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Mindsets

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Do you believe that your ability to learn languages is an innate quality that cannot be changed, or something that can be developed through effort and strategy? Psychological research has long focused on people’s fundamental beliefs about the malleability of personal characteristics (i.e., mindsets). Dweck et al provide evidence that these mindsets are important predictors of learning and behaviors (Dweck & Leggett, 1988; see Burnette et al., 2013 for a meta-analysis), as well as resilience and success in many endeavors in life (Dweck, 2006; Dweck & Yeager, 2019). In a recent study by the Programme for International Student Assessment (PISA) that surveyed random samples in 74 countries (N = 555,458), mindsets are significantly linked to students’ test scores in 72 of those countries (OECD, 2019; see also Yeager & Dweck, 2020). In addition to school achievement, mindset theory has been widely applied within psychological disciplines, including social psychology, personality, developmental science, as well as in relevant domains such as interpersonal relationships, health, and management (Dweck, 2006; Lou & Li, 2017).

Although second language acquisition (SLA) researchers have long acknowledged the importance of learners’ personal beliefs, including beliefs about aptitude (Barcelos & Kalaja, 2011; Horwitz, 1988), it was not until the past decade that researchers started to systematically examine the role of mindsets in language learning (Lou & Noels, 2016; Mercer & Ryan, 2010). Our literature search resulted in 28 studies about mindsets in SLA (see the Research section). These recent studies focus on whether and how individual differences in mindsets are tied to language learners’ motivation, engagement, and achievement. Given that the concept of mindset has become more popular, it is timely to summarize these existing works and their implications in SLA. In this chapter, we describe a theoretical framework of mindset and systematically review empirical evidence on mindsets in SLA. After summarizing the contributions of mindset theory in SLA, we discuss the discrepancies between theories/concepts and empirical findings and the sometimes mixed results across studies. Finally, we propose how the breadth and depth of scholarship on mindsets can be extended to better inform theories and practices across a wide array of phenomena in language learning.

**Definition and Conceptualization**

discusses two main mindsets—fixed and growth mindsets—that help individuals navigate different aspects of their life. Fixed mindsets are the beliefs that one’s basic qualities and attributes (e.g., intelligence, aptitude, personality, and morality) are innate and, therefore, cannot be changed. In contrast, growth mindsets are the beliefs that one’s qualities can be cultivated over time through hard work and strategic actions. These two types of mindsets are underlying beliefs of a meaning system that help people make sense of complex information by offering them a simple schematic about themselves and their social world. For language learners, mindsets provide a vantage point for understanding the broad nature of the language-learning process.

Although the term “mindset” is widely used in recent literature (e.g., Dweck & Yeager, 2019) and by the general public, the term was initially named “implicit theories” in earlier works in psychology (e.g., Dweck & Leggett, 1988; Dweck et al., 1995). The term “implicit” suggests that individuals may not be aware of this set of beliefs and its influence on their psychological processes (see Dweck & Yeager, 2019, p. 243). The term “theory” suggests that everyone is a lay scientist and relies on their own assumptions and understanding of the world to explain and predict their own and others’ behaviors. In the field of SLA, researchers have also employed different terminologies, including language mindsets (e.g., Lou & Noels, 2017) and implicit theories of SLA (e.g., Brown & Hanson, 2019). However, in this chapter, we used the term “mindset” because it is more commonly used in recent psychology literature (see Dweck & Yeager, 2019).

In addition to terminology, the conceptualization of mindsets is also varied. Most research on mindsets to date conceptualizes fixed and growth mindsets as opposite ends of a continuum, such that individuals vary along this spectrum (Dweck et al., 1995). This one-dimension framework is well documented, shows evidence of sound psychometric properties, and has many practical merits (Dweck et al., 1995). Some earlier work attempted to simplify this framework by categorizing individuals into either a fixed or a growth mindset group (e.g., Dweck et al., 1995; Hong et al., 1999), implying a discontinuity between the two. In contrast to the one-factor continuum structure, some studies showed that even when items of fixed and growth mindsets are negatively correlated at a moderate to strong level, a two-factor model represents the mindset structure better than a one-factor model (e.g., Dupeyrat & Mariné, 2005; Lou & Noels, 2017). Although there is no one “best” solution in representing the individual differences of mindsets, researchers should choose a model based on not merely the alignment with a specific factor analysis solution, but also a coherent representation of mindsets they deem meaningful for the research domain. As such, a low-dimensional model solution is potentially useful for simple interpretation, but a more complex model may offer more nuances. Researchers may also prioritize parsimony, interpretability, utility, cross-sample invariance, and/or the potential to synthesize across studies (given most previous works used the one-factor continuum) when deciding the use of different structures (Srivastava, 2020).

When conceptualizing mindsets in SLA, Lou and Noels (2017) further discussed that there are three possible interrelated components in language mindsets based on previous qualitative research (Mercer & Ryan, 2010; Ryan & Mercer, 2012a): beliefs about verbal intelligence (i.e., ability in language reasoning in general), beliefs about L2 aptitudes (i.e., ability to learn new languages), and beliefs about the sensitivity of age. Each component represents a belief about a factor or concept that is widely discussed/debated in SLA and psychology research regarding the fixedness of language learning ability (see Lou & Noels, 2019a for a discussion). Having the three components may provide a more nuanced understanding of the natural complexity of language mindsets and variance explained by mindsets, but trade-offs are parsimony and interpretability. Like many trait theories based on factor reduction (e.g., big five personality traits), a lower-dimensional model can be useful for synthesizing a variety of beliefs and providing structures for organizing mindset research. Indeed, research shows that fixed and growth mindsets about the three components can be rightly reduced to a two-factor model of fixed and growth mindsets (Lou & Noels, 2017). Besides, rather than using all three aspects of language mindsets, researchers may focus on one aspect, such as beliefs about L2 aptitude, to suit the purpose of a study.
The conceptualization of mindsets should also consider domain specificity, such that people may endorse different mindsets across different domains (Dweck et al., 1995; cf. Cutumisu & Lou, 2020b). For example, learners may believe that their language aptitude is somewhat flexible, but their math ability is relatively stable. Accordingly, SLA researchers have discussed the possibility of different sub-domains in language learning (e.g., pronunciation, grammar, listening, speaking, reading, and writing). It is possible that one endorses a growth mindset about writing but a fixed mindset about pronunciation (Ryan & Mercer, 2012b). Therefore, a more specific aspect of L2 learning (e.g., writing; see Bai & Guo, 2021; Waller & Papi, 2017) may be a more useful concept than a general belief about learning in understanding learners’ motivation and engagement in a specific area of L2 learning. Although researchers may be interested in a general L2 mindset, understanding domain-specific mindsets may provide implications for different subfields of SLA (e.g., L2 writing, pronunciation, and grammar learning), as well as practical implications for teachers in different instructional goals. For example, Waller and Papi (2017) adapted Dweck’s scale to measure domain-specific (L2 writing) mindsets, which correlated but were independent of Dweck’s general mindsets. Moreover, little is known about whether mindsets differ across different target languages. Learners may perceive they can change their ability to learn some languages but not others, and it may depend on the language distance and difficulty.

**Language Mindset Meaning System**

Research on mindsets focuses on how these different beliefs are linked to human motivation, including distinct cognitions, emotions, and behaviors, and, ultimately, achievement and resilience. For example, growth mindsets are positively associated with effort beliefs, learning goals, mastery-oriented strategies such as feedback-seeking, and self-efficacy; they are also negatively associated with setting goals focused on avoiding failure, avoidant coping strategies, and anxiety (Burnette et al., 2013; Cutumisu & Lou, 2020a; Dweck & Yeager, 2019). How do mindsets and relevant motivational factors relate to one another? These factors are argued to be linked systematically and work together as a meaning system that guides people to assign meaning and react to events (Molden & Dweck, 2006). Although the system may function as a whole, mindsets are a core belief and postulated to be foundational to connect factors within the system (e.g., attribution and effect beliefs; Blackwell et al., 2007; Lou & Noels, 2016). Similarly, Lou and Noels (2019a) argued that language mindsets relate to many motivational constructs that together guide individuals to make sense of situations involving language learning and use (see Table 8.1).

The Language Mindset Meaning System is a central organizing framework highlighting that language mindsets are linked to patterns of beliefs and goals that drive motivation and motivated behaviors. These beliefs and goals include attribution, effort beliefs, goal orientations, beliefs about failures/mistakes, regulatory focus, and emotional tendencies (see Table 8.1). Learners use these beliefs and tendencies to engage in their social world, with which they make sense of their ability, self, and the environment. This meaning system is important in understanding learners’ motivation and behaviors, especially when facing challenges. A student who failed a language test, for example, may attribute their failure to lack of effort (attribution; e.g., Zhang et al., 2020), expect effort will improve their future performance (effort beliefs; e.g., Lou & Noels, 2017), focus on the learning rather than validating abilities (learning goals; e.g., Lou & Noels, 2016), believe that failure can help one improve their ability (failure mindset/not fear of failure; e.g., Lou & Noels, 2017), find strategies such as seeking help to improve (self-improvement regulation; e.g., Papi et al., 2019, 2020), and feel less anxious about learning and using the language (emotional tendencies; e.g., Lou & Noels, 2020a). However, these expectations and reactions depend on learners’ mindset that their ability to learn is not fixed.
<table>
<thead>
<tr>
<th>Mindsets</th>
<th>Fixed-oriented subsystem</th>
<th>Growth-oriented subsystem</th>
<th>Empirical evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Attribution:</strong></td>
<td>Uncontrollable: Attribute successes to one’s own talent and failures to the lack of natural ability.</td>
<td>Controllable: Attribute success to hard work and challenges/mistakes to insufficient effort and motivation.</td>
<td>Hong et al. (1999); also see Zhang et al. (2020) for a discussion</td>
</tr>
<tr>
<td><strong>Effort beliefs:</strong></td>
<td>Negative: Exertion of effort reflects one’s lack of natural talent; effort cannot compensate for lack of talent.</td>
<td>Positive: Effort is the key to improvement and a means to become competent.</td>
<td>Lou &amp; Noels (2016, 2017)</td>
</tr>
<tr>
<td><strong>Goal orientations:</strong></td>
<td>Performance goals: Aim to outperform others and validate ability (when perceived competence is high) or avoid being seen as incompetent (when perceived competence is low).</td>
<td>Mastery goals: Aim to develop and improve language competence; focus on the learning process.</td>
<td>Lou &amp; Noels (2016, 2017); Papi et al. (2019)</td>
</tr>
<tr>
<td><strong>Beliefs about failure/mistake:</strong></td>
<td>Failure as debilitating: Failure or making mistakes inhibits one’s learning and debilitates one’s performance; one should avoid failure or making mistakes to learn and perform well.</td>
<td>Failure as enhancing: Failures or mistakes provide opportunities to understand what is needed and to facilitate improvement; one should take advantage of failure to learn and grow.</td>
<td>Lou &amp; Noels (2016, 2017)</td>
</tr>
<tr>
<td><strong>Self-regulatory tendency in the face of adversity:</strong></td>
<td>Self-defensive (helpless) strategies: Avoid similar situations (e.g., avoid using/learning the target language) and engage in downward comparisons (e.g., “many students got a worse grade than me”) to protect self-esteem.</td>
<td>Self-improvement (mastery-oriented) strategies: Seek better learning strategies and feedback to improve and to overcome setbacks.</td>
<td>Bai et al. (2021); Lou &amp; Noels (2016, 2017, 2021); Hong et al. (1999); Papi et al. (2020)</td>
</tr>
<tr>
<td><strong>Competence-based emotional tendency in the face of adversity:</strong></td>
<td>Anxiety: Afraid of challenges and failure; anxious to use the target language and fear of being judged/rejected.</td>
<td>Confidence: Enjoy challenging tasks; confidence to use the language and to develop and improve competence.</td>
<td>Lou &amp; Noels (2019a); Molway &amp; Mutton (2020); Teimouri et al. (2020)</td>
</tr>
</tbody>
</table>

**Note.** This table presented the two ends of the fixed and growth subsystems as a simplistic representation of the mindset systems.
Learning Outcomes

In addition to factors within the language mindset meaning system, language mindsets may drive motivational processes to affect learning achievement and other learning outcomes. However, there are growing critiques about whether and how mindsets directly or indirectly link to learning achievement. Although some lab and field studies find that mindsets predict both perceived and objective competence (e.g., grades; Blackwell et al., 2007), other research suggests that the effect of growth mindsets on objective academic achievement is weak or non-existent (Sisk et al., 2018). This line of research is beginning to shed light on mindsets about language outcomes. In addition to studying perceived proficiency (Lou & Noels, 2020d; Zarrinabadi et al., 2021a) and objective measures of proficiency or class achievement (Chaffee et al., 2020; Khajavy et al., 2021), SLA researchers also focus on language use as an outcome of language mindsets (Lou & Noels, 2020a). We will further discuss the role of mindsets on different outcomes in the section of research evidence.

Changing Mindsets and Implications for Individual Difference Research

Learners may change their mindset intentionally or unintentionally in response to interventions or interactions with others (e.g., feedback) in the learning environment. When exposed to growth mindset messages—that people can improve their intelligence—students who face challenges become more resilient and subsequently achieve greater academic success (Yeager et al., 2019). Similarly, when primed that their ability to learn languages is malleable (vs. a fixed mindset condition), language learners show a stronger endorsement of effort beliefs and learning goals (Lou & Noels, 2016), and report more adaptive attribution styles (Molway & Mutton, 2020). Moreover, for students with lower initial competence, those who receive interventions were more likely to continue (Molway & Mutton, 2020) and more willing to interact (Lou & Noels, 2020) compared to those who do not. Although these findings of mindset experiments/interventions have been applied to many learning contexts, some studies have failed to show the positive effect of mindsets in learning outcomes (Sisk et al., 2018). It is possible that the inconsistent findings are due to the differences in design choices and learning environment. For example, mindsets intervention is more effective on students’ learning when the classroom norm is consistent with the growth mindset messages (Yeager et al., 2019). More studies are needed to understand how to improve mindset interventions.

The inconsistent findings of mindset inventions may also provide implications for understanding individual differences. As such, although mindsets, including language mindsets, are postulated to be somewhat consistent over time (Dweck et al., 1995; Lou & Noels, 2017), they can also be shifted easily, at least temporarily for some learners. It is possible that with increasing age/experience in a domain, mindsets can become more difficult to change, although we did not see any research directly supporting this claim. According to Vygotsky’s sociocultural theory (1978), students come to the classroom with their pre-existing beliefs (e.g., mindset about their ability). Still, their beliefs may continue to change and develop depending on how ingrained their pre-existing mindsets were and their social interactions (e.g., feedback and mindset messages they received). In other words, learners may construct meanings in response to their social world and change their mindsets to adapt to that world. Therefore, it is important to understand these contexts to understand learners’ mindsets. In our research, we also review the contexts that mindset research is conducted, including the immediate environment (e.g., classroom/lab) and sociocultural environment (e.g., countries).

Research

Mindset research draws from developmental, social, and personality psychology to examine how people develop and use their beliefs to structure the self and guide their responses to the social
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world. As such, researchers focus on the origins of different mindsets (Haimovitz & Dweck, 2016; Mercer & Ryan, 2010; Shirvan et al., 2021), their role in motivation and self-regulation (Lou & Noels, 2016, 2017, 2020a; Papi et al., 2019, 2020), and their impacts on achievement and intercultural processes (Lou & Noels, 2020c). We conducted a literature search in Linguistics and Language Behavior Abstracts (LLBA), PsycINFO, and Education Resources Information Center (ERIC). Our search started at the date of Hong et al.’s work in 1999 because this is the first mindset research in relation to second language learning that we knew of, and ended in May 2020. We included only empirical articles that discussed mindsets, implicit theories, or lay theories concerning L2 learning and teaching.

Evidence

Our review of evidence focused on 1) the links between mindsets and other motivational variables/learning outcomes, and 2) the causal evidence of mindsets in experimental and intervention studies.

Links between Mindsets and Other Motivational Variables and Outcomes from Correlational Studies

Several studies have examined how language mindsets are associated with other psychological factors involved in language learning or teaching (see osf.io/82dj4/ for a summary). These empirical findings generally support the meaning system presented in Table 8.1. These studies show, for instance, that mindsets are related to various patterns of motivation and emotion. For example, studies showed that growth mindsets were linked with mastery-oriented strategies, while fixed mindsets were correlated with helpless and avoidance strategies in the language classroom (e.g., Bai et al., 2021; Lou & Noels, 2017; Hong et al., 1999; Papi et al., 2019). In addition, the studies by Lou and Noels (2017) and Papi et al. (2019) found that growth mindsets predicted mastery goals and fixed mindsets predicted performance goals. Regarding the emotional tendencies in the face of adversity, fixed mindsets correlated with anxiety (Lou & Noels, 2019), while growth mindsets were associated with confidence and enjoying challenging tasks (Teimouri et al., 2020). Also, these studies showed that L2 mindsets are associated with variables such as feedback-seeking behavior, self-efficacy, motivation, and joy.

There are a few indications in the literature that research findings are not consistent with the mindset meaning system model. For example, Papi et al. (2019) reported growth mindsets were positively correlated with avoidance, which is inconsistent with the mindsets model, whereas Lou and Noels (2017) found that neither fixed nor growth mindsets were significantly linked to performance-avoidance goals. There is also growing evidence showing that fixed-growth mindsets do not necessarily correspond with mastery-performance goal orientations. For example, growth mindset students may embrace performance-approach goals to focus on achieving good grades (Papi et al., 2019, 2020). These findings suggest that students with a similar language mindset may not necessarily have the same patterns of motivation and that other contextual and individual variables may moderate the links between mindsets and motivational variables.

Interventions

We identified only four studies that utilized manipulations or interventions to promote a growth mindset in the SLA context (see Table 8.2). In the first experimental study of mindsets in SLA, Lou and Noels (2016) reported that learners who read a growth mindset article showed stronger growth (vs. fixed) beliefs and stronger learning orientation, which in turn predicted stronger mastery responses and intention to continue learning the target language. In contrast, the students who read a fixed-mindset article endorsed performance-approach goals and showed helpless-oriented
Table 8.2 Experiment/Intervention Research of Language Mindsets on Outcomes

<table>
<thead>
<tr>
<th>Reference</th>
<th>N</th>
<th>Population</th>
<th>Experimental groups</th>
<th>Experiment/intervention length</th>
<th>Control group</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lou &amp; Noels (2016)</td>
<td>150</td>
<td>University students</td>
<td>Mock <em>Psychology Today</em> articles on language intelligence</td>
<td>One session</td>
<td>No control group (only fixed vs. growth conditions)</td>
<td>Learners primed with an incremental belief were more likely to set learning goals and to be more optimistic about the effects of effort.</td>
</tr>
<tr>
<td>Lou &amp; Noels (2019) Study 2</td>
<td>116</td>
<td>University students</td>
<td>Same as Lou &amp; Noels (2016)</td>
<td>One session</td>
<td>No control group (only fixed vs. growth conditions)</td>
<td>Manipulating mindsets significantly influenced sensitivity to language-based rejection, intergroup anxiety, and cultural adjustment expectancy.</td>
</tr>
</tbody>
</table>
| Molway & Mutton (2020) | 127   | Primary school   | Findings of previous research on mindsets were presented to the learners | Two sessions in one month:  
  - Two hour-long intervention on mindsets based on Blackwell et al., 2007  
  - One month later: the same intervention | Control group: Similar activities but did not learn about mindset materials | The intervention changed mindsets and responses to classroom challenges.                                                                |
| Lou & Noels (2020a) Study 3 | 72    | University students | Same as Lou & Noels (2016)                              | One session                   | Control group: Read an article about green energy                             | Growth mindset reduced perceived rejection and future contact avoidance among ESL students with lower English competence.           |
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responses and fear of failure. In a study in the UK, Molway and Mutton (2020) read the findings of research on mindsets to the students and asked them to read the article used in Blackwell et al. (2007). Molway and Mutton (2020) reported that their intervention primed growth mindsets and improved responses to the way students reacted to challenges. More recently, Lou and Noels (2020) reported that a growth-mindset manipulation reduced perceived rejection and future contact avoidance among ESL students with lower English competence.

As shown in Table 8.2, the length for all the experiments/interventions took only one or two brief sessions; it is unclear whether the duration and “dosage” of L2 mindset interventions can impact the strength of the effect. There is also a lack of longitudinal data on how mindset experiment/intervention influences motivation over longer time frames, such as an instructional unit, a semester, or an academic year. Moreover, these studies have mainly focused on investigating the effectiveness of mindset manipulations on psychological aspects of language learning, and little is done to see whether such manipulations improve learners’ performance in different language skills. Similarly, no study has been conducted to compare domain-specific interventions against general language mindset interventions. There is a need to understand, for example, whether interventions that help learners endorse growth mindsets about a particular language skill (e.g., writing) can improve linguistic (e.g., writing performance) and non-linguistic (e.g., writing anxiety and writing motivation) aspects of language skills. In summary, the current literature of language mindset experiments/intervention provides initial evidence that growth language mindsets may at least temporarily change mindsets and motivation, but there is no evidence on whether mindset intervention would yield long-term effects.

Data Elicitation

We coded the eligible studies based on 1) population and context, 2) research methodologies, and 3) how mindsets are measured.

Population and Contexts (see Table 8.3)

In regard to population, our review indicated that the majority of studies had been conducted with post-secondary language learners (21 studies). Less attention is paid to examining language mindsets among secondary-level students. As younger children are still forming their mindsets and may not be able to fully articulate their mindsets, measuring their mindsets should be done cautiously and requires adaption (Haimovitz & Dweck, 2016). Moreover, most studies that included elementary- and secondary-level students did not use measures developed specifically for assessing language mindsets. Also, only three studies examined language teachers’ mindsets (Bai et al., 2019; Irie et al., 2018).

Regarding contexts, our analysis revealed that most studies on language mindsets were done in EFL (k = 13; 46%) and ESL (k = 10, 36%) contexts. Only five studies (18%) were conducted with learners studying foreign languages other than English (LOTE). The participants of these studies came from different countries and different linguistic and cultural backgrounds. The studies that used the language mindset inventory (Lou & Noels, 2017, 2019, 2020) and those that measured fixed and growth language mindsets (Papi et al., 2019; Papi et al., 2020; Waller & Papi, 2017) were mainly conducted in English–speaking countries (e.g., Canada and the US; k = 15; 54%). In addition, almost all of the studies have been conducted with L2 learners, and there is a lack of research comparing language mindsets of L2, L3, and L4 learners.

Research Methods

Our review showed that quantitative, qualitative, and mixed-methods studies had been used to understand learners’ mindsets about language learning. As shown in the Table 8.3, out of 28 studies,
Table 8.3 Methodological and Contextual Issues in Empirical Studies Involving Mindsets in SLA

<table>
<thead>
<tr>
<th>Authors (year of publication)</th>
<th>Method</th>
<th>Data</th>
<th>Participants</th>
<th>Contact situation</th>
<th>Country</th>
<th>Country in which data were collected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hong et al. (1999)</td>
<td>Cross-sectional (experimental)</td>
<td>Quantitative</td>
<td>PS</td>
<td>EFL</td>
<td>Hong Kong</td>
<td></td>
</tr>
<tr>
<td>Mercer &amp; Ryan (2010)</td>
<td>Cross-sectional</td>
<td>Qualitative</td>
<td>PS</td>
<td>EFL</td>
<td>Austria, Japan</td>
<td></td>
</tr>
<tr>
<td>Ryan &amp; Mercer (2012b)</td>
<td>Cross-sectional</td>
<td>Mixed</td>
<td>PS</td>
<td>EFL</td>
<td>Austria, Japan</td>
<td></td>
</tr>
<tr>
<td>Ryan &amp; Mercer (2012a)</td>
<td>Cross-sectional</td>
<td>Quantitative</td>
<td>E</td>
<td>EFL</td>
<td>Sweden</td>
<td></td>
</tr>
<tr>
<td>Henry (2014)</td>
<td>Cross-sectional</td>
<td>Quantitative</td>
<td>PS</td>
<td>ESL</td>
<td>USA</td>
<td></td>
</tr>
<tr>
<td>Mystkowska (2014)</td>
<td>Cross-sectional</td>
<td>Quantitative</td>
<td>PS</td>
<td>ESL</td>
<td>USA</td>
<td></td>
</tr>
<tr>
<td>Lou &amp; Noels (2016)</td>
<td>Cross-sectional</td>
<td>Quantitative</td>
<td>PS</td>
<td>LOTE</td>
<td>Canada</td>
<td></td>
</tr>
<tr>
<td>Lou &amp; Noels (2017)</td>
<td>Cross-sectional</td>
<td>Mixed</td>
<td>PS</td>
<td>LOTE</td>
<td>Canada</td>
<td></td>
</tr>
<tr>
<td>Waller &amp; Papi (2017)</td>
<td>Cross-sectional</td>
<td>Quantitative</td>
<td>PS</td>
<td>ESL</td>
<td>USA</td>
<td></td>
</tr>
<tr>
<td>Sato (2017)</td>
<td>Longitudinal</td>
<td>Mixed</td>
<td>S</td>
<td>EFL</td>
<td>Chile</td>
<td></td>
</tr>
<tr>
<td>Irie et al. (2018)</td>
<td>Cross-sectional</td>
<td>Quantitative</td>
<td>T</td>
<td>EFL</td>
<td>Austria</td>
<td></td>
</tr>
<tr>
<td>Fenyesi et al. (2020)</td>
<td>Longitudinal</td>
<td>Quantitative</td>
<td>E</td>
<td>EFL</td>
<td>Denmark</td>
<td></td>
</tr>
<tr>
<td>Lou &amp; Noels (2019) Study 1</td>
<td>Cross-sectional</td>
<td>Quantitative</td>
<td>PS</td>
<td>ESL</td>
<td>Canada</td>
<td></td>
</tr>
<tr>
<td>Lou &amp; Noels (2019) Study 2</td>
<td>Cross-sectional (experimental)</td>
<td>Quantitative</td>
<td>PS</td>
<td>ESL</td>
<td>USA</td>
<td></td>
</tr>
<tr>
<td>Lou &amp; Noels (2019) Study 3</td>
<td>Cross-sectional</td>
<td>Quantitative</td>
<td>ES</td>
<td>LOTE</td>
<td>USA</td>
<td>(German)</td>
</tr>
<tr>
<td>Brown &amp; Hanson (2019)</td>
<td>Cross-sectional (experimental)</td>
<td>Quantitative</td>
<td>E</td>
<td>LOTE</td>
<td>USA</td>
<td>(Japanese)</td>
</tr>
<tr>
<td>Molway &amp; Mutton (2020)</td>
<td>Cross-sectional</td>
<td>Quantitative</td>
<td>PS</td>
<td>LOTE</td>
<td>USA</td>
<td>(Spanish)</td>
</tr>
<tr>
<td>Hanson &amp; Brown (2020)</td>
<td>Longitudinal</td>
<td>Quantitative</td>
<td>PS</td>
<td>LOTE</td>
<td>USA</td>
<td>(Spanish)</td>
</tr>
<tr>
<td>Papi et al. (2020)</td>
<td>Cross-sectional</td>
<td>Quantitative</td>
<td>PS</td>
<td>ESL</td>
<td>USA</td>
<td></td>
</tr>
<tr>
<td>Chaffee et al. (2020)</td>
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<td>Quantitative</td>
<td>PS</td>
<td>ESL</td>
<td>Canada</td>
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<tr>
<td>Chism &amp; Graff (2020)</td>
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<td>Quantitative</td>
<td>PS</td>
<td>ESL</td>
<td>USA</td>
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<td>Teimouri et al. (2020)</td>
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<td>Quantitative</td>
<td>PS</td>
<td>ESL</td>
<td>Iran</td>
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</tr>
<tr>
<td>Lou &amp; Noels (2020a) Study 1</td>
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<td>Quantitative</td>
<td>PS</td>
<td>ESL</td>
<td>Canada</td>
<td></td>
</tr>
<tr>
<td>Lou &amp; Noels (2020a) Study 2</td>
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<td>Quantitative</td>
<td>PS</td>
<td>ESL</td>
<td>Canada</td>
<td></td>
</tr>
<tr>
<td>Lou &amp; Noels (2020a) Study 3</td>
<td>Longitudinal</td>
<td>Quantitative</td>
<td>PS</td>
<td>ESL</td>
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<td></td>
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<tr>
<td>Lou &amp; Noels (2020b)</td>
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<td>Quantitative</td>
<td>PS</td>
<td>ESL</td>
<td>Canada</td>
<td></td>
</tr>
</tbody>
</table>

Note. ESL = English as a Second Language; LOTE = Language Other Than English; EFL = English as a Foreign Language. The literature searches started at the date of Hong et al.’s work in 1999 and ended in May 2020. This table is inspired by McEown et al. (2014).
there were one qualitative, 24 quantitative, and three mixed-methods studies. As the first attempt to examine implicit theories in SLA, Mercer and Ryan (2010) used semi-structured interviews to examine Japanese and Austrian EFL learners’ views about the role of talent and effort in language learning. They found that learners had a mixture of fixed and growth mindsets and reported that learners’ beliefs were domain specific. Moreover, Ryan and Mercer (2012b) analyzed reflective writings by five language learners on the role of natural ability in language learners and found that learners believed in the role of natural talent in language learning (i.e., a fixed-language mindset). In addition, Mystkowska (2014) used semi-structured interviews to understand four Norwegian students’ beliefs about language learning and reported that participants’ attitudes varied on a fixed-growth mindset continuum, while most were inclined toward a growth mindset. Mystkowska (2014) also found that language teachers may play a role in establishing attitudes toward the role of effort in language learning. These qualitative studies exploring learners’ beliefs about talent and effort in language learning also pointed to a few important factors that engendered fixed or growth language mindsets (e.g., social comparisons and the role of teachers).

Another line of inquiry included using self-report scales to measure and assess language learners’ fixed and growth mindsets. In so doing, some researchers such as Papi et al. (2019) and Bai and Guo (2021) adapted Dweck’s scale to measure L2 mindsets, while Lou and Noels (2017) developed a measure of L2-specific items to measure learners’ fixed, growth, and combined mindsets. A mixed-methods design was used in a few studies. These studies focused on the structure of mindsets and the links to other motivational constructs and learning outcomes. For example, Ryan and Mercer (2012b) integrated the findings of self-report mindset scales with semi-structured interviews to understand learners’ mindsets about language learning. They found that although a questionnaire was able to capture the fixed and growth aspects of mindsets, the qualitative analyses shed light on understanding more domain-specific mindsets and more complex beliefs.

Measurement and Structure of Language Mindsets

Three approaches to measuring mindsets in language learners were identified. First, some studies extend Dweck’s bipolar model of general intelligence mindsets to language learners (e.g., Fenyvesi et al., 2020; Hong et al., 1999). These studies did not measure mindsets about language learning per se but measured language learners’ general intelligence mindsets. Second, some researchers adapted the items of Dweck’s (2006) implicit theories of intelligence scale to the language learning domain. For example, Bai et al. (2021) adapted Dweck’s scale to measure mindsets to the context of e-language learning. Papi et al. (2019) created L2-specific fixed and growth language mindsets items. Finally, based on the observations reported in qualitative studies (Mercer & Ryan, 2010), Lou and Noels (2017) developed a three-dimensional instrument to assess three aspects of language mindsets (as discussed earlier). The instrument, the language mindset inventory, is reported to be a valid and reliable measure of this model of mindsets in L2 (e.g., Lou & Noels, 2017, 2019, 2020). Finally, we also noticed that some language mindset measures that we reviewed did not directly measure beliefs about whether the ability is malleable, but instead examined related concepts such as effort beliefs (e.g., whether effort can improve their performance) or beliefs about challenges/mistakes (these measures were not included in Table 8.4).

Regarding the structure of fixed and growth mindsets, as shown in Table 8.4, some research found evidence for a one-factor solution (five studies), whereas others reported/utilized a two-factor solution (eight studies). Furthermore, although some studies found support for a two-factor solution, researchers combined the fixed and growth mindsets because they are strongly and negatively correlated, they predict different outcomes with similar magnitude, and they represent the most parsimonious way of interpreting findings (e.g., Lou & Noels, 2017). The scales are generally reliable in most cases, although there are a couple of studies that report relatively low reliability (α < 0.70; Ryan & Mercer, 2012b; Waller & Papi, 2017).
Table 8.4 Measurement of Language Mindsets

<table>
<thead>
<tr>
<th>Reference</th>
<th>N</th>
<th>Population and contexts</th>
<th>Aspects of language mindsets measured</th>
<th>Factor analysis method</th>
<th>Factor solution</th>
<th>Reliability (Cronbach’s α)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ryan &amp; Marcer</td>
<td>81</td>
<td>University students/EFL</td>
<td>L2 mindsets</td>
<td>–</td>
<td>2 factors</td>
<td>Fixed mindset: 0.86</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Growth mindset: 0.69</td>
</tr>
<tr>
<td>Lou &amp; Noels</td>
<td>150</td>
<td>University students/ESL</td>
<td>Beliefs about language intelligence, L2 aptitude, age sensitivity</td>
<td>–</td>
<td>2 factors</td>
<td>Pre-test fixed mindsets: 0.81</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Post-test fixed mindsets: 0.87</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Post-test growth mindsets: 0.92</td>
</tr>
<tr>
<td>Lou &amp; Noels</td>
<td>1,633 (study 1)</td>
<td>University students/ESL</td>
<td>Same as Lou &amp; Noels (2016)</td>
<td>CFA</td>
<td>2 factors</td>
<td>Pre-test: entity = 0.82, incremental = 0.90, combined items = 0.91</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Post-test: entity = 0.89, incremental = 0.91, combined items = 0.94</td>
</tr>
<tr>
<td>Lou &amp; Noels</td>
<td>189 (study 2)</td>
<td>University students/ESL</td>
<td>Same as above</td>
<td>CFA</td>
<td>2 factors</td>
<td>Entity: 0.83, incremental: 0.88</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>Combined items: 0.92</td>
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<td></td>
<td></td>
<td></td>
<td>Entity writing beliefs: 0.55</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Incremental writing beliefs: 0.67</td>
</tr>
<tr>
<td>Waller &amp; Papi</td>
<td>174</td>
<td>University students/EFL/ESL</td>
<td>L2 writing mindsets</td>
<td>EFA</td>
<td>2 factors</td>
<td></td>
</tr>
<tr>
<td>Bai &amp; Guo</td>
<td>523</td>
<td>Primary school students/EFL Teachers/EFL</td>
<td>English writing mindsets</td>
<td>CFA</td>
<td>2 factors</td>
<td></td>
</tr>
<tr>
<td>Bai et al.</td>
<td>156</td>
<td></td>
<td>General intelligence mindsets</td>
<td>CFA</td>
<td>1 factor</td>
<td></td>
</tr>
<tr>
<td>Brown &amp; Hanson</td>
<td>72</td>
<td>University students/EFL</td>
<td>General intelligence mindsets</td>
<td>–</td>
<td>1 factor</td>
<td>Time 1 = 0.92, Time 2 = 0.91, Time 3 = 0.93</td>
</tr>
<tr>
<td>Lou &amp; Noels</td>
<td>176</td>
<td>University students/EFL</td>
<td>Same as Lou &amp; Noels (2016)</td>
<td>–</td>
<td>1 factor</td>
<td>Pre-test mindset: 0.85</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Post-test mindset: 0.89</td>
</tr>
<tr>
<td>Papi et al.</td>
<td>128</td>
<td>University students/ESL</td>
<td>L2 mindsets</td>
<td>EFA</td>
<td>2 factors</td>
<td>Growth L2 mindset: 0.92</td>
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<td></td>
<td>Fixed L2 Mindset: 0.93</td>
</tr>
<tr>
<td></td>
<td>91 (study 1)</td>
<td>University students/ESL</td>
<td>Same as Lou &amp; Noels (2016)</td>
<td>CFA</td>
<td>1 factor</td>
<td>0.84 (study 1)</td>
</tr>
<tr>
<td></td>
<td>418 (study 3)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.93 (study 3)</td>
</tr>
<tr>
<td>Papi et al.</td>
<td>128</td>
<td>University students/ESL</td>
<td>L2 mindsets</td>
<td>EFA</td>
<td>2 factors</td>
<td>Growth L2 mindset: 0.85</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>Fixed L2 mindset: 0.70</td>
</tr>
<tr>
<td>Teimouri et al.</td>
<td>191</td>
<td>University students/EFL</td>
<td>Growth mindsets</td>
<td>–</td>
<td>1 factor</td>
<td>0.90</td>
</tr>
</tbody>
</table>

Note. CFA: confirmatory factor analysis; EFA: exploratory factor analysis.
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Practical Applications

Changing students’ beliefs can have a powerful impact on students’ resilience (Yeager & Dweck, 2012; Yun et al., 2018). Research on mindsets is beginning to shed light on their impact on learners, teachers, and the classroom environment. Students enter the classroom and other language learning/use contexts with pre-existing mindsets about language learning. Learners may interpret others’ feedback through the lens of their mindsets, influencing their subsequent expectations, emotions, and behaviors (e.g., Plaks et al., 2005). Therefore, interactions with others may reinforce existing mindsets. For example, a learner who endorses the mindset that their capacity can be improved may interpret negative feedback as a signal to grow and take this opportunity to learn. They may also expect their effort can overcome challenges, and this belief may spur them to seek better strategies and help. By the same token, students who are encouraged to set mastery goals and seek strategies to improve may also learn to develop growth mindsets (Leith et al., 2014). As such, teachers can help students develop growth mindsets through directly targeting other factors in the language mindset meaning system, such as through reappraising negative feedback and challenges with students (i.e., failure mindsets; Haimovitz & Dweck, 2016).

Moreover, social interactions with others can shift students’ mindsets (Haimovitz & Dweck, 2016; Lou & Noels, 2020b). Helping learners develop a growth mindset, for instance, may impact learners’ beliefs about effort, making mistakes, patterns of attributions, and emotional tendencies during challenges (Hong et al., 1999). One way to promote growth mindsets in the classroom is to provide learners with feedback that focuses on the learning process and strategies for improvement (Lou & Noels, 2020b; Mueller & Dweck, 1998). In contrast, teachers can reinforce a fixed mindset by praising students for their ability (Mueller & Dweck, 1998), comforting students for low ability (“it’s alright, people are good at different things”; e.g., Lou & Noels, 2020b; Rattan et al., 2012), or using generic ability-focused languages (e.g., “you are a talented student”; “boys/girls are good at this”; Cimpian et al., 2007; Park et al., 2017). Critically, research shows that growth-minded teachers are more likely to provide improvement feedback, thereby reinforcing learners’ growth mindsets that can have multiple indirect effects on their motivation (Rattan et al., 2012). Therefore, when teachers embrace a growth mindset about students’ ability, their learners report stronger motivation and receive higher grades (Canning et al., 2019).

In addition to the impact of the learning environment, some studies showed that short and inexpensive mindset interventions could also change students’ mindsets and improve their motivation and grade (Yeager et al., 2019). Although this area of large-scale intervention research in general education is rapidly expanding, some research found that mindset intervention yielded little effect on achievement (Sisk et al., 2018). In a meta-analysis of 29 studies, Sisk et al. (2018) found little evidence that mindset interventions improve academic outcomes. It is possible that one-shot growth mindset interventions might not provide enough dosage or power to produce effects and/or that the effects can fade out quickly. Although the effect is small, Yeager et al. (2019) argued that mindset intervention is a low-cost strategy to yield meaningful impacts on students’ learning. However, as shown in our review, little is known about the long-term impact of mindset interventions on language learners’ achievement and long-term engagement. It is possible that mindset intervention is effective for only specific subgroups of learners. For example, a recent large-scale study with a nationally representative sample showed that the mindset intervention was effective for only underrepresented students or students with lower prior achievement (Yeager et al., 2019). Before any larger-scale interventions and policy-wise changes are advocated in SLA, more extensive and intensive intervention research is needed to understand the validity, effectiveness, generalizability, and boundary conditions of mindset interventions in SLA (e.g., Molway & Mutton, 2020; Lanvers, 2020).

While mindsets are widely known and applied in some school systems (e.g., K-12 in the US; Yettick et al., 2016), it is important to acknowledge the criticism that mindset intervention mainly
focused on individual students and less on the learning environment. When the intervention fosters growth mindsets, but the classroom remains a very fixed-oriented culture, mindset intervention is unlikely to be successful (Yeager et al., 2019). In addition to the learning environment, other factors, such as development factors, and other individual differences also play important roles in language learning. Therefore, it should not be assumed that mindset intervention is a “panacea” or that one’s lack of motivation/improvement is simply because of having fixed mindsets. Moreover, educators should be mindful of applying false growth mindsets, such as the belief that students’ effort is the only thing that matters, in teaching (Dweck & Yeager, 2019). Students’ effort can be ineffective for many reasons (e.g., not using the right learning strategies). Teachers who hold this overly simplistic understanding of growth mindsets may encourage students in a counter-productive way by blaming students who fail (e.g., “students who failed are simply because they are lazy”). Therefore, teachers and researchers who deliver mindset interventions should also be trained to have a clear understanding of mindset.

**Future Directions**

The strengths and limitations that are highlighted in our review provide implications for areas for future work. First, researchers should carefully articulate their operationalization of mindsets. Some measures that we reviewed did not directly measure beliefs about whether the ability is malleable, but instead other related language beliefs (see research on language beliefs in the Chapter 14 in this handbook). Determining the validity of a measure is a cumulative process. Given that measuring mindsets in SLA is still relatively new, the validity of mindset measures should be assessed more comprehensively (via internal consistency, immediate and delayed test–retest reliability, factor structure, and measurement invariance for cultural, age, and gender groups). Moreover, as discussed, more research should aim to understand whether a more domain-specific mindset (L2 writing vs. pronunciation) would account for additional variance in predicting motivation in particular domains of SLA.

Second, as proposed by Lou and Noels (2019), more research should systematically investigate the interconnections between mindsets and other components within the *language mindset meaning system*. Researchers may study language mindsets as a direct predictor of various learning outcomes, but they may also consider incorporating the broader meaning-making process to understand the motivation and language learning processes (see Lou et al., 2021). Moreover, mindset may overlap with other motivational constructs that are not discussed in the language mindset meaning system, such as L2 self (Dörnyei & Ushioda, 2009), grit (Khajavy et al., 2021; Teimouri et al., 2020), regulatory focus (Lou et al., 2017; Papi, 2018), and self-determined motivation (McEown et al., 2014; Noels et al., 2019). For example, learners who think they cannot change their L2 ability may not have an image of themselves as proficient L2 speakers. That is, a growth language mindset could be an antecedent for an ideal L2 self (cf. Dörnyei & Ushioda, 2009). Recent research also showed that grit, which is defined as a combination of perseverance toward and passion for a long-term goal (Duckworth et al., 2007), is related to but distinct from language mindsets (Khajavy et al., 2021; Teimouri et al., 2020). However, these two existing studies showed contradictory findings: whereas Khajavy et al. (2021) showed that language mindsets predict performance better than grit, Teimouri et al. (2020) showed the opposite. The field might benefit from close examination of the conceptual link between mindsets and these relevant constructs, which may inform an integrated theoretical framework. For example, because grit is conceptualized as a steadfast dedication to pursue long-term goals, growth mindsets that influence how people react to failure may act as fuel to sustain grit for achieving long-term goals. Moreover, little is known about how other individual characteristics (e.g., age, gender, language level, and L1 experiences) predict mindsets or interact with mindsets in predicting learning outcomes.
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It is important to note that the existing “longitudinal studies” in mindset research have only examined how language mindsets assessed at an earlier time predicted other factors (e.g., language use) at a later point in time (e.g., Lou & Noels, 2020a, 2020d). Researchers should incorporate more longitudinal designs with multiple time points to address the question of “how mindset changes”, the question of “which came first (e.g., do mindsets predict achievement goals or do achievement goals predicted mindsets?)”, and the question of “whether mindsets have long-term effects”. For example, Dai and Cromley (2014) measured mindsets four times over a year and found that fixed mindsets increased and growth mindsets decreased over time, and that the decrease in growth mindsets predicted dropout in STEM majors. The negative pattern of changes is also consistent with research in academic self-efficacy or competence beliefs (e.g., Wigfield & Eccles, 1994). This line of research that examines the stability and changes in language learners’ mindsets is also important to help understand whether and how language mindsets are developed and shaped by the learning environment (Zarrinabadi et al., 2021b). For example, are adult language learners, compared to younger learners, less likely to change their mindsets over time?

Given that language learning is a complex process that takes place in formal educational and non-formal contexts (Reinders & Benson, 2017), future research on mindsets should also move beyond motivation and achievement within L2 classrooms and extend to the contexts of technology-assisted language learning (e.g., online language classes and language learning mobile apps) and intercultural communication (e.g., willingness to interact with other ethnolinguistic groups and foreign workers’ communication using the target languages). Mindsets are argued to be important for both academic and social development (see Dweck & Yeager, 2019). Although research about the impact of language mindsets on learners’ experiences in the classroom is accumulating (Lou & Noels, 2019c, 2020a), little is known about whether and how mindsets impact language learning beyond the classroom and whether and how they help construct interlocutors’ meaning-system when interacting with L2 learners (Lou & Noels, 2020c).

Finally, as research on language mindsets continues to expand, future meta-analyses would be valuable to quantitatively synthesize findings in this area of research—for example, do language mindsets predict different motivational and achievement outcomes; under what conditions does the effect size become stronger or weaker; and what variables are (in)consistently linked to mindsets? Understanding the overall effect size across samples, designs, and outcomes can provide an idea of whether the expansion of future large-scale mindset interventions in SLA is warranted.

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