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Sahat, NS¹; Xia, XL²; Liu, YY³; Kang, YL⁴.**ADMINISTRATIVE INFORMATION****Support** - None.**Review Stage at time of this submission** - Data extraction.**Conflicts of interest** - None declared.**INPLASY registration number:** INPLASY2023110062**Amendments** - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 15 November 2023 and was last updated on 15 November 2023.**INTRODUCTION**

Review question / Objective This paper aims to provide a comprehensive review of the research on emotions in foreign/second language learning by using both bibliometric analysis and meta-analysis to summarize its development and major findings over the past five decades, and to offer insights into the potential avenues for future research in this field. Specifically with meta-analysis, we aim to answer: which achievement emotions have been investigated in the FL/L2 setting and how does it impact FL/L2 learners?

A bibliometric and meta-analysis on published literature aims to answer the following research questions:

- 1) What is the academic architecture of the existing literature regarding the interplay between emotions and the FL/SL learning/acquisition?
- 2) What are the primary research themes, trends, and future directions in this field?
- 3) What are the antecedents and effect of emotions in L2/FL Learners?

Rationale Emotions play a significant role in language learning and have a close connection with cognitive abilities, which are pivotal factors influencing the process of acquiring a foreign or second language. In recent years, researchers have shifted from studying only negative emotions before shifting towards exploring outcomes of positive emotions in foreign language learning and second language acquisition. The Control-Value theory identifies several commonly reported emotions in academic settings, including enjoyment, hope, pride, relief, anger, anxiety, hopelessness, shame, and boredom (Pekrun et al., 2002). By considering a broader range of emotions in the context of language learning and examining their antecedents and outcomes from a positive perspective, we are aligning with the current wave of investigating the effects of emotions holistically to gain a more balanced insight into how language learners can harness their emotions for long-term success in second language acquisition (Oxford, 2016). This perspective broadens the scope of understanding the emotional experiences of language learners and

their impact on language acquisition and proficiency. Considering the growing interest and branching of emotion studies into other educational domains, particularly in the second language acquisition and foreign language learning context, there was a need to comprehensively assess the literature and synthesize findings to elucidate the effects of emotions in language learners.

Condition being studied Language learning elicits a wide spectrum of emotions, both positive and negative, which significantly impact second language (L2) acquisition and achievement. These emotional experiences have a profound impact on students' language learning processes and outcomes by influencing cognitive functions, motivation, learning strategies, and self-regulation (Pekrun et al., 2011, Pekrun et al., 2023; Shao et al., 2019). Despite the significant role these emotions play in L2 learning, researchers have primarily focused on a limited number of emotions, with L2 anxiety and enjoyment receiving the most attention (Dewaele et al., 2019; Zhang, 2019). The Control-Value theory (CVT) identifies several commonly reported emotions in academic setting and places control and value appraisals as main factors (proximal antecedents) to directly affect emotional states of learners i.e. achievement emotions, and in turn, influence outcomes. The model proposes that achievement emotions, their sources, and consequences are interconnected through a reciprocal loop (Pekrun et al., 2006). The condition being studied are emotional states elicited during FL learning/SLA and their relationship with various factors such as control-value appraisals (e.g., self-efficacy, interest, motivation) and language learning outcomes (e.g., language performance, willingness to communicate, engagement) in the context of foreign language acquisition.

METHODS

Search strategy The search was conducted in accordance with PRISMA guidelines. First, a preliminary search was employed in WoS, SCOPUS and Google Scholar to assess eligibility of bibliometric and meta-analysis using the search term "emotions in foreign language/second language".

Search terms: based on the literature review and Loderer et al (2019), search terms included general terms such as emotion, mood, positive/negative effect, and a list of discrete emotions e.g. hope, anxiety, anger, and foreign language, second language. Search terms were a combination of these sets and adapted for each database.

Search databases: Based on the results of the bibliometric analyses, search terms were inputted into SCOPUS, WoS & ProQuest in September 2023. Bibliographic analysis justified the need to include an extra database; EBCO host (in October). Search dates were from 13 September 2023 to 13 October 2023.

Search was limited to published and peer-reviewed journal articles (dissertations and conference findings will only be included if they were published in a peer-reviewed journal article). Reference/bibliographic information must be available. There was no restriction on publication period during search strategy.

Participant or population - Individuals who are acquiring proficiency in a language other than their native or first language, generally identified as Foreign language learners (FLLs) and second language learners (SLLs), regardless of gender, age, grade, major, ethnic group. Although the terms are often used interchangeably, the main distinction lies in the context of language acquisition. FLLs typically learn a language that is not commonly spoken in their home country or communities, while SLLs acquire a language in addition to their native tongue for daily life, work, or social integration. For example, a student who is learning Chinese in the United Kingdom is an FLL and a child who is growing up in a bilingual household (still learning both Chinese and English) is an SLL. This can include (but is not limited to); immigrants and refugees, individuals living in multilingual communities, individuals working in international business or government, individuals studying abroad and in language immersion programs.- Bilingual or multilingual individuals who are learning are still in the process of acquiring proficiency are eligible for inclusion; a bilingual speaker who is learning a third language would be considered a FLL for the third language. A multilingual speaker not yet fluent in their fourth language is still considered a FLL in that language. The key distinction is that FLL and SLL refer to individuals who are actively engaged in the process of acquiring proficiency in a language that is not their first language. Excluded populations: • Native speakers and heritage language speakers Native speakers are individuals who have learned a language from birth or from a very young age and use the language fluently in all aspects of their lives. Heritage language speakers are individuals who are speakers of a language other than the dominant language in their community. Both groups may have learned the language from their parents and family members (e.g. grandparents), their communities or heritage language programs. Individual from these groups

are not considered to be engaging actively in acquiring proficiency in a language that is not their first language. • Language learners with Special Education Needs, Learning Disabilities (such as dyslexia) and Learners with Speech or Hearing Impairments are excluded due to several considerations, which may raise unique methodological challenges. Learners needing educational support might differ substantially in their learning experiences, profiles and learning strategies compared to typical language learners for example, tailored instructional approaches may be required and different.

Intervention The meta-analysis will analyze studies that have investigated how different emotions influence the process of learning a foreign language. The meta-analysis will review emotional states and experiences of foreign language learners/second language learners (FLLs/SLLs) and how these emotions impact language learning performance and acquisition, based on the Control-Value Theory (CVT; Pekrun et al., 2006). The Control-Value theory identifies several commonly reported emotions in academic settings called achievement emotions, including enjoyment, hope, pride, relief, anger, anxiety, hopelessness, shame, and boredom (Pekrun et al., 2002). The CVT posits that control and value appraisals directly influence emotions experienced by students in achievement settings such as in school (Pekrun, 2006). Perceived control refers to students' belief in their ability to influence the learning process and outcomes, while perceived value pertains to the importance that they attribute to learning activities and outcomes (Pekrun & Perry, 2014). The model proposes that learners' control and value appraisals are shaped from distal antecedents such as gender, beliefs, tasks, and goals in the achievement settings/environment. Thus, studies measuring emotions (e.g. anxiety, boredom, enjoyment) and correlated variables (such as self-efficacy, self-concept, motivation) will be evaluated.

Comparator The wide scope and nature of this review was to encompass learners in a specific subject domain i.e. FLL/L2A, however, CVT was originated from education and educational psychology. Although there is no explicit comparator group, to ascertain that CVT was domain-specific, studies would compare language against other subject domains such as math, physics. Additionally, emotion-inducing settings may also differ in language learning e.g., academic vs non-academic. Therefore, comparator groups are learners from different subject, learners in non-academic settings.

Study designs to be included - Bibliometric analysis was utilized to answer the first half of the review question, which is to synthesize and illuminate what has been researched in the field of emotions within the context of FLL/SLA (qualitative). - Meta-analysis helps to quantitatively assess the effects of emotions on other antecedents which can also impact FLL/SLA and more specifically, in learners. To address the objective of the review of summarizing, synthesizing and visualizing how emotions impact learners, the study first ran a preliminary literature search to assess whether existing publications on FLL/SLA w.

Eligibility criteria - Reviews, observations, case studies, and other narrative publications were excluded. (mixed methods were accepted if sufficient information was provided) 2. Specific Learning Environments: - Studies conducted in special education contexts and learning disabilities will be excluded. 3. Study Designs: - Studies solely using physiological measures such as EEG, eye tracker to measure emotions were excluded. 4. Teacher-Centric Studies: - Studies that primarily focus on the emotional experiences or factors related solely to teachers, without explicitly investigating their impact on the emotions or outcomes of FL/L2 learners will be excluded.

Information sources Sources are electronic databases WoS, SCOPUS, ProRequest and EbcHost. As this review receives no funding and has limited access, only published studies providing full-text and peer-reviewed will be sought in consideration of the time and resource restrictions. Conference papers, gray literature and books were not considered and where possible, authors will be contacted for access or raw data, but unpublished studies will not be sought.

Main outcome(s) According to the CVT, any change on the model can affect achievement emotions and outcomes. Thus, the outcomes of this review are emotions and correlate variables as listed. Emotions that arise from achievement settings (academic, non-academic, mixed) may be measured by self-reported questionnaires such as the Achievement emotion questionnaire, FL Anxiety Scale, or other measures such as facial recognition scores. Correlate variables may also be measured from self-reported questionnaires and from experimental results. For example, experimental or causal designs, change in emotion scores or correlate scores may occur before and after intervention, or in differing time points in a longitudinal design.

Additional outcome(s) Data extraction sheet (for selection and coding) will help to assess outcomes as such.

- Emotions (object focus): For emotions, numbers in parentheses refer to the object focus 1 = non-academic (e.g. depression), 2 = academic (i.e., learning, achievement, or contents thereof), 3 = mixed, unspecified, or not reported. Distinguished between studies focusing on academic emotions and those exploring the impact of non-academic emotions in language learners.
- Correlate constructs: For correlate constructs, numbers in parentheses refer to the category within which the variable was grouped, where Appraisal/antecedent
 - 1 = perceived control (self concept, self-efficacy, self-esteem, confidence), 2 = perceived value (interest, importance, attitude, perception),
 - Learner characteristics:
 - 3 = gender, 4 = prior knowledge/experience, 5 = engagement, 6 = disengagement, 7 = regulation strategy use, 8 = learning outcomes (8.1 = learning gains), 9 = (meta-)cognitive support, 10 = emotional intelligence, 11 = motivation 12 = grit, 13 = WTC, 14 = personality trait,
 - Learning design and environment (distal antecedent)
 - 15 = cognitive conflict/quality, affective support, 16 = peer/instructor esteem, 17 = instructional / task demands, 18 = autonomy support, 19 = goal structures + expectancies, 20 = feedback and consequences, 21 = classroom environment (virtual, in-person, others e.g. communities, etc)
 - Type of measurement: 1 = self-report, 2 = physiological measure, 3 = others, mixed
 - correlation r = correlation coefficient r , no. of participants for correlation, and other additional information.

Data management – Results from databases were downloaded in both .RIS format and .CSV. They were all imported to Zotero to assess duplicates.

- Data inserted into Rayyan website in .csv
- Data or articles retained after inclusion/exclusion criteria were exported into .csv and opened as Excel Spreadsheet for an overview of retained articles.
- Coding Sheet was developed in an Excel Sheet for data extraction, extracted data will be kept in this similar format.
- Extracted data will be imported to Comprehensive Meta Analysis software for necessary data conversions to correlation coefficient r and for subsequent, meta analyses.
- Results from databases were downloaded in both .RIS format and .CSV. They were all imported to Zotero to assess duplicates.

– Then, data inserted into Rayyan website in .csv for title and abstract screening by 2 reviewers.

– Data or articles retained after inclusion/exclusion criteria were exported into .csv and opened as Excel Spreadsheet for an overview of retained articles.

– Coding Sheet was developed in an Excel Sheet for data extraction, extracted data will be kept in this similar format.

Quality assessment / Risk of bias analysis

Quality assessment will be done using MERSQI checklist (Reed et al., 2007) during full-text screening on 10% of randomly selected articles, as suggested by Field and Gillet (2010). The MERSQI checklist has been used to study non-medical education research, it contains six domains, including study design, sampling, type of data, validity of evidence for evaluation instrument scores, data analysis and outcome. Each domain has a maximum score of 3, making a maximum total score of 18 and potential range 5 to 18 (Reed et al., 2007). It was reported that the average total score of 11 or so could be taken as the benchmark of study quality (Li, 2017). Publication bias can be assessed using contour-enhanced funnel plots, cumulative meta-analysis, and by examining the effect sizes across different studies and emotions (Camacho-Morles et al., 2021; Loderer et al., 2019). To maintain quality, two reviewers will be doing the full text screening and disagreements will be resolved through discussion and consensus. Quality assessment will be done using MERSQI checklist (Reed et al., 2007) during full-text screening on 10% of randomly selected articles, as suggested by Field and Gillet (2010). The MERSQI checklist has been used to study non-medical education research, it contains six domains, including study design, sampling, type of data, validity of evidence for evaluation instrument scores, data analysis and outcome. Each domain has a maximum score of 3, making a maximum total score of 18 and potential range 5 to 18. It was reported that the average total score of 11 or so could be taken as the benchmark of study quality. Publication bias can be assessed using contour-enhanced funnel plots, cumulative meta-analysis, and by examining the effect sizes across different studies and emotions (Camacho-Morles et al., 2021; Loderer et al., 2019). Two reviewers will be doing the full text screening and disagreements will be resolved through discussion and consensus. Quality assessment will be done using MERSQI checklist (Reed et al., 2007) during full-text screening on 10% of randomly selected articles, as suggested by Field and Gillet (2010). The MERSQI checklist has been used to study non-medical education research, it contains six domains,

including study design, sampling, type of data, validity of evidence for evaluation instrument scores, data analysis and outcome. Each domain has a maximum score of 3, making a maximum total score of 18 and potential range 5 to 18. It was reported that the average total score of.

Strategy of data synthesis After coding and data extraction, correlation r or other statistical data which can be converted (to r or z -scores) will be noted. The minimum number required for data synthesis in the study are 3 independent studies for random-effects model (Camacho-Morles et al., 2021; Loderor et al., 2020; Schmidt & Hunter, 2015). This model allows for variations in effect sizes between studies, resulting in more accurate and generalizable estimates with realistic confidence intervals (CI).

The primary data to be synthesized are correlations between emotions (emotional variables) and performance outcomes, such as academic achievement or other relevant indicators and summary effect measures that provide an overall estimate of the relationships between emotions and performance. These summary effect measures encapsulate the combined findings from the individual studies. Sample-sized weighted mean correlation will be calculated and variables, with adjustment for measurement error. Prior to analysis, data will be transformed to Fisher's z . This transformation is used to stabilize the variance and normalize the sampling distribution of the data.

Subgroup analysis Based on Loderor et al (2020) and Camacho-Morles et al. (2021), the following moderator variables and their respective subgroups may be subjected to subgroup analysis: Emotion Focus' i.e. academic and non-academic, Gender, Nationality/Continental composition e.g., Asian Context, European Context, Domain Subgroups: FLL/SLL, non-FLL, FLL subgroups, learning settings i.e. virtual, traditional, community settings.

The analytic approaches that this study will consider are (1) meta-regression analysis to examine the relationships between moderator variables and effects. (2) Tests of interaction such as ANOVA can be used to compare the effect of the independent variable on the outcome variable for two or more subgroups.

Sensitivity analysis Some sensitivity analysis to consider would be using trimmed mean estimation, publication bias analysis and subgroup analysis, as well as using contour-enhanced funnel plots, and by examining the effect sizes across different studies and emotions (Camacho-Morles et al.,

2021; Field and Gillet, 2010; Loderor et al., 2019) to examine effects of moderator variables as aforementioned.

Language restriction Pertained to English publications only.

Country(ies) involved China.

Keywords Meta-analysis; bibliometric; foreign language learning; second language acquisition; control-value theory; emotions; CVT.

Dissemination plans • Published in author 1's Master's Thesis to fulfill graduation requirements
• Publication of the meta-analysis findings in a peer-reviewed journal
• Where applicable, presentation of the meta-analysis findings at a conference on foreign language learning.

Contributions of each author

Author 1 - Nazatul S. Sahat - Author 1 conceptualized and performed initial search/literature review to assess literature gap, as part of her Master's degree graduation thesis and requirement. Author 1 developed search protocol, strategy, coding sheet and extraction and performed the consequent meta/bibliometric analyses. Author 1 was the main reviewer and will draft manuscript.

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Author 2 - Xiao Lin Xia - The author was the second reviewer, contributed to the development of coding sheet and extraction, performed quality assessment.

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Author 3 - Yang Yang Liu - Author 3 is author 1's main supervisor for graduation thesis and thus, this review. The author provided guidance, helped solved any conflicting decisions between reviewer 1 and 2 (author 1 and 2), will provide statistical guidance/expertise.

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Author 4 - Yu Lin Kang - Author 4 is author 1's second supervisor for graduation thesis and thus, this review. The author contributed to the development of the selection criteria, provided feedback for any protocols, will provide statistical guidance/expertise, helped solved any conflicting decisions between reviewer 1 and 2 (author 1 and 2).

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