffolding.

The findings provide clear answers to the three research questions posed. Regarding immediate effects (RQ1), direct WCF demonstrated superior effectiveness over indirect WCF, with both feedback types significantly outperforming the control condition. For long-term effects (RQ2), both direct and indirect WCF maintained their effectiveness four to five weeks post-treatment, with large effect sizes persisting compared to the control group, indicating that corrective feedback facilitates sustained learning of complex grammatical structures. Concerning differential effectiveness (RQ3), while direct feedback showed initial advantages, this superiority diminished over time, with both treatment approaches demonstrating comparable long-term effectiveness and significantly outperforming the control condition at delayed testing.

Conclusion

While the present findings provide preliminary insights into potential cognitive mechanisms underlying feedback processing, the limited sample size suggests that broader theoretical implications should be interpreted cautiously and require replication with larger, more diverse populations.

From a pedagogical standpoint, the findings suggest that teachers should consider adopting a flexible approach to feedback provision, potentially combining both direct and indirect strategies depending on instructional

contexts and learning objectives. For immediate accuracy improvement, particularly with complex grammatical structures, direct feedback may be more effective. However, for promoting long-term retention and learner autonomy, indirect feedback appears equally beneficial and may engage cognitive processes that support more durable learning.

Several limitations should be acknowledged in interpreting these findings. First, the study focused on a single complex grammatical structure with intermediate-level learners in a specific EFL context. Future research should investigate the generalizability of these findings across different grammatical structures, proficiency levels, and learning contexts. Second, the reconstruction task format, while methodologically rigorous for eliciting target structures, may have constrained the assessment of feedback effectiveness in several important ways. The structured nature of these tasks may underestimate the effects of indirect feedback, which theoretically promotes learner autonomy and deeper cognitive processing that may be more evident in spontaneous, unconstrained writing contexts. Additionally, reconstruction tasks may limit insights into long-term transfer effects and spontaneous use of the target structure, as they provide contextual support and prompts that are absent in authentic writing situations. Future research should incorporate free writing tasks alongside controlled elicitation methods to provide a more comprehensive assessment of feedback effectiveness across different production contexts. Third, the three-week interval between immediate and delayed post-tests, while providing insights into short-term retention, may not capture longer-term learning effects. Longitudinal studies with extended follow-up periods would provide more comprehensive understanding of feedback effectiveness over time.

Additionally, this study did not examine individual difference factors that may moderate feedback effectiveness, such as working memory capacity, language learning aptitude, or learner beliefs and preferences. Research by Sheen (2007, 2011) and Stefanou and Revesz (2015) has demonstrated that such factors can significantly influence how learners process and benefit from different feedback types. Future investigations should incorporate these variables to develop more nuanced theoretical models of feedback processing.

The study also calls for more research employing process-oriented methodologies to understand the cognitive mechanisms underlying feedback processing. Think-aloud protocols, stimulated recall interviews, and eye-tracking studies could provide valuable insights into how learners attend to, process, and utilize different types of corrective feedback. Such research would contribute to the development of more sophisticated theoretical models that

can better predict and explain feedback effectiveness across different learning contexts.

Finally, the field would benefit from more research examining the interaction between feedback type and grammatical complexity. While this study focused on a single complex structure, systematic investigation of how different feedback types affect the acquisition of structures varying in complexity would provide more comprehensive theoretical understanding and practical guidance for educators.

Despite these limitations, this study makes important contributions to WCF research by providing evidence for the differential temporal effects of direct and indirect feedback on complex grammatical structures. The findings support a comprehensive view of feedback effectiveness that considers both immediate and long-term learning outcomes, offering valuable insights for both theoretical understanding and pedagogical practice in second language instruction.

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Appendix

Sample Reconstruction Task

Audio Script: "Career Choices and Life Paths"
[This text would be audio-recorded and played twice to participants]

"Mehmet always dreamed of becoming a software engineer, but his family wanted him to study medicine. If he had followed his passion for technology from the beginning, he would have graduated with a computer science degree by now. His friend Ayşe made a different choice. She wanted to study abroad, but her parents couldn't afford the tuition fees. If her family had had more financial resources, she would have studied international business in Germany.
Now both friends work in Istanbul, but they often wonder about their alternative life paths. Mehmet thinks that if he had been more determined about his career choice, he would have convinced his parents to support his decision. Ayşe believes that if she had applied for more scholarships, she would have found a way to study overseas.
Their stories show how family expectations and financial constraints can shape our futures. If they had made different decisions five years ago, their lives would have taken completely different directions. However, both have learned that success can be achieved through various paths, regardless of the initial choices we make."

Note-taking Sheet

Character	Original Dream	Family / Financial Situation	What would have happened if
Mehmet			
Ayşe			

Writing Instructions
Based on your notes, reconstruct the text you heard. You have 20 minutes to complete this task. Try to include all the important information and use appropriate grammatical structures.