Research Square

Preprints are preliminary reports that have not undergone peer review.
They should not be considered conclusive, used to inform clinical practice,
or referenced by the media as validated information.

Evaluating Conceptual Framing in AI-Generated Educational Writing: A Cognitive-Linguistic Analysis of Student Revision

Marina Jovic

jovic.m@gust.edu.kw

Gulf University for Science & Technology

Mirka Ćirović

Research Article

Keywords: AI-generated writing, revision, cognitive bias, cognitive metaphor, blending theory

Posted Date: July 7th, 2026

DOI: https://doi.org/10.21203/rs.3.rs-10249462/v1

License: This work is licensed under a Creative Commons Attribution 4.0 International License.
Read Full License

Additional Declarations: No competing interests reported.

Evaluating Conceptual Framing in AI-Generated Educational Writing: A Cognitive-Linguistic Analysis of Student Revision

Marina Jovic[1]*, Mirka Ćirović[2]

[1]Gulf University for Science and Technology

[2]Independent researcher

*Corresponding author: jovic.m@gust.edu.kw

Abstract: Large language models increasingly shape student writing, yet the conceptual assumptions embedded in their prose remain underexplored. This study examines how Gulf Arabic-speaking undergraduate writers revise the metaphorical representations of parental authority and child autonomy found in AI-generated argumentative essays. Drawing on Conceptual Metaphor Theory and Blending Theory, we compare AI-generated essays on parental influence over children's career choices with student-revised versions of the same texts. The analysis reveals the following revision patterns: students retain some metaphorical schemas, reduce or eliminate others, and introduce or expand alternative source domains with conceptually simpler and more student-centred alternatives. The analysis reveals the following revision patterns: students retain some metaphorical schemas, reduce or eliminate others, and introduce or expand alternative source domains. Most notably, the student revisions indicate that AI-generated conceptual framing is not simply carried over into the final texts; instead, parental authority is often reframed away from formative shaping and toward guidance, advice, and conditional involvement. The findings demonstrate how cognitive-linguistic analysis can reveal the conceptual assumptions embedded in AI-assisted writing and provide a framework for identifying potential cultural bias in educational uses of generative AI.

Keywords: AI-generated writing, revision, cognitive bias, cognitive metaphor, blending theory

1. Introduction

Generative AI writing assistants are increasingly integrated into undergraduate writing practices. Existing research has focused primarily on the linguistic and educational consequences of AI-assisted writing, including stylistic uniformity, reduced distinctiveness of writer voice [1], [2], and weaker critical engagement when students accept generated text without substantial revision [3], [4]. Beyond these linguistic and educational outcomes, however, less is known about the conceptual structures, particularly cognitive metaphors, through which AI-generated prose represents abstract social issues.

Recent metaphor-oriented studies have generally treated AI as the object of conceptualisation. They have examined how students conceptualise generative AI in their writing practices [5], how AI literacy frameworks position it in relation to students and teachers [6], and how metaphor may support the teaching of critical AI literacy [7]. However, the metaphorical patterns embedded in AI-generated prose or the ways the students engage with them have received little attention.

This gap warrants attention for several reasons. First, LLMs do not produce culturally neutral text, as their outputs reflect the values of the data they were trained on [8]–[10]. Second, metaphorical framing can influence how readers interpret and respond to a topic [11]. Yet research on AI bias has focused mainly on the content of generated outputs, with less attention to the conceptual structures through which culturally situated assumptions are framed. It also remains unclear how students revise these framings, particularly in culturally sensitive domains.

To examine these conceptual framings, the study draws on Conceptual Metaphor Theory (CMT) and Blending Theory (BT). The topic of parental influence over children's career choices is productive because it brings together questions of family authority and individual autonomy. The study analyses a paired corpus of AI-generated argumentative essays and Gulf Arabic-speaking undergraduates' revisions on parental influence over children's career choices.

The analysis has two aims: to identify the systematic metaphorical preferences embedded in the ChatGPT-5.2's framing of authority and autonomy, and to trace whether and how student revisions retain, reduce, or replace those patterns. These aims are addressed through four research questions:

RQ1. How does the frequency of metaphorical expressions differ between AI-generated essays and their student-revised versions?

RQ2. Which source domains are retained, eliminated, or newly introduced in student revisions, and which retained domains are reduced, stable, or expanded?

RQ3. Do AI-generated and student-revised essays differ in source-domain coherence across a text and in the production of double-scope blends?

RQ4. How do AI-generated and student-revised essays differ in their conceptualisation of parental authority and child autonomy?

Together, these questions link patterns of metaphor use to the ways parental authority and child autonomy are framed in AI-generated and student-revised essays.

The following section situates the study within research on metaphorical conceptualisations of parental authority and autonomy, cultural variation, and AI-assisted writing. The paper then describes the corpus and analytical procedure, presents and discusses the findings, and concludes by considering the study's limitations and directions for future research.

2. Literature Review

2.1 Conceptual Metaphor, Blending, and Cultural Variation

Conceptual Metaphor Theory (CMT) treats metaphor as a systematic relationship between a relatively concrete source domain and a more abstract target domain [12], [13]. Abstract concepts are therefore understood through embodied experiences such as movement, force, possession, containment, and construction. Metaphorical framing matters because it foregrounds some interpretations while backgrounding others, as shown by Thibodeau and Boroditsky [11], who found that different crime metaphors prompted different policy preferences. In argumentative writing, metaphors may similarly shape how writers frame social relations, evaluate positions, and assign authority.

While CMT identifies recurring source–target mappings, Blending Theory explains expressions in which elements from several conceptual frames interact to create emergent meaning [14]. In double-scope networks, both input spaces contribute organising structure, and their integration produces meaning that cannot be reduced to either input independently. The two approaches are therefore complementary: CMT captures systematic patterns, whereas Blending Theory accounts for more locally creative combinations.

2.2 Authority, Parental Control, and Career

Parental authority is not represented through a single stable metaphorical model. Instead, it is associated with conceptualisations of discipline, care, control, protection, development, and guidance. Lakoff's Strict Father and Nurturant Parent models [15] provide one influential account of this contrast. The Strict Father model links authority with hierarchy, obedience, discipline, and preparation for a competitive world. The Nurturant Parent model, however, foregrounds empathy, support, communication, and the gradual development of autonomy. Other metaphorical representations assign parents the roles of guides, educators, or protectors. Suter et al. [16], for example, identify PROTECTOR and EDUCATOR metaphors in parental discourse. A parent represented as a protector shields the child from danger, whereas a guide or educator offers knowledge and preparation without necessarily determining the final choice. These models were developed primarily as accounts of American moral and political reasoning rather than as universal parenting categories. Nevertheless, they provide a useful heuristic for distinguishing between disciplinary and facilitative representations of parental authority.

Parental influence can also be understood through force-dynamic relations. Talmy's account of Force Dynamics [17] explains how social interaction is conceptualised through physical experiences of pressure, resistance, blockage, compulsion, and enablement. Expressions such as *push*, *pressure*, *force*, *restrain*, and *steer* represent one participant as exerting force on another. In discussions of career choice, these expressions allow parental influence to be represented as varying in magnitude. Guidance may be construed as a relatively weak or enabling force, whereas control is represented as excessive pressure that restricts the child's movement or choice. Force-dynamic language therefore provides writers with a conceptual scale for distinguishing acceptable influence from coercion.

Parental advice may also be conceptualised as a transferable resource. Drawing on Reddy's Conduit Metaphor [18], communication is commonly understood as the transfer of objects between individuals, with ideas and meanings treated as entities that can be given, received, stored, or passed on. Lakoff and Johnson [12] further develop this view through metaphors such as IDEAS ARE OBJECTS. Advice exhibits many of these characteristics, as speakers routinely refer to *giving*, *taking*, *following*, *rejecting*, *applying*, or *relying* on advice. In family contexts, parental advice is often represented as something useful that can be drawn upon when making important decisions. Expressions referring to the value, usefulness, or application of parental advice suggest a conceptualization in which advice functions as a resource that can facilitate decision-making, reduce uncertainty, and contribute to future success. Consequently, instances of PARENTAL ADVICE IS A RESOURCE may be understood as manifestations of broader conceptualizations of knowledge and guidance as valuable and usable assets.

Among Inkson's nine career metaphors [19], JOURNEY, INHERITANCE, and CONSTRUCTION are most relevant to parental influence. CAREER IS A JOURNEY is a

specialised instantiation of A PURPOSEFUL LIFE IS A JOURNEY within the Event Structure Metaphor [20], mapping the individual onto a traveller, goals onto destinations, progress onto movement, difficulties onto obstacles, and parents onto potential guides. Smith-Ruig [21] similarly documents path, road, and journey imagery in professionals' career narratives. INHERITANCE foregrounds the intergenerational transmission of expectations and social position, whereas CONSTRUCTION emphasises self-directed career formation. These metaphors distribute authority differently: JOURNEY allows guidance; INHERITANCE stresses continuity, and CONSTRUCTION foregrounds self-determination. Building on Inkson's observation that stakeholder position influences metaphor choice, this study examines how AI-generated and student-revised texts frame career decision-making.

Finally, academic work is often conceptualised as a physical struggle. Talmy's Force Dynamics [17] and Lakoff's Event Structure Metaphor [20] account for expressions such as *struggle with assignments*, *overcome challenges*, *tackle problems*, and *carry a heavy workload*. These expressions frame academic difficulties as obstacles and achievement as their successful negotiation. The metaphor ACADEMIC WORK IS PHYSICAL STRUGGLE therefore represents learning as an effortful process requiring persistence.

2.3 Cultural Context and Cognitive Bias in LLM Output

Cross-cultural research suggests that parental authority and autonomy are interpreted differently across contexts. Some Asian settings place greater emphasis on obedience and hierarchy [22], although modernisation has also increased expectations of emotional autonomy [23]. The research in the United States more often foregrounds parenting that combines control, warmth, and support for autonomy [24]. Metaphorical preferences tend to be shaped by social experience and cultural knowledge [25].

In Gulf contexts, career choice is frequently negotiated within family relationships and expectations. Studies from the UAE, Kuwait, and the wider Arabian Gulf associate parental influence with economic security, social reputation, hierarchical family relations, and family approval of particular careers [26]–[28]. These findings do not imply a uniform Gulf model, but they indicate that career decisions may involve collective and intergenerational considerations alongside individual preference.

This context is relevant because LLM outputs often align more closely with Western, particularly American, value profiles and may represent non-Western perspectives less consistently [8]–[10], [29]. Evidence of religious and social bias in generated texts further supports this concern [30], [31]. However, such biases are not necessarily transferred unchanged into student writing: Wambsganss et al. [32], for example, found no significant downstream transfer of gender bias. The present study therefore examines whether students retain, modify, or reject the metaphorical framings found in AI-generated texts.

2.4 AI Framing and Student Revision

Users may perceive AI-generated prose as factual and objective, which can reduce scrutiny of its underlying assumptions [31]. In academic writing, beginning with an AI-generated draft alters the conventional writing process because students encounter a pre-formed argument that already contains particular rhetorical and conceptual choices. Revision therefore becomes a process of accepting, modifying, or resisting those choices rather than simply refining the writer's own initial

ideas. Research suggests that uncritical reliance on AI may reduce engagement and originality, whereas selective use may preserve stronger authorial voice and critical involvement [4], [33]. For the present study, the central question is therefore not whether students use AI, but how their revisions reproduce or transform the metaphorical framings embedded in AI-generated text.

3. Method

3.1 Research Design

The study employed a qualitative cognitive-linguistic design combining metaphor identification, conceptual analysis, and paired-text comparison. The unit of analysis was a matched essay pair consisting of an AI-generated draft, and the version subsequently revised by the student who generated it. Differences between the two versions were therefore treated as changes introduced during revision.

3.2 Participants and Corpus Construction

The corpus comprised 30 essays arranged in 15 matched pairs. Participants were Arabic-speaking undergraduates enrolled in an Academic Writing course at Gulf University for Science and Technology in Kuwait and were native speakers of Gulf Arabic varieties. Only submissions from higher-performing students whose course grades ranged from B to A were included. This criterion was used to minimise the possibility that revision choices primarily reflected limitations in English-language proficiency.

All texts responded to the prompt: "*To what extent should parents influence their children's career choices?*" The prompt was submitted by each participant in a new ChatGPT-5.2 session using the same model configuration. Data were collected during a regular class session in February 2026. Students were given 50 minutes to generate and revise their essays independently. Peer feedback, external sources, dictionaries, and additional AI tools were not permitted. Each AI-generated draft and its student-revised version were assigned a shared identifier, from Pair 1 to Pair 15, and all personal identifiers were removed before analysis.

The corpus size was considered appropriate for a qualitative cognitive-linguistic analysis because metaphor identification, schema mapping, and blending analysis require detailed examination of individual texts rather than large-scale quantitative comparison.

3.3 Analytical Procedure

The analysis proceeded at four levels: metaphorical lexical units, conceptual schemas, blended constructions, and matched essay pairs. First, metaphorically used lexical units were identified using the Metaphor Identification Procedure (MIP) [34]. Each essay was read for overall meaning, divided into lexical units, and examined for contrasts between contextual and more basic meanings. Units meeting the MIP criteria were coded as metaphorical. Second, metaphorical expressions were grouped into conceptual schemas. A schema was recorded when at least two distinct expressions within a text instantiated the same source-domain mapping. For each schema, the source domain, target domain, and principal correspondences were documented. Third, expressions involving more than one source domain were analysed using the four-space model of Blending Theory [14]. A construction was classified as a double-scope blend only when both input frames contributed organising structure and produced emergent meaning not reducible to either input alone. Fourth, each matched pair was compared in terms of metaphorical frequency, source-

domain inventories, source-domain coherence, and blended constructions. Source domains were classified as retained when present in both versions, eliminated when present only in the AI-generated version, and introduced when present only in the student revision. Retained domains were further classified as reduced when they appeared with lower frequency or less lexical elaboration in the student revision, expanded when they appeared with greater frequency or elaboration, and stable when their use remained broadly comparable across the pair.

3.4 Coding Reliability

All 30 essays underwent primary coding and full second-coder verification. The two researchers alternated roles so that each served as the primary coder for half of the essay pairs and as the verifying coder for the remaining pairs. The verifying coder reviewed every decision concerning metaphor identification, source-domain assignment, schema classification, and blending analysis. Disagreements were documented and resolved through discussion. Cases for which agreement could not be reached were excluded from the relevant frequency counts, schema inventories, and blend classifications. The final analysis therefore included only jointly accepted coding decisions.

4. Findings and Discussion

4.1 RQ1: Frequency of Metaphorical Expressions

The student-revised essays generally contained fewer metaphorical expressions than their corresponding AI-generated drafts. Table 1 presents the frequencies for each matched essay pair, together with the percentage reduction recorded during revision.

Table 1 Frequency of metaphorical expressions in AI-generated and student-revised essays

Essay Pair	AI-generated text	Student-revised text	Reduction (%)
1	35	25	29%
2	30	20	33%
3	30	16	47%
4	30	22	27%
5	22	20	9%
6	35	35	0%
7	40	25	38%
8	30	22	27%
9	30	22	27%
10	30	25	17%

Essay Pair	AI-generated text	Student-revised text	Reduction (%)
11	30	20	33%
12	28	22	21%
13	30	20	33%
14	30	22	27%
15	32	25	22%
Total	462	341	26.2%
Mean per essay	30.8	22.7	-

As shown in Table 1, the number of metaphorical expressions decreased in 14 of the 15 matched essay pairs. Across the corpus, the AI-generated essays contained 462 metaphorical expressions, whereas the student-revised essays contained 341. Student revision therefore resulted in an overall reduction of 26.2%. The mean number of metaphorical expressions per essay decreased from 30.8 in the AI-generated texts to 22.7 in the student revisions. Pair-level reductions ranged from 9.1% in Pair 5 to 46.7% in Pair 3. Pair 6 showed no change in overall frequency.

Overall, the students generally used fewer metaphorical expressions when revising the AI-generated drafts. This finding should not be interpreted directly as evidence of linguistic simplification. The lower frequencies reflect the deletion of metaphorical wording, its replacement with more literal language, or the substitution of one source domain for another. These differences are examined in the analyses of source-domain patterns and conceptual blending under RQ2 and RQ3.

4.2 RQ2: Source-Domain Retention, Reduction, Elimination, and Introduction

Three broad patterns emerged in source-domain use across the matched pairs.

4.2.1 Retained Source Domains

First, both AI-generated and student-revised essays drew on a shared metaphorical repertoire for discussing parental influence and career choice. They are as follows:

1. CAREER IS A JOURNEY

This is the most persistent and productive source domain across all thirty essays. The mappings include:

Traveler → Young person/child
Path → Career trajectory
Guide → Parent/ parental advice
Destination → Long-term professional outcomes
Obstacles → Common career mistakes or instability
Exploring different routes → Looking into different career options

The JOURNEY domain appears in every essay pair, often through several lexical realisations. Its recurrence is consistent with its conventional role in English-language career discourse. For example, an AI-generated essay states that "parents, having navigated the complexities of the labor market, possess a realistic understanding of economic trends and the viability of certain industries" (Pair 10), where parents are positioned as experienced navigators who have already traveled the terrain and can help the child-traveler avoid hazards along the career path. Similarly, a student writes that "parents should guide their children, but the final decision should be left to the child" (Pair 13), where the parent serves as a guide accompanying the child-traveler along the career path toward the destination of a satisfying professional future.

2. PARENTAL INFLUENCE IS A PHYSICAL FORCE

This domain appears with near-universal frequency. The mappings include:

Magnitude of force → Degree of parental influence
Excessive force → Controlling/ authoritarian parenting
Light force → Democratic parenting

The FORCE domain is also frequent and allows parental influence to be represented in terms of degree. Expressions such as "pressure" and "force" frame excessive control as force exerted on the child and associate it with negative emotional or motivational consequences. For example, an AI-generated essay warns that "excessive parental control can have negative consequences" and "when children are pressured into careers that do not align with their passions or talents, they may experience dissatisfaction, stress, and a lack of motivation" (Pair 8). Excessive control is conceptualized here as a compressive force that crushes the child's internal drive. Similarly, a student writes that "when parents force their children too hard, this will cause bad results" and "if a child feels they are forced into a work field, this will result in zero ambition" (Pair 11). Parental pressure is depicted here as a force that may destroy a child's motivation.

3. PARENTAL ADVICE IS A RESOURCE (USABLE OBJECT)

This domain appears consistently across both essay versions. The mappings include:

Possession of resource → Having experience/ insight
Offering a resource → Giving advice
Using a resource → Accepting parental guidance
Quality of the resource → Value of parental advice

Unlike JOURNEY and FORCE, which generate evaluative distinctions (good vs. bad influence), the RESOURCE domain is largely neutral in the sense that advice can be a resource regardless of whether it is followed. For example, an AI-generated essay states that "parents often have more life experience and a broader understanding of the job market, which allows them to provide practical and realistic advice" (Pair 1). Parental experience is framed here as a valuable possession that can be offered to the child as a usable resource for decision-making. Similarly, a student writes that "parents can give advice for certain aspects such as money and education" (Pair 9), where advice is treated as a tangible commodity that parents possess and can transfer to the child.

4. ACADEMIC WORK IS PHYSICAL STRUGGLE

This domain appears in most essays, though often as a single conventionalized expression. The mappings include:

Combatant → Student
Opposing force → Academic material/ studies
Physical pain → Emotional distress
Losing the struggle → Academic failure

Expressions such as "struggle academically" or "struggle to keep up" appear across both AI-generated and student-revised essays, suggesting this metaphor has become fully conventionalized in educational discourse.

4.2.2 Reduced and Eliminated Source Domains

The second significant observation is that several source domains appearing consistently in AI-generated essays are systematically reduced or eliminated in the student-revised versions. They are given as follows:

1. THE CHILD'S DEVELOPMENT IS A PLANT

This domain appears frequently in AI-generated essays but is often dropped by students. The mappings include:

The plant → Young adult
Growth → Psychological/ professional development
Flourishing/ Thriving → Personal and professional success
Hindering growth → Controlling parenting
Nurturing → Supportive parenting

In Pair 7, for example, the AI-generated essay extensively develops the PLANT domain including: "excessive parental control may hinder a child's personal development," "this collaborative approach fosters critical thinking and confidence," "excessive control can be detrimental to a child's development of independence." The student version in Essay Pair 7 retains only the most conventional vestiges ("developing independence") while dropping the richer horticultural imagery.

2. A CAREER PATH IS A BUILDING / CONSTRUCTION

This domain appears frequently in AI-generated essays with elaborated mappings that students rarely preserve:

The building → Person's career
Structural stability → Financial/ professional security
Weakening the structure → Damaging performance and well-being
Sustainability → Long-term career viability
Scaffolding → Temporary external support
Constructing/ Building → Providing constructive advice/ Building functional family relationships

In Pair 3, the AI-generated essay develops this domain extensively including: "excessive control over career decisions can undermine personal fulfillment and independence," "unsustainable career choices," "supports informed decision-making," "financial stability," "strong employment opportunities," "a constructive advice." The student-revised version in Essay Pair 3 retains only "scaffolding" ("support their children") while dropping the structural integrity mappings.

1. TO BE A PARENT IS TO PLAY A ROLE (THEATRE)

This domain appears uniquely in AI-generated essays and is almost never preserved by students. The mappings include:

A role in a play → Parent's function in the child's life

A specific role type (Mentor) → Parent who advises without commanding

The THEATRE domain is particularly interesting because it often participates in double-scope blends with SCULPTING, as in the expression "parents play a significant role in shaping their children's future." This blend appears in multiple AI-generated essays but never survives student revision.

2. PARENTAL INFLUENCE IS SCULPTING

This domain is consistently present in AI-generated essays and consistently absent from student versions. The mappings include:

Sculptor/ Molder → Parents

Clay/ Material → Child's life/ development/ decisions

Action of shaping → Parental guidance and influence

Final form → The adult the child becomes/ The decisions the child makes

The SCULPTING metaphor positions the child as passive material being formed by the parent. This is a framing that, even when critiqued, naturalizes parental authority. Students appear to reject this metaphor entirely, perhaps because it conflicts with their more agency-centered conception of the child.

3. PARENTAL GUIDANCE IS A PROTECTIVE BARRIER/ SHIELD

This domain frequently appears in AI-generated essays but is absent from student versions. The mappings include:

Protective barrier/ shield → Parental guidance

Threat/ danger → Uninformed choices/ bad decisions

Blocking the threat → Preventing bad decisions

Expressions such as "safeguard against impulsive decisions" (Essay Pair 7) or "protective factor" (Essay Pair 13) position parents as defenders against external threats. No corresponding SHIELD expressions were identified in the student revisions, which more often relied on GUIDE or RESOURCE domains.

4.2.3 Newly Introduced and Expanded Source Domains

The third relevant observation is that while students primarily simplify and reduce AI-generated metaphorical repertoire, they occasionally introduce novel domains or expand the ones appearing only minimally in AI-generated essays. They are given as follows:

1. DECISION MAKING IS POSSESSION/ OWNERSHIP

This domain is present in both versions but is significantly more elaborated and emphasized by students. The mappings include:

Owner → The person who makes the final decision (the child)
The object owned → The decision about career choice
Taking ownership → Accepting responsibility for a decision

Student formulations such as "the final decision should belong to the child" (Essay Pair 15) and "children should have the freedom to choose" (Essay Pair 12) establish a property-rights framework for autonomy. This domain supports the students' re-centering on the child as the legitimate decision-maker.

2. MOTIVATION/ PASSION IS A POSSESSION

This domain appears more frequently and more explicitly in student-revised essays. The mappings include:

An owned object → Motivation or passion
Object lost/ taken away → Motivation diminishes or disappears due to overcontrol

Expressions such as "lose motivation" and "lose passion" appear in multiple student-revised essays, treating internal drives as possessions that can be taken by parental pressure. This framing emphasizes the psychological cost of overcontrol in terms children can articulate from their own experience.

3. TIME AND EFFORT ARE RESOURCES/COMMODITY

This domain appears in student-revised essays but is largely absent from the AI-generated versions. The mappings include:

Valuable resources → Time and effort
Squandering resources → Wasting time and effort through wrong career choices

Students write that forced career paths "waste time and effort" (Essay Pairs 1 & 13), introducing a pragmatic, economic rationale against parental overcontrol that is absent from AI-generated focus on "fulfillment" and "autonomy."

4. PARENTAL AUTHORITY AS CORPORATE/MILITARY HIERARCHY

This domain appears uniquely in some student essays, notably in Pair 10, where the student writes about "top-down career planning." The mappings include:

- Top – Parents (authority figures)
- Down – Child (subordinate receiving commands)
- Method – Formal procedure or protocol

- Career planning – The operational task being managed

The expression “top-down career planning” maps parents onto a higher hierarchical position and children onto a subordinate position, representing career decision-making as vertically organised.

4.3 RQ3: Source-Domain Coherence and Double-Scope Blends

The analysis of source domains typically used in the fifteen essay pairs reveals that AI-generated essays exhibit principled and rather repetitive cognitive patterning. This points to a limited scope of conceptual mechanisms for discussing parental authority and child autonomy, which is surprising given the immense amount of data on which the model has been trained. AI-generated essays demonstrate within-domain consistency, where the same metaphor reappears multiple times. For example, AI-generated essays systematically return to the JOURNEY metaphor across multiple paragraphs, using different lexical items such as "guide," "navigate," "path," "explore," and "destination" to reinforce the same conceptual mapping. In contrast, the student version of Essay Pair 7 retains the JOURNEY domain but uses it less frequently and with less elaboration, dropping the more poetic extensions involving "navigation" and "destination." Beyond within-domain consistency, AI-generated essays exhibit cross-domain coherence, where different metaphors reinforce the same abstract idea. For example, in Pair 3, the AI-generated essay uses FORCE, PLANT, BUILDING, and POSSESSION domains to reinforce the same argument about autonomy requiring protection from excessive control. These metaphors reinforce each other in the following manner: balance ↔ moderate influence ↔ individual autonomy ↔ natural development ↔ long-term stability. This creates an integrated conceptual system where each metaphor supports and amplifies the others.

On the other hand, student-revised essays frequently exhibit sporadic and undeveloped metaphorical patterns. The SPORTS GAME metaphor in Essay Pair 2 appears only in paragraph one ("parents should play on both sides") and never again. The HIDDEN OBJECT metaphor in the same essay appears only in paragraph four ("expose your child to reality"). These isolated metaphors are not integrated into a broader conceptual system. This fragmentation suggests that students are not operating with a systematic conceptual system for the target domain. Instead, they produce isolated metaphorical expressions as local stylistic choices rather than as manifestations of underlying schemas.

4.3.1 Double-Scope Networks Used Across Essay Pairs

The analysis of double-scope networks across the fifteen essay pairs reveals a consistent pattern of reduction, with notable exceptions. AI-generated essays consistently produce more double-scope networks than student versions. The most complex essays contain four or five distinct double-scope blends, while student versions rarely exceed one or two. For instance, the AI-generated essay in Pair 7 contains five double-scope networks, while the student version contains two. The AI-generated essay in Pair 1 contains five double-scope networks, while the student version contains one.

The FORCE+CONTAINER blend ("pushed into a career," "forced into a profession") survives in almost every student essay. This blend has become so conventionalized in educational discourse that it may no longer require active double-scope integration. Instead, it functions as a single conceptual unit. The student-revised essay in Pair 11 produces a more complex FORCE+CONTAINER+JOURNEY triple blend for "forced into a path they are not passionate

about," demonstrating that students can generate complex integrations when rhetorically motivated.

The THEATRE+SCULPTING blend ("parents play a role in shaping their children's future") disappears entirely from student essays. This blend requires maintaining two conflicting frames simultaneously: parent as actor (mutual, scripted, responsive) and parent as sculptor (unilateral, transformative, material). The cognitive demand appears to exceed students' processing preference or stylistic comfort.

The BUILDING+ORGANISM blend ("remain adaptable and resilient") from Essay Pair 10 disappears in the student-revised version, where it is replaced by conventional JOURNEY metaphors. The LIQUID+BUILDING blend ("saturated or declining field") from Essay Pair 10 also disappears in the student-revised version. These economic-structural blends appear to be too abstract or technical for students to preserve.

Notably, some students produce novel blends that are not present in the AI-generated original. The student in Essay Pair 7 produces the SURFACE/ INTERIOR blend ("succeed on the surface but still feel unfulfilled"), which integrates CONTAINER and PERCEPTION frames to produce the emergent meaning that external success can mask internal dissatisfaction. The student in Essay Pair 11 produces the HELPER/ HARM contrast ("parents are harming instead of helping"), which holds two opposing frames in tension to capture how well-intentioned pressure can produce negative outcomes. These examples demonstrate that students are capable of creative double-scope integration when the rhetorical payoff is clear.

4.4 RQ4: Parental Authority and Child Autonomy

4.4.1 Parental Authority: From Moderation to Conditionality

Across the AI-generated essays, parental authority is recurrently presented as legitimate but requiring moderation. The ideal parent is a mentor, guide, or gardener who possesses wisdom and must learn to restrain helpful impulses so that their agency would not result in harm rather than benefit. The balance metaphor, which is central to AI-generated essays, assumes parents and children start from equal footing on a scale. However, this metaphor masks fundamental asymmetry: the parent holds the power to add or remove weight. The child cannot "strike the balance" unilaterally.

Some AI-generated essays also occasionally frame parental authority as sculpting, as a creative, formative act that positions the child as material being shaped. Even when critiqued, this metaphor naturalizes parental authority as an inherent feature of the parent-child relationship. Additionally, the AI-generated essay in Pair 14 states that "parents usually play a central role in their children's upbringing" and that "parents often have more life experience, a broader understanding of the job market, and a strong desire to see their children succeed." As seen from this, authority derives from experience, concern, and position; not from delegation.

Several student revisions retain the value of parental guidance but present its scope as more conditional and limited. In Pair 14, the student writes that parents “can’t choose their child’s career unless their own child asks for their help.” This wording makes direct parental involvement dependent on the child’s request. In other revisions, guidance is justified by a temporary need, such as when the child is described as “lost” during the decision-making process. A similar

tendency appears in Pair 9, where the student writes that “the final decision should be left to the child and not to the parents.” An ownership framing is used to position the child as the primary decision-maker, while allowing parental advice to remain part of the process. The contrast between the two sets of texts is therefore not a simple opposition between accepting and rejecting parental authority. Rather, the student revisions more often distinguish between offering guidance and determining the final outcome.

Several student revisions place greater emphasis on boundaries and conditions. Expressions such as “to a moderate extent,” “not too much,” “clear limits,” and “only if” present parental involvement as acceptable within specified constraints. By contrast, AI-generated essays more often use the language of balance. Whereas balance language leaves the distribution of decision-making power relatively open, boundary-setting language foregrounds the point at which parental involvement may become excessive and gives greater prominence to the child’s final choice. Some student revisions also frame excessive parental control in terms of personal cost, using expressions such as “psychological cost” and “at the cost of individual sovereignty.” References to “regret,” “stress,” “dissatisfaction,” “lack of motivation,” and “feeling trapped” make the possible consequences of pressure more explicit. Compared with the AI-generated essays, which tend to describe excessive control more generally as “problematic” or “negative,” the student-revised essays more often present it as harmful, making the framing more direct and emotionally specific without dismissing the value of parental involvement itself.

4.4.2 Child Autonomy: Supported Development and Final Decision-Making

AI-generated essays see autonomy as something that develops over time through guided practice. The PLANT domain contributes to this framing because the child grows naturally but benefits from nurturing. The BUILDING domain contributes scaffolding, where parents provide temporary support until the child's own structure strengthens. The JOURNEY domain positions the child as a traveler who gains competence through experience. The AI-generated essay in Pair 7 exemplifies this by stating that "parents can help children develop confidence in their own judgment" and "this collaborative approach fosters critical thinking and confidence." Autonomy is an outcome of proper parenting, not a pre-existing right. This representation resembles the facilitative features of Lakoff’s Nurturant Parent model [15], although the comparison is analytical rather than an assertion of cultural equivalence.

Several student revisions place greater emphasis on autonomy as an already available decision-making capacity that excessive control may restrict. In Pair 13, the student writes that “too much control can stop children from thinking for themselves.” This expression suggests that independent thought is already present but can be obstructed through excessive intervention. The difference lies in whether autonomy is framed primarily as an outcome of supportive parenting or as an existing capacity that parental involvement should respect.

Possession-based expressions also contribute to this child-centred framing, although they involve different target domains. Statements that children “have” freedom may be analysed as FREEDOM IS A POSSESSION, while claims that the final decision “belongs” to the child instantiate DECISION-MAKING IS OWNERSHIP. Expressions such as “lose motivation,” by contrast, conceptualise MOTIVATION AS A POSSESSION that may be reduced through excessive pressure. Together, however, they place greater emphasis on what the child already has or controls and on what may be affected by parental intervention.

The student revisions do not generally present autonomy as complete separation from parental advice. In Pair 13, the final decision is expected to "reflect both practical thinking and personal interest," representing career choice as an integration of external considerations and personal preference. Pair 11 develops a similar formulation in which the child is "guided by experience and their own passion." This expression constructs two complementary sources of direction: parental experience as an external guide and personal passion as an internal one. The resulting representation does not remove parents from the decision-making process. Instead, the child may consider parental knowledge while retaining responsibility for the final decision. This pattern is consistent with the JOURNEY metaphor described by Inkson [19], in which a guide may offer direction without determining the traveller's destination.

A further difference appears in the representation of mistakes. The student in Pair 9 adds that, even if young people make mistakes in their choices, "this will be a lesson they can learn from in future situations." Several AI-generated essays, by contrast, describe parental guidance as a means of helping children "avoid mistakes." These formulations foreground different, though not necessarily incompatible, orientations. The AI-generated framing emphasises prevention and the protective value of parental experience, whereas the student revision represents mistakes as possible sources of learning. The latter therefore gives greater emphasis to learning through personal experience while still allowing parental advice to remain available.

4.4.3 Scalar Calibration of Parental Influence

A further recurring pattern in the student revisions is the use of scalar, conditional, and boundary-setting expressions to define the acceptable extent of parental influence. These include boundary markers such as "limits," "extent," and "to a point"; degree modifiers such as "too much," "completely," and "moderately"; comparative formulations such as "not too little, not too much"; and threshold expressions such as "only if," "as long as," and "unless." Although these expressions are not necessarily metaphorical, they complement the metaphor analysis by showing how parental involvement is represented as variable in degree and subject to conditions. In Pair 1, for example, the student writes that parents "should not completely control but also should not stay silent." This double-boundary formulation presents both excessive control and complete non-involvement as undesirable. Similarly, the student in Pair 15 argues that parents should have "some influence" but that this influence requires "clear limits."

By representing parental involvement as a matter of degree, these expressions make it linguistically open to evaluation and restriction. They also show that the student revisions do not simply replace parental authority with unrestricted individual choice. Instead, they seek to specify a form of involvement that preserves parental advice while limiting direct control over the final career decision.

At the same time, terms such as "moderate," "reasonable," and "limited" remain context-dependent. They do not specify precisely where supportive involvement ends and excessive influence begins. Scalar language therefore creates an appearance of calibration without establishing a fixed threshold that can be applied across family situations. Nevertheless, its recurrence in the student revisions supports the broader finding that these texts place greater emphasis on defining the conditions and limits of parental involvement.

Taken together, the findings indicate that the student revisions do not remove parental guidance from the conceptual frame; rather, they alter the conditions under which it is presented as legitimate. GUIDE and JOURNEY remain available in both sets of texts, preserving a role for parental knowledge and experience. The AI-generated essays more often represent autonomy as a capacity developed through growth, support, and guided movement, whereas the student revisions more frequently combine guidance with ownership, conditionality, and boundary-setting language. Parental experience is consequently reframed as an advisory resource that may inform, but does not determine, the child's final choice. The contrast is therefore between two configurations of supportive authority rather than between family involvement and individual independence. More importantly, the findings show that students' revision reshapes the conceptual organisation of an AI-generated argument rather than merely modify its wording.

Autonomy-oriented framings nevertheless predominate in both sets of texts, while family reputation, intergenerational obligation, and collective decision-making are not strongly foregrounded. This absence should not be interpreted as a rejection of family-centred values or as representative of Arab or Gulf culture more broadly. It may reflect the AI-generated starting text, the prompt, conventions of English-language argumentative writing, the classroom context, the participants' own orientations, or an interaction among these factors. The findings therefore describe how parental involvement and child autonomy are negotiated within this particular corpus rather than establishing a general cultural opposition between the two.

5. Pedagogical Implications

The findings suggest that AI-assisted writing instruction should treat revision as conceptual as well as linguistic. Although students delegated initial drafting to ChatGPT, a form of cognitive offloading, their revisions involved the selective retention, reduction, elimination, and replacement of metaphorical framings, suggesting renewed conceptual engagement. Cognitive offloading may therefore coexist with subsequent critical re-engagement rather than lead necessarily to passive acceptance. Instructors could support this process by asking students to identify recurring metaphors, examine the assumptions they foreground, compare alternative framings, and justify their revisions. Paired draft-and-revision activities may thus shift attention from surface correction towards critical evaluation of conceptual structure. As the study did not directly measure cognitive offloading or test a specific pedagogical intervention, these implications remain exploratory.

6. Limitations and Future Research

The findings should be interpreted within the scope of the study. The corpus comprised fifteen matched essay pairs produced by higher-performing students at one institution, using one English-language prompt and one ChatGPT model under a 50-minute classroom condition. These choices supported close comparison but limit the extent to which the patterns can be generalised to other students, tasks, or contexts. Metaphor identification and blend classification also involve interpretive judgement, although full second-coder verification strengthened consistency. Since the student texts were produced by revising AI-generated drafts, the analysis focuses on textual changes within each matched pair. Without interview or process data, the findings are interpreted at the level of the texts rather than as direct evidence of students' intentions or cultural beliefs.

Future research could examine larger and more varied samples, compare independent and AI-assisted writing, and include additional topics, models, and prompting languages. Process-based methods, including revision histories and stimulated-recall interviews, could further clarify why metaphorical framings are retained, eliminated, or newly introduced.

7. Conclusion

This study compared pairs of AI-generated and student-revised argumentative essays to examine differences in metaphorical frequency, source-domain selection, conceptual coherence, blending, and the representation of parental authority and child autonomy. The student-revised essays contained 26.2% fewer metaphorical expressions overall, although the extent of reduction varied across pairs. This decrease did not represent a uniform removal of metaphor. Rather, students retained some conventional domains, particularly JOURNEY, FORCE, and RESOURCE, while reducing or eliminating several more elaborated AI-generated domains and occasionally introducing or expanding alternative mappings.

The two sets of texts also differed in the organisation of metaphor across the essay. The AI-generated essays generally displayed greater within-domain recurrence and cross-domain coherence, developing related mappings through several lexical expressions and producing more double-scope blends. The student-revised essays tended to use metaphor more selectively and locally. Nevertheless, some revisions introduced blended constructions that were absent from the corresponding AI-generated drafts, showing that reduced metaphorical frequency did not preclude conceptual creativity.

These differences contributed to distinct, though overlapping, representations of parental influence. The AI-generated essays more often presented parental authority as legitimate, formative, and in need of moderation, while autonomy was frequently construed as a capacity developed through support and guidance. The student revisions continued to value parental experience but more often framed its role as conditional, bounded, and advisory. Ownership and boundary-setting expressions gave greater prominence to the child's final decision without presenting autonomy as complete separation from parental advice. The contrast therefore concerns the conditions under which parental involvement is legitimised rather than a simple opposition between family authority and individual freedom.

Taken together, the findings demonstrate that student revision can affect both the linguistic form and the conceptual organisation of AI-generated writing. The paired design makes it possible to trace the retention, reduction, elimination, introduction, and expansion of metaphorical patterns within the same argument. Autonomy-oriented framings predominated in both sets of texts, while collective obligation, family reputation, and intergenerational responsibility were less prominent. This pattern should be interpreted cautiously, since the study cannot isolate the influence of the AI-generated draft, prompt, English-language academic conventions, classroom context, or participants' own orientations. More broadly, the study illustrates the value of cognitive-linguistic analysis for examining the assumptions embedded in AI-assisted writing and supports critical AI literacy that attends to conceptual framing as well as accuracy and style.

Declarations

Data availability: The datasets generated and analysed during the current study are available from the corresponding author on reasonable request.

Clinical trial number: Not applicable.

Consent to Participate declaration: Not applicable.

Consent to Publish declaration: Not applicable.

Ethics declaration: Not applicable. The study analysed fully anonymised student essays, and no personally identifiable information was collected or reported. Only brief excerpts were reproduced for illustrative purposes.

Funding: This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Competing interests: The authors declare that they have no competing interests.

Use of generative AI: ChatGPT (OpenAI) was used to generate the source texts analysed as part of the research corpus. The authors reviewed and verified all AI-generated materials used in the study and take full responsibility for the manuscript.

References

[1] Al Hosni JK. Preserving authorial voice in academic texts in the age of generative AI: a thematic literature review. Arab World Engl J. 2025;16.

[2] O'Sullivan J. Stylometric comparisons of human versus AI-generated creative writing. Humanit Soc Sci Commun. 2025;12:1708. DOI:10.1057/s41599-025-05986-3.

[3] Pryma V, Pelivan O, Teletska T, Tsobenko O, Zagrebelna N. AI writing assistants and student competence: a linguistic aspect. Arab World Engl J. 2025;16. DOI: https://dx.doi.org/10.24093/awej/AI.18

[4] Lee HPH, Sarkar A, Tankelevitch L, Drosos I, Rintel S, Banks R, et al. The impact of generative AI on critical thinking: self-reported reductions in cognitive effort and confidence effects from a survey of knowledge workers. In: Proc CHI Conf Human Factors in Computing Systems. 2025. DOI:10.1145/3706598.3713778.

[5] Jin F, Sun L, Pan Y, Lin C-H. High heels, compass, Spider-Man, or drug? Metaphor analysis of generative artificial intelligence in academic writing. Comput Educ. 2025;228:105248. DOI: 10.1016/j.compedu.2025.105248

[6] Lucas KA, Lioy A. Mapping AI literacy frameworks: an analysis of the evolving metaphorical relationships between students, teachers, and AI. J Interact Media Educ. 2025;2025(1):15. DOI: https://doi. org/10.5334/jime.974

[7] Roe J, Perkins M, Furze L. Reflecting reality, amplifying bias? Using metaphors to teach critical AI literacy. J Interact Media Educ. 2025;2025(1):18. DOI:10.5334/jime.961.

[8] Atari M, Xue MJ, Park PS, Blasi DE, Henrich J. Which humans? Preprint. 2023. DOI:10.31234/osf.io/5b26t.

[9] Cao Y, Zhou L, Lee S, Cabello L, Chen M, Hershcovich D. Assessing cross-cultural alignment between ChatGPT and human societies: an empirical study. In: Proc Workshop on Cross-Cultural Considerations in NLP. 2023. DOI: 10.18653/v1/2023.c3nlp-1.7

[10] Hartmann J, Schwenzow J, Witte M. The political ideology of conversational AI: converging evidence on ChatGPT's pro-environmental, left-libertarian orientation. SSRN Electron J. 2023. DOI:10.2139/ssrn.4372349.

[11] Thibodeau PH, Boroditsky L. Metaphors we think with: the role of metaphor in reasoning. PLoS ONE. 2011;6(2):e16782. DOI:10.1371/journal.pone.0016782.

[12] Lakoff G, Johnson M. Metaphors we live by. Chicago: University of Chicago Press; 1980.

[13] Kövecses Z. Metaphor: a practical introduction. Oxford: Oxford University Press; 2002.

[14] Fauconnier G, Turner M. The way we think: conceptual blending and the mind's hidden complexities. New York: Basic Books; 2002.

[15] Lakoff G. Moral politics: how liberals and conservatives think. 2nd ed. Chicago: University of Chicago Press; 2002.

[16] Suter EA, Reyes KL, Ballard RL. Parental management of adoptive identities during challenging encounters: adoptive parents as 'protectors' and 'educators'. J Soc Pers Relat. 2011;28(2):242–261. DOI:

[17] Talmy L. Force dynamics in language and cognition. Cogn Sci. 1988;12(1):49–100. DOI: **https://doi.org/10.1207/s15516709cog1201_2**

[18] Reddy MJ. The conduit metaphor: a case of frame conflict in our language about language. In: Ortony A, editor. Metaphor and thought. Cambridge: Cambridge University Press; 1979. p. 284–324. DOI:https://doi.org/10.1017/CBO9781139173865.012

[19] Inkson K. Images of career: nine key metaphors. J Vocat Behav. 2004;65(1):96–111. DOI:10.1016/S0001-8791(03)00053-8.

[20] Lakoff G. The contemporary theory of metaphor. In: Ortony A, editor. Metaphor and thought. 2nd ed. Cambridge: Cambridge University Press; 1993. p. 202–251.

[21] Smith-Ruig T. Making sense of careers through the lens of a path metaphor. Career Dev Int. 2008;13(1):20–32. DOI:10.1108/13620430810849515.

[22] Bi X, Yang Y, Li H, Wang M, Zhang W, Deater-Deckard K. Parenting styles and parent–adolescent relationships: the mediating roles of behavioral autonomy and parental authority. Front Psychol. 2018;9:2187. DOI:10.3389/fpsyg.2018.02187.

[23] Kim SY, Shen J, Yávar Calderón MP, Zhang T, Wen W, Lo AY, et al. Parenting of Asian adolescents: a systematic review of the past decade. Adolesc Res Rev. 2025;10(4):545–592. DOI: https://doi.org/10.1007/s40894-025-00258-2

[24] Cheung HS, Cheah CS. The forms and functions of parental control and parental warmth across cultures: evidence for commonality and specificity. Int J Behav Dev. 2025;49(5):419–430. DOI: https://doi.org/10.1177/01650254251337734

[25] Kövecses Z. Metaphor in culture: universality and variation. Cambridge: Cambridge University Press; 2005.

[26] Al-Kandari MT, Al-Kandari EM, Al-Kandari YY. Cultural differences in the parents and children interaction in Kuwait society. Cogent Educ. 2022;9(1):2122335. DOI https://doi.org/10.1080/2331186X.2022.2122335

[27] Rutledge E, Madi M. Parental influence on female vocational intentions in the Arabian Gulf. Int J Manpow. 2017;38(2):145–159. DOI:10.1108/IJM-08-2015-0130.

[28] Mohebi L, David SA. Exploring the factors affecting career choices of undergraduate Emirati students. SAGE Open. 2024;14(4). DOI:10.1177/21582440241295814.

[29] Arora S, Kaffee L-A, Augenstein I. Probing pre-trained language models for cross-cultural differences in values. In: Proc Workshop on Cross-Cultural Considerations in NLP. 2023. DOI: 10.18653/v1/2023.c3nlp-1.12

[30] Zhang J, Song W, Liu Y. Cognitive bias in generative AI influences religious education. Sci Rep. 2025;15:15720. DOI:10.1038/s41598-025-99121-6.

[31] Gabino-Campos M, Baile JI, Padilla-Martínez A. Social biases in AI-generated creative texts: a mixed-methods approach in the Spanish context. Social Sciences. 2025;14(3):170. DOI:10.3390/socsci14030170.

[32] Wambsganss T, Su X, Swamy V, Neshaei SP, Rietsche R, Käser T. Unraveling downstream gender bias from large language models: a study on AI educational writing assistance. In: Findings of the Association for Computational Linguistics: EMNLP 2023. 2023. p. 10275–10288. DOI: 10.18653/v1/2023.findings-emnlp.689

[33] Tekir S. Generative AI use in EFL writing: associations with originality, critical reasoning, and metacognitive engagement in a Turkish higher education context. Comput Assist Lang Learn. 2026:1–22. DOI: https://doi.org/10.1080/09588221.2026.2617399

[34] Pragglejaz Group. MIP: a method for identifying metaphorically used words in discourse. Metaphor Symb. 2007;22(1):1–39. DOI: https://doi.org/10.1080/10926480709336752

Appendix

In this assignment, you will explore how effectively you can revise and improve AI-generated writing. To ensure consistency, all students must use the following prompt in ChatGPT-5.2:

Write a 400–500 word academic essay discussing the topic: "To what extent should parents influence their children's career choices?"
The essay should follow a clear 5-paragraph structure (introduction, three body paragraphs, conclusion).
Include a clear thesis statement, arguments (both for and against parental influence), and a formal academic tone suitable for undergraduate writing.
Use general reasoning and examples, but do not cite specific sources or studies. Avoid bullet points. Write in full paragraphs.

Carefully review the AI-generated essay and rewrite it in your own voice.