

**L2 INPUT AND CHARACTERISTICS OF INSTRUCTIONAL  
TECHNIQUES IN EARLY FOREIGN LANGUAGE CLASSROOMS:  
UNDERLYING THEORY AND PEDAGOGICAL PRACTICE**

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**ABSTRACT**

Theoretical approaches within the cognitive-interactionist framework (Long, 2015) have identified various aspects of L2 input and characteristics of instruction that predict learners' L2 outcomes. Such strategies of L2 teaching relate to shaping characteristics of communicative activities in which the L2 is embedded, with modified L2 input, L2 interactions and learners' L2 output. These strategies are in line with task-based and content-based teaching approaches. This article starts out with theoretical underpinnings to L2 instructional principles. It introduces the roles of sensory input and individual perception, internal knowledge construction, prior knowledge, and selective attention as understood within this framework. Consequences of this type of processing for instruction are discussed with respect to the instigation of noticing, salience, cognitive activation, learning from insight and depth of processing. The second part gives an overview of characteristics of teachers' linguistic behaviour, which includes how teachers modify verbal and non-verbal L2 input, shape communicative activities and interactions in terms of authenticity, negotiation of meaning, feedback and focus on form, and create opportunities for learners' L2 output. The goal of these strategies of L2 teaching is to provide comprehensibility and cognitive stimulation during the L2 acquisition process, induce wide-spread neural activity, and facilitate long-term retention. All of these strategies are exemplified by, and operationalised in, the Teacher Input Observation Scheme (TIOS, Kersten, Bruhn, Ponto, Böhnke, & Greve, 2018), which provides a systematic basis for empirical L2 classroom observation, teacher training and teachers' self-evaluation. The article closes with empirical and practical examples of the effects of L2 instructional strategies in pre-school and primary school.

**KEYWORDS**

Instructed Second Language Acquisition (ISLA), input, L2 processing, knowledge construction.

**1. INTRODUCTION**

Decades of research have looked at linguistic input, the nature of linguistic interactions and learner output both from a learner-centred SLA perspective and a classroom-centred instructional perspective. Notably, input is considered one of the most important prerequisites for the acquisition of a foreign language, the *sine qua non* in language acquisition. It is commonly defined as “language that a learner is exposed to in a communicative context” (Gass & Mackey, 2015, p. 181).

While varying definitions and emphasis on different facets of input have been suggested, I shall adopt a recent rather comprehensive understanding (Truscott & Sharwood Smith, 2019) which sheds light on a variety of aspects that are considered crucial for the language learning process. It stresses the internal processing perspective of input, including different types of sensory information such as:

sights, including pointing and gesturing, sounds, smells, tastes, etc., in other words everything that contributes to the interpretation of an utterance, and which can lead to further development of an individual's linguistic ability, i.e., all the relevant external contexts. This should be included in a comprehensive understanding of what input is (Truscott & Sharwood Smith, 2019, p. 10).

In second language (L2) instructional settings, thus, input cannot be regarded as detached from the specific contexts in which the L2 is encountered by the learners (*situational context*). This involves not only the specific linguistic features of the input delivered to the learners in a narrow sense (*discourse context*) and the supporting techniques used to render it comprehensible, but it also pertains to the characteristics of *activities* chosen by the teacher to form the matrix for language learning opportunities (Truscott & Sharwood Smith, 2019). Throughout this article, *activities* refer to teacher-induced exercises or tasks (R. Ellis & Shintani, 2014). This interplay of instructional principles (choice of linguistic input, activities and supporting techniques) and their effects on the process and attainment of L2 learning is one of the major foci of the relatively new field of Instructed Second Language Acquisition (ISLA) (e.g., Loewen, 2020).

Numerous hypotheses within ISLA have identified aspects of L2 input and characteristics of instruction that predict learners' L2 outcomes (Loewen & Sato, 2018). Their common goal is to describe how the L2 learning process can effectively be shaped, for example, by providing comprehensibility and cognitive stimulation during the acquisition process, by inducing widespread neural activity, facilitating processing, and ultimately fostering long-term retention in and retrieval from memory (Li & Jeong, 2020). Among these, instructional scaffolding techniques which promote comprehensibility of the input are especially crucial for young learners to build up their emerging L2 system. Long (2015) accounts for these effects in his theoretical approach referred to as the *cognitive-interactionist framework*. Task-Based Language Teaching (TBLT; Ellis, 2003) and Content-Based Language Teaching (CBLT), which subsume different types of bilingual programmes such as CLIL or immersion (Larsen-Freeman & Anderson, 2011; Lightbown, 2014; see also *Content-Based Instruction* in Richards and Rodgers, 2014), are two influential instructional approaches that aim at incorporating these instructional principles. The following argumentation is positioned within this framework.

The article aims to give an overview of effective L2 instructional techniques both from a theoretical perspective and regarding their practical implementation in the classroom. While theory and teaching principles are relevant across different groups of learners, research studies and examples are discussed with reference to young learners, ranging from pre-school age to pre-teens. Section 2 first introduces the most important aspects and processes currently discussed in ISLA, based on a graphical illustration of external instructional factors and learner-internal

processing of the incoming information. These pertain, on the one hand, to the aspects controlled by the teacher, such as choice and characteristics of classroom activities, verbal and non-verbal input and interactional strategies, and, on the other hand, to the internal context which conditions individual information intake and knowledge construction, that is, the actual learning process from the learner's perspective. Using a second model, Section 3 then focuses in more detail on this *internal context* of knowledge construction.

The article first discusses the nature of input as sensory stimuli, the role of prior knowledge, selective attention and (incomplete) conscious perception, and then addresses their consequences for instruction, focusing particularly on cognitive activation, depth of processing, and the role of salience for noticing and awareness. These underlying processes are crucial to understand why the teaching principles promoted within the cognitive-interactionist framework are assumed to be effective for L2 acquisition. The section ends with a discussion of how to render instructional techniques measurable for empirical purposes and pedagogical practice. To that end, it introduces the *Teacher Input Observation Scheme* (TIOS) (Kersten, Schüle, & Steinlen, 2018) which was derived from the above framework and developed for the purpose of operationalising instructional techniques. The goal of all techniques accumulated in this instrument is, accordingly, to increase saliency and comprehensibility of stimuli, to facilitate attention, noticing, intake, deep processing and long-term retention. The selection of these specific L2 instructional techniques that are part of the TIOS serve as a structuring element for sections 4 and 5, which focus on the *external instructional context*. In these sections, I discuss concrete characteristics of L2 instructional activities which represent the matrix for linguistic input, and the quality of L2 input, interaction and support of learners' output. In Section 6, implications of the issues discussed in this article with reference to examples from different primary programmes in Germany are summarised and some recent empirical evidence which incorporates a combination of these factors to show their effects on the L2 acquisition of young learners is provided.

## **2. THE NATURE OF VARIABLES AND PROCESSES IN ISLA**

The empirical investigation of ISLA focuses on numerous external and internal elements that have been identified as relevant for language learning. This section provides an overview of the most important aspects as discussed in ISLA, based on a graphical illustration (Figure 1; for overviews on different aspects of the graphic, see de Graaff and Housen, 2009; R. Ellis and Shintani, 2014; Gass, Behney and Plonsky, 2020; Leow, 2015; Loewen, 2020; Loewen and Sato, 2018; Long, 2015). They are briefly introduced here, and then described in more detail in the following sections.

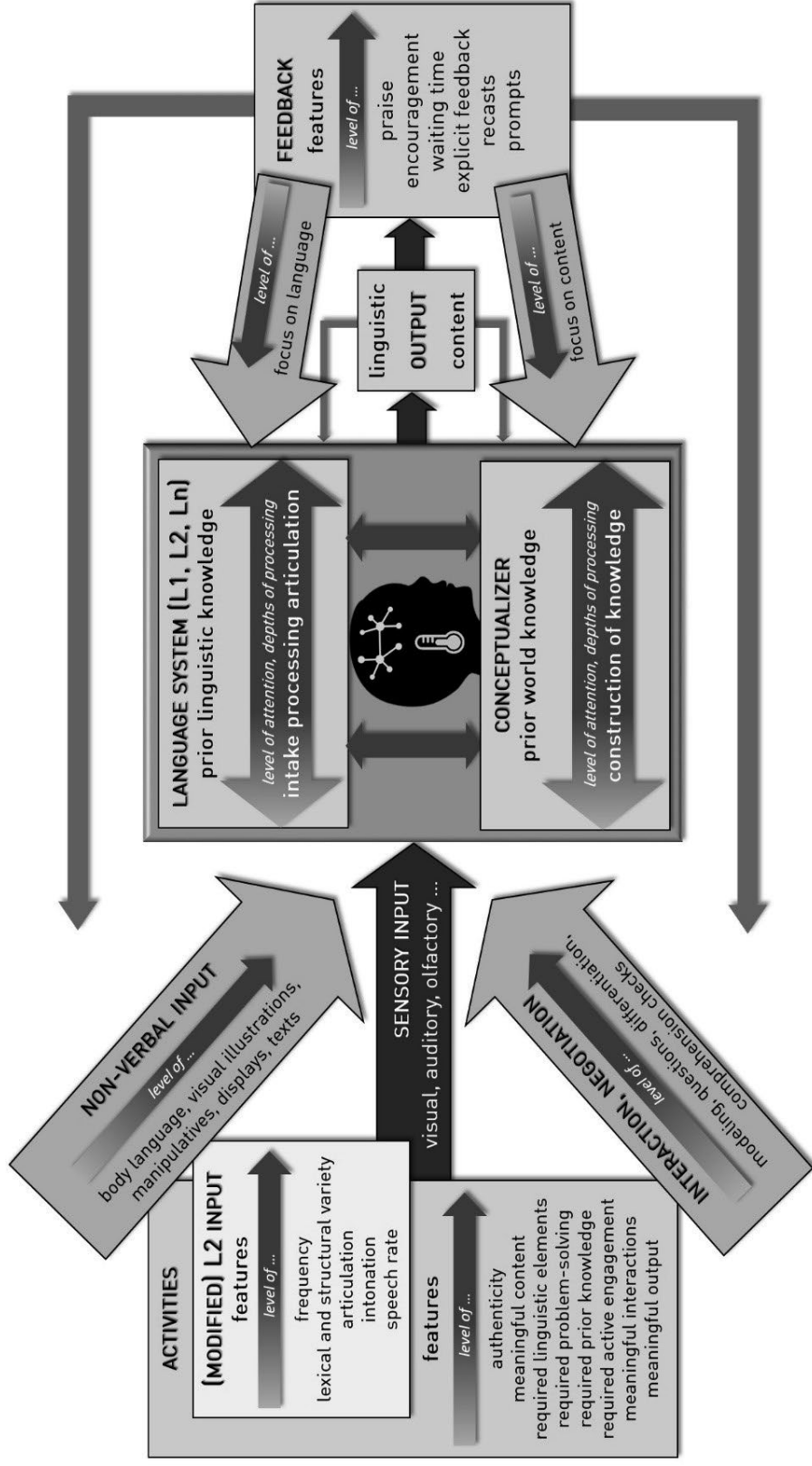


Figure 1. Model of characteristics and processes in ISLA. External context (activities, modified input and feedback, shaped by non-verbal input and negotiation techniques) stimulating the learner's internal cognitive system (conceptual and linguistic system) in the form of sensory input.



The overview of characteristics and processes in ISLA in Figure 1 depicts, first of all, the external situational and linguistic context in which learners encounter the L2. This context is composed of *activities* and *modified linguistic input* usually chosen and delivered by the teacher in accordance with the age and language level of the learners. They are accompanied by different types of verbal and non-verbal measures and materials to enhance comprehensibility and cognitive engagement. These then reach the learner in the form of sensory input. As will be further specified in Section 4, sensory input is the only form in which types of input stimulate the learner's internal system. Within the learner's internal system (the grey box in the centre of the figure), linguistic and non-linguistic representations are stored in the conceptualiser and the language system/s (Truscott & Sharwood Smith, 2019), where internal processing, knowledge construction, retention and retrieval and the generation of output take place (Section 3). The learner's output, finally, leads to monitoring within the individual's cognitive system, and to different types of external feedback from teacher and peers, which again serve as ongoing input in communicative interactions. These different elements and underlying processes are introduced in the remainder of this section, and subsequently explained in more detail in the following ones.

*Activities and (modified) L2 input:* The graphic depicts L2 activities in foreign language classrooms which serve as a matrix for linguistic L2 input, and specific features of both language and activities that are thought to affect SLA. Language and activities are accompanied by non-verbal aspects of communication such as body language and illustrations, and are further shaped by the ways in which they are modelled and structured. It is important to note that the model in Figure 1 restricts itself mostly to descriptive form- rather than function-related terms. Function-related terms such as *scaffolding* inherently presuppose an intention; however, input characteristics – input used in the encompassing sense of the term – do not always result from a conscious goal or decision of the teacher to intentionally use scaffolds (Section 3.3).

*Sensory input and information processing within the cognitive system:* All non-linguistic and linguistic features represent the incoming sensory stimulation of the learner which reach the learner only in the form of visual, auditory and other sensory perceptions (this process is described in more detail in Section 4). They enter the learner's processing systems where content as well as linguistic information are processed, depicted here as the *conceptualiser* and the *(L2) language system*. For an overview of the relationship of L1 and L2 processing/storage components in current processing models see de Groot (2015) and Truscott and Sharwood Smith (2019) – these could easily complement this graphic but are not relevant for the current purpose. In that sense, the model in Figure 1 emphasises the multisensory character of input both from an external and an internal perspective.

Linguistic input is never devoid of content, which means that language learning and general learning mechanisms are intrinsically intertwined. The conceptualiser, that is, the non-linguistic component which stores and processes mental representations (ideas, concepts, meaning; Kormos, 2011; Levelt, 1989) is centrally involved in the meaning-making process. In these underlying processing models, this meaning-making process, that is, actual *comprehension* of the incoming information, is seen as *individually constructed* by each learner. This notion of

individual construction of knowledge is essential for all instructional techniques referred to here and is further discussed in Section 3.1.

The language system, on the other hand, is thought of as the module in which linguistic information, that is, information specific to the L2, is processed and stored. It needs to contain processing modules for lexical, grammatical, phonetic-phonological and other types of linguistic information. SLA models identify numerous steps and factors which lead from an external stimulus to different types of learners' internal *intake*, *processing* and *storage*, and, in the case of a verbal reaction, to the planned verbal message (phonetic plan) for the *output* in the articulator (Gass, Behney, & Plonsky, 2020, Kormos, 2011; Leow, 2015; Levelt, 1989). Intake is most commonly referred to as the process in which input gets transformed and becomes available for further processing and incorporation within the learner's internal system (Gass, Spinner, & Behney, 2018). For further detail on these processes, see two influential models by Gass and colleagues and by Leow, who depict these processes as *apperceived input – comprehended input – intake – integration – output* (Gass et al., 2020) and as *input processing – intake – intake processing – internal knowledge – knowledge processing – output*, respectively (Leow, 2015, 2018).

Input also has the potential to impact the learner's affective system. Emotions, symbolised by the *thermometer* in the learner's internal system, have been found to play an important part in SLA. Krashen (1985) claimed in his Monitor Model that emotions may function as an *affective filter* which determines whether learners are open to comprehensible input; a high affective filter would result in low reception and no further processing. In more recent work, emotions play a central role in the *affective system* of Truscott and Sharwood Smith's (2019) Modular Cognition Framework (MCF) and have been thoroughly investigated in terms of *foreign language anxiety and enjoyment* (Dewaele & MacIntyre, 2014). Correspondingly, the *thermometer* in Figure 1 indicates the role of the *perceived learning atmosphere* and *emotional availability* of the learner.

*Type* and *level of stimulation* from the incoming sensory input are thought to affect whether incoming information leads to intensive mental operations (*intake*, *depths of processing*; Section 3.2.1), which condition whether it gets stored and becomes readily available for retrieval when the learner wants to use it. Each stimulus can occur on a continuum from very low to very high intensity. This *intensity* of the stimulus is indicated by the arrows labelled "level of..." in the graphic and is thought to be relevant for the level of attention and the following cognitive engagement with the stimulus. This engagement is a prerequisite for further processing. A crucial role in these processes has been attributed to the activation of prior linguistic and world knowledge as a basis for extended knowledge construction (Section 3.1.2).

*Feedback*: Teachers (and peers) react to the learner's L2 output both with regard to language and content. At the same time, learners' productions feed back into their own linguistic and conceptual monitoring systems as indicated by the small arrows (Gass et al., 2020; Kormos, 2011). Typologies of positive and corrective feedback types and their differential effects have been described in numerous studies (e.g., Lyster & Saito, 2010). Feedback can be seen as part of an ongoing communicative interaction, and thus also represents an element of input, which is again shaped further by features of verbal and non-verbal input. This is indicated by the loops

directed back at the input part of the graphic and is discussed in combination with these features in Section 5.3.

Section 3 outlines in more detail the nature of sensory input and knowledge construction as a basis of SLA and ISLA. Section 4 and Section 5 then discuss characteristics of L2 instructional activities and the quality of input, interaction and support of output. This is presented with reference to an observational schedule which helps operationalise these instructional techniques for empirical research and pedagogical practice, and which has been found especially helpful for early stages of L2 acquisition (Kersten, Bruhn, Koch, & Schriek, 2019; Kersten et al., in preparation). In addition, some recent empirical evidence on young learners which incorporates a combination of these factors and their effects on SLA is provided.

### **3. SENSORY INPUT AND KNOWLEDGE CONSTRUCTION**

To follow the argumentation outlined in this section, Figure 2 represents a graphic illustration of internal cognitive-linguistic meaning-making processes known as *construction of knowledge*. The different elements depicted in Figure 2 are explained in detail in the subsequent sections. If not indicated otherwise, Figure 2 as well as the following sections 3.1-3.2 rely on Kormos' (2011) *Model of Bilingual Speech Production*, Leow's (2015) *Model of the L2 Learning Process in ISLA*, Truscott and Sharwood Smith's (2019) *Modular Cognition Framework (MCF)*, Gass et al.'s (2020) *Model of Second Language Acquisition*, and Li and Jeong's (2020) *Social Brain of Language Learning*. For a detailed overview of the underlying cognitive processes of instructed language learning, see also Böttger (2016).

#### **3.1 THE INTERNAL MEANING-MAKING PROCESS (CONSTRUCTION OF KNOWLEDGE)**

The human mind is constantly exposed to a great amount of incoming information through all our senses. This relates to everything we see, hear, smell, touch and taste, not only in everyday, but also in instructional contexts.

Figure 2 gives a more detailed overview of how recent models of input processing depict the central part illustrated in Figure 1, that is, a conception of what happens when incoming linguistic and environmental stimuli hit the mental system and are comprehended and stored. (Note that, as in Figure 1, this graphic is not supposed to be exhaustive but is rather used as an illustration to highlight some effects described in this article. This holds particularly for the network of associations depicted on the right which just serves an exemplary modelling purpose of a highly complex and widespread activation pattern.)

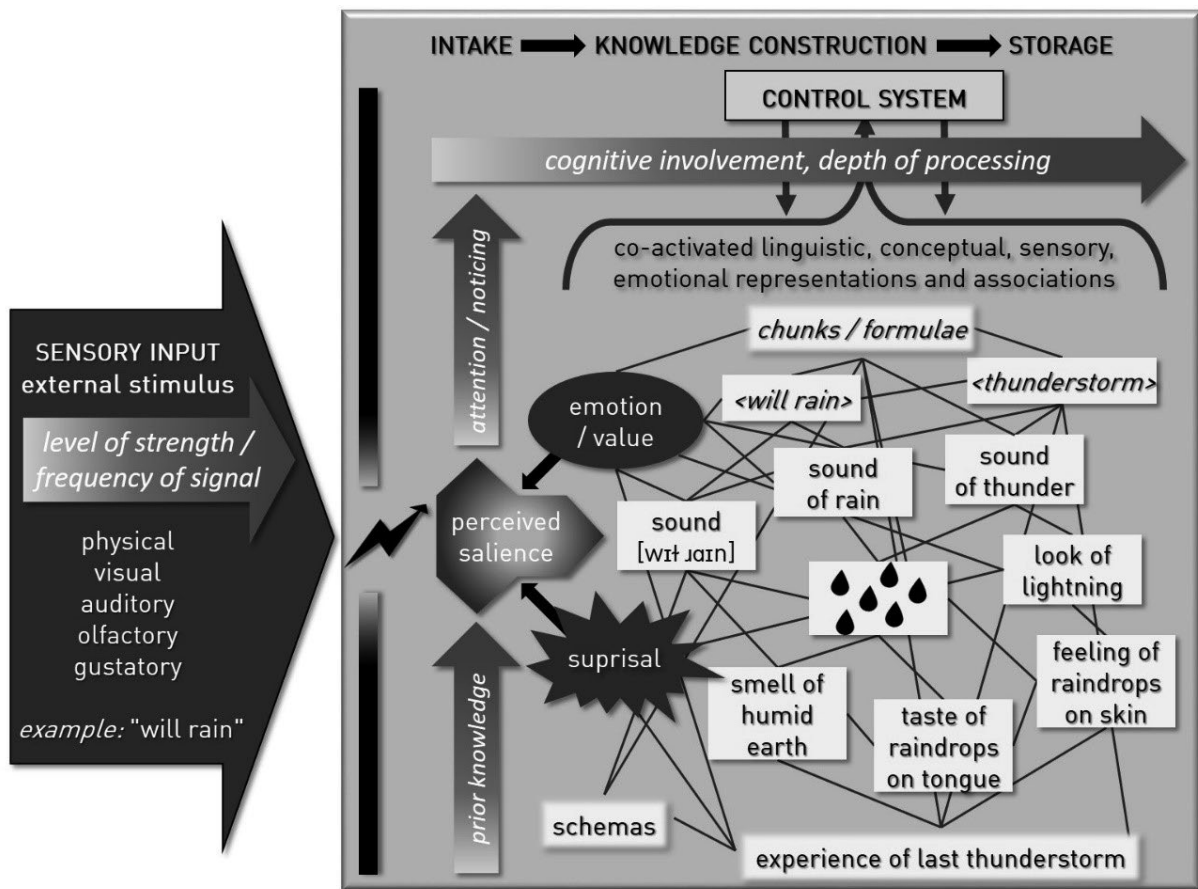


Figure 2. Internal processing and linguistic-conceptual knowledge construction. Factors affecting how external sensory impulses stimulate mental representations during intake and knowledge construction across linguistic and conceptual systems – an exemplary network of linguistic and non-linguistic representations is co-activated in language processing.

### 3.1.1 THE NATURE OF SENSORY STIMULI

All types of knowledge humans accumulate based on external input, and which are subsequently stored in our brain, are conveyed through the transmission of external sensory stimuli. Already in the middle of the 18th century, Hume pointed out that “[t]he mind has never anything present to it but the perceptions” (Hume, 1907[1748], p. 162). On a neurophysiological level, information processing refers to electrochemical coding of stimuli from different sources. There is no light or colour, no sound, no music, no heat or cold that enters the brain but only electromagnetic waves, fluctuations in air pressure and kinetically driven movements of molecules (von Foerster, 1981). As a consequence, in order to make sense of all this and to survive (in life *and* in the classroom), the mind needs to actively reconstruct meaningful representations from the huge number of incoming stimuli. This is the reason why Carroll (1999, cited in Truscott & Sharwood Smith, 2019, p. 9) suggested replacing what was generally called “input,” that is linguistic information

in the external social world, with “sensory data,” to which input is reduced when the learner first perceives it. In pedagogical literature, this is referred to as *knowledge construction* (Cameron, 2001; Rüschoff & Ritter, 2001).

This internal meaning-making process is further complicated by the fact that the brain cannot, in principle, distinguish between internal and external events. The human body has only about 100 million sensory cells that perceive stimuli from the outside, but over 10,000 billion synapses at which information is transmitted; so humans are “100,000 times more receptive to changes in our inner environment than to changes in our outer environment” (von Foerster, 1981, p. 50f, translation by the author). Von Foerster goes on to say that the chemical composition of the transmitter substance filling the synaptic cleft determines the transmission of an impulse to the dendrite of the target neuron. In this micro-environment of the neuron, the transmission of impulses can, under certain circumstances, be both inhibited and promoted, and thereby influences which stimuli reach the CNS, and in which intensity they do so. Therefore, our inner experiences and emotions can influence our perception of reality to an even greater extent than external circumstances, or, to quote Truscott and Sharwood Smith (p. 53), “[t]his activation can come, perhaps most notably, from the affective system, interacting with varying situational context.” The psychosomatic branch of medicine or phenomena such as phantom limbs attest to that.

### 3.1.2 THE ROLE OF PRIOR KNOWLEDGE

The mind’s meaning-making process is highly individual. First of all, all incoming stimuli are automatically compared to previously stored knowledge. The situational context functions as a kind of prime, which means that external stimuli raise the activation levels of certain aspects of mental representation that are stored in our brains. The core of these mental representations is referred to as *concepts*, defined as “a conglomerate of inter-related memory traces consisting of information concerning word meaning” (Kormos, 2011, p. 42). Thus, these incoming stimuli are categorised based on the mental structures learners have already constructed, and which constitute the sum of our previous individual experiences. In fact, that way our existing mental structures act as a “guide” for what we become aware of, or what we deem relevant in a situation. That is why “a significant role is assigned to prior knowledge and experience as activators of selective attention” (Gass et al., 2020, p. 581). This categorisation, based on prior knowledge, facilitates cognitive processing immensely; instead of a disordered flood of raw data about the environment, we almost instantly receive meaningful, already ordered mental representations which enable us to make even complex decisions in a very short time.

It should be noted that external stimuli, linguistic messages included, are thought to co-activate representations in all different mental modules (*parallel activation, activation spreading*): linguistic representations (meaning, sound, grammar) and all other sensory information related to this (visual, spatial, motor, affective, auditory, gustatory etc.), “resulting in the virtually immediate experience of the meaning of the utterance in the listener’s mind” (Truscott & Sharwood Smith, 2019, p. 53). These co-activated modular networks are referred to

as representational *schemas*. Schemas may differ in L1 and L2 because they might be stored with different activation patterns in both language contexts, depending on previous experiences which generated these co-activation patterns (Kormos, 2011). What exactly it is that gets activated, how strongly it gets activated, and what finally reaches the threshold for further processing depends both on the strength of the external trigger and on the individual's internal reaction. This is in line with Li and Jeong's (2020) overview on the "social brain" of L2 learning which engages in deep processing and involves widespread brain regions as a function of rich perceptual environments.

### 3.1.3 THE ROLE OF SELECTIVE ATTENTION

An important guiding factor for this process of knowledge construction is *selective attention*. A student, for example, may see the teacher writing a mathematical calculation on the board and hear her oral explanation of it, but at the same time he feels the chair he is sitting on, feels his hand lying on the table, sees his classmates sitting in between himself and the blackboard, hears a wasp buzzing in the window, and a car passing outside, while secretly tasting the chewing gum in his mouth and smelling the gum's faint pepperminty odour. These and many other sensory stimuli are incessantly registered by the human brain – which does not mean, however, that we are *aware of them* at all times. Actually, if we were, it would be a total information overload for our system. In the example above, the student would not be able to follow (let alone learn) a single thing the teacher is currently trying to convey at the blackboard.

As it is, our mind is able to select only those pieces of information that are currently relevant to us – a survival mechanism without which our species would not have been able to evolve. In our classroom, however, the problem is that the pieces of information we are aware of are not necessarily those that the teacher wants or expects us to focus on. Information that is only registered extremely peripherally and not judged as relevant by our mind (a misleading formulation as this is, as a rule, an automatic, unconscious process) will not be processed in working memory and, consequently, it is then also not available for further processing and for storage in long-term memory. If the student deems the wasp, or the fact that a classmate is passing another one a love letter in front of him, as more important, his mind will only peripherally register the teacher's explanations of binomial formulas. It follows that in order to induce some type of learning the first threshold a stimulus has to overcome to be passed on to working memory for further processing is some kind of awareness, attention or noticing, a phenomenon which has been taken up in ISLA in the form of the *Noticing Hypothesis* (Schmidt, 1990, Section 3.2.1).

While some attentional processes are automatic and are not subject to our conscious volition, others can be conscious or controlled, and in that latter function "can be voluntarily directed to different aspects of performance" (Kormos, 2011, p. 52). This attentional control system is thought to intentionally direct our attention, to regulate our actions, including language production, and is involved in decision making and problem solving. It is represented as *control system* in Figure 2.

### 3.1.4 THE EFFECTS OF CONSCIOUS PERCEPTION: KNOWLEDGE CONSTRUCTION IS INDIVIDUAL, WARPED AND INCOMPLETE

Another crucial consequence of this phenomenon which is highly relevant for both language and content learning is that the mind can – and very often does – misinterpret incoming information, again for very good reasons of survival (in life – this goes way back to times long before classrooms even existed; see Kersten, 2019a). Consider the following examples:

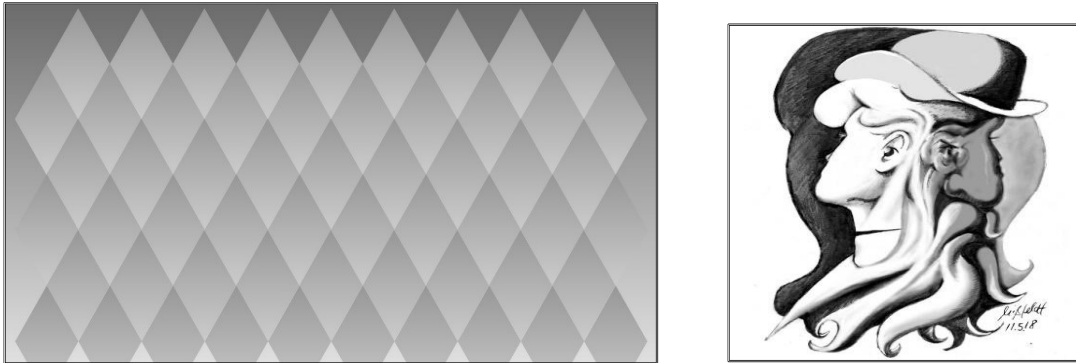


Figure 3. Optical illusions.

Left: all diamonds are equally light, the impression is created by a slight colour gradient of the diamonds and the background (<https://www.youtube.com/watch?v=1DvtYICr9Qc&feature=youtu.be>)

Right: reversible image of old and young woman, old and young man ([www.sehtestbilder.de/optische-taeuschungen-illusionen/images/optische-taeuschung-alte-junge-frau-alter-junger-mann-me.jpg](http://www.sehtestbilder.de/optische-taeuschungen-illusionen/images/optische-taeuschung-alte-junge-frau-alter-junger-mann-me.jpg)) (images created by Martin Mißfeld, 2018; <https://www.martin-missfeldt.de>)

The brain, with its fundamental organising principles, strives to structure and categorise the incoming stimuli and apply meaning to them, as happens for example, with the reversible image in Figure 3<sub>right</sub> when we make out four different faces in an image composed only of different lines and shades of grey. Optical illusions such as the one in Figure 3<sub>left</sub> attest to the fact that this automatic structuring process can lead to distortions or misinterpretations of the actual physical reality where correction is impossible even when the error is understood (we know that the diamonds are of the same colour, and yet we cannot see it). The loss of a part of the visual field, the so-called “blind spot,” is seamlessly completed by the brain, a principle that applies to all senses, and to assessment of causal relationships, as well. What humans actually perceive is only *consecutions* of events – each *causation* of events is our own interpretation. An example for warped perception from language processing is the so-called *magnet effect* of sound categories of our language, which we perceive as more prototypical than they actually are in acoustic reality (Kuhl, 1999). Differences between similar L1 and L2 sounds become increasingly difficult to differentiate, which leads to foreign accents of older L2 learners. This *categorisation* effect, based on the *prototypical* mental representations, which are, again, vital for speedy information processing, works for input to all human senses (N. Ellis, 2012; see *prototype theory* by Rosch, 1973).

These and many other phenomena of optical and other sensory illusions underline that the things we unconsciously and consciously perceive are *products* of our sensory perceptions, and in that they are only a partial reflection of the external physical reality. There are a number of reasons for that. First of all, human perceptions are limited in their physical spectrum: we can only see part of the colour spectrum (butterflies are able to see other parts); we can only hear part of the auditory spectrum (bats are able to hear other parts). Even the machines that are constructed to overcome these barriers have their own physical limitations. In combination with automatic mental categorisation and selective attention, which prevents most of the incoming stimuli from reaching our conscious awareness, this leads to highly automatic processes of *active interpretation and knowledge construction* (Wolff, 2002).

### **3.2 INSTRUCTIONAL CONSEQUENCES AND SUGGESTED REMEDIES**

It has become clear that incoming physical stimuli are not coded by the nervous system in their *quality*, that is, as colour, sound, temperature, etc. Rather, it is their *quantity* or, in other words, the variety and strength of their impulses which may or may not lead to further processing in the brain. Concerning situational and linguistic input as sensory information, this raises the question: Which conditions exactly lead to the transfer of external stimuli to internal knowledge stores (i.e., processing, retention, and thus learning)?

#### **3.2.1 THE ROLE OF NOTICING AND COGNITIVE ACTIVATION**

Different models have been proposed to answer this question, but they all share the fact that attention, awareness, noticing and the amount of cognitive engagement – also referred to as *depth of processing* (Leow, 2015) – play a major role in this process. They are thought to be located in working memory (Leow, 2015). Terminologically, it makes sense to distinguish between terms that refer to external impulses such as *mental* or *cognitive stimulation*, often in connection with the *complexity* of the stimulus (e.g., task complexity, as argued in Kormos, 2011), and those that refer to the same phenomenon from an internal process such as *mental* or *cognitive effort, engagement, involvement* or *depth of processing*, which is the focus of this section:

The higher the depth of processing or more cognitive or mental effort that leads to higher levels of awareness, characterized by instances of hypothesis testing, rule formulation, metacognition, and activation of previous knowledge, the more the potential for such processed information to be learned and retained (Leow, 2018, p. 788).

As an example, linguistic features used in a cloze test where the correct form has to be chosen from a given list and added to the correct gaps in the text activate recognition of some lexical items in written form, maybe even without full conceptual understanding of what these items mean. The resulting activation of mental structures in working memory is low, as is the chance of a rich network of associations during processing and storage. On the other hand, linguistic features used in a task in a primary school classroom in which they are needed for problem-



solving to create a meaningful product, say the *will*-future is needed for creating a weather forecast, will be processed while many conceptual and situational representations as an example for correct usage will be activated at the same time (Figure 2). This does not only refer to the core prototypical semantic meaning of a construct, but its more complex pragmatic meaning (meaning in context of use, Truscott & Sharwood Smith, 2019) and situational associations, and the sound, written form and grammatical features of the concept as well as frequent linguistic chunks or formulae which it is part of (Kormos, 2011). In fact, research on the *insight memory advantage* corroborates the significance of autonomous individual problem solving, during which new knowledge is integrated into existing representations and stimulates positive emotions, for long-term retention (Danek & Wiley, 2020; Kizilirmak, Galvao Gomes da Silva, Imamoglu, & Richardson-Klavehn, 2016).

If the teacher succeeds in strongly stimulating even more sensory representations from the learners' prior world knowledge, such as, for example, the sound of raindrops on the window and of thunder rumbling in the distance, the look of lightning in the dark sky, the smell of humid earth during a thunderstorm, the emotions experienced during the last thunderstorm and the location where it took place, the linguistic element will be processed within a rich network of associations (Figure 2) and, as theory goes, will have a much greater chance of intake, of strong memory traces and easier retrieval afterwards (Li & Jeong, 2020). For teaching purposes, it is therefore vital not to restrict the concept of prior knowledge to *prior linguistic knowledge* as encountered in earlier language lessons, but to encompass specifically *prior world knowledge* as the entirety of prior experiences pertaining to situations of use. Only the latter has the potential to activate the huge variety of associations relevant for the construction of a well-rounded conceptual-linguistic representation in the learner's interlanguage system.

The focus on linguistic form has a special place in this discussion (Section 5.3). Although theorists agree that a certain amount of attention to a language element is necessary to ensure intake, it is an ongoing controversy as to how much attending to a feature is needed to guarantee further processing and storage (*Noticing Hypothesis*, Schmidt, 1990). The Noticing Hypothesis posits that a voluntary or involuntary degree of consciousness (i.e., registering a linguistic feature) is necessary for language learning. Schmidt claims that conscious noticing is the necessary and sufficient condition, but that only the first encounter of a feature needs to be conscious for successful learning, a notion with which not all experts agree (Mitchell, Myles, & Marsden, 2019).

Other controversies pertain to the questions of whether *explicit* learning (using conscious attention) or *implicit* learning (without conscious awareness) is more helpful for this, and whether explicit knowledge can be converted, more or less automatically, into implicit knowledge (*no-, weak or strong interface positions*, R. Ellis et al., 2009, p. 20ff). While some researchers make a strong argument that implicit learning is the default learning mechanism in L2 acquisition, there is wide agreement that the capacity for it seems to diminish with age and that explicit learning facilitates SLA, especially given the fact that L2 exposure in the classroom is highly limited (Long, 2015). Another matter is the degree of awareness necessary for *noticing*. Other relevant distinctions in this debate are made between *incidental* (unintentional) vs. *intentional learning*,

*declarative* vs. *procedural knowledge*, and *automatic* vs. *controlled* processing, often operationalised in different terms (see R. Ellis et al., 2009, for an overview).

What seems clear, however, is that the conscious noticing of a certain linguistic element functions as a “door-opener” for future conscious or unconscious recognition of this particular input feature. For example, if a learner has noticed adverb formation in L2 English using *-ly*, s/he will be more likely to notice *-ly*-structures in the input from then on. This phenomenon is referred to in SLA as *priming* (Gass et al., 2020; Long, 2015).

For the sake of the argument of this overview, I hold that increasing levels of awareness / noticing will lead to increasing depth of processing and chance of storage, that incidental and implicit learning are possible in L2 acquisition, and that explicit knowledge is a different type of knowledge than implicit knowledge and stored in a different way, but that it can be used to form (and in that way, be converted into) implicit knowledge. As to the exact nature of this conversion, for the purpose of this article I remain agnostic.

It seems that learners differ individually in their aptitude (or their ease) to acquire explicit and implicit knowledge, and that very different cognitive skills are related to both types of learning (Long, 2015). This provides a strong argument for teaching approaches which cater to both implicit and explicit learning at the same time, such as TBLT and, even more strongly, CBLT. Massive doses of L2 input are helpful for implicit L2 learning (Long, 2015). CBLT in the form of intensive bilingual programmes in which a large part of the curriculum is taught through the L2 has a high potential for *both* types of learning due to the high amount of L2 input and frequent opportunities for *focus on form* during content-based activities (Section 5.3). This is compatible with findings which reveal that embodied multimodal social learning is especially beneficial for struggling learners who have difficulties following abstract information sources (Li & Jeong, 2020).

Research in ISLA asks the question of what input characteristics lead to attention, noticing, deep processing and storage, and how they can be achieved through instructional techniques. The following section focuses on this aspect.

### **3.2.2 WHAT LEADS TO HIGH LEVELS OF ATTENTION, NOTICING, COGNITIVE INVOLVEMENT AND KNOWLEDGE CONSTRUCTION?**

Figure 2 shows that many processing models see perceived *salience* of an impulse as a strong moderating factor for attention and noticing, and as a trigger for activation of mental representations (N. Ellis, 2012; Gass, Spinner, & Behney, 2018). This trigger is closely connected with what learners experience as unexpected (*surprisal*) or as important (*emotion / value*). *Salience* means that a certain stimulus is registered as standing out from other perceptions by the learner.

N. Ellis describes three ways in which a signal can “pop out” for the learner. First of all, it may depend on the intensity of an external stimulus such as unexpected loud noises or sudden movements, which represent a strong contrast to the background (*psychophysical salience*, also often referred to as *perceptual salience*). Secondly, something may stand out because it is

relevant to the learner's current mental state or prior experiences (*salient associations*). This may have to do with their emotions, with motivation, with what they value, all of which is highly individual. If the teacher for instance uses the picture of a well-known soccer player, salience might be much higher for soccer fans (and especially of that particular club) than for those unfamiliar with him or her. Finally, a stimulus is salient when learners experience a *surprise* because their expectations did not come true (N. Ellis, 2016).

Most of our human experiences rely on the regularity in our outside world – in fact, we would not be able to function if it were not for recurring patterns in almost everything we experience from communicative situations to other patterns of human behaviour to the physical operating of the world. We function, therefore, based on ongoing predictions with respect to all of these matters. If these predictions are violated because the signal we perceive is highly unexpected, this surprisal might lead to learning even based on a single strong experience. This may refer to content as well as language learning. If a teacher throws two balls to the ground of which only one bounces back and the other remains on the floor, this is a surprising impulse which might introduce a general studies lesson in primary school (content). For salient linguistic forms, Gass et al. (2018) take the example of article use in the L2, which might be unexpected if the learner's L1 does not contain articles. The concept of salience is very much in line with Piaget's notion of *disequilibrium* in his theory of learning in which accommodation, that is, the internal shift of stored schemas, happens because of an imbalance in the learner's internal representations based on a new, surprising experience.

While different forms of salience occur naturally across contexts, one aim of teaching is to generate or to increase salience of certain linguistic structures (or subject content, for that matter) to facilitate learning (*constructed salience*, also referred to as *pedagogically manipulated* or *externally induced salience*) (Gass et al., 2018, pp. 7ff, 292). This may happen, for example, “by enhancing their transparency, modifying their input frequency, or otherwise increasing their salience so that, ultimately, their learning difficulty is mitigated” (Housen & Simoens, 2016, p. 169); in other words, using all kinds of techniques which emphasise, visualise, explain and repeat the information to render it more accessible, noticeable and comprehensible for the learner.

After a stimulus has been noticed by the learner, and a network of mental representations has been triggered (Figure 2), *comprehension* is an essential part of knowledge construction and storage; noticing a certain feature does not help much if its meaning in the context does not become clear (*form-function mapping*). This was stressed in Krashen's *Comprehensible Input Hypothesis* (1985), which is generally considered a starting point of the fruitful input-interaction-output debates that resulted in the cognitive-interactionist framework recently formulated by Long (2015). For this meaning-making process to take place, teachers use a variety of instructional strategies both on a linguistic and a non-linguistic level.

Sections 4-5 report on a number of such strategies used in instructional contexts to meet these different goals as summarised above: modifying situational contexts (e.g., tasks), input and classroom interaction to increase saliency and comprehensibility of stimuli, in order to facilitate attention, noticing, intake, deep processing, and long-term retention. An important modification of the situational context which induces widespread cognitive stimulation, including the

activation of prior world and language knowledge is to involve learners in active *problem-solving* processes.

Tasks and subject content which engage learners in intensive thinking processes facilitate construction of new knowledge and long-term retention. These instructional techniques are elaborated on in Section 4. Section 5 then focuses on modifications of the linguistic context with respect to characteristics of the teacher's input, interaction and the support of learner's output. It is important for the classification of such instructional techniques to be clear about the types of constructs used for that description. They are, therefore, explained in the following section.

### 3.3 OPERATIONALISING L2 INSTRUCTIONAL TECHNIQUES

It is essential for empirical studies in ISLA to define the strategies described above in such a way as to render them measurable. Classroom observation instruments with clear definitions of each strategy are helpful means to that end and can furthermore serve to inform pedagogical classroom practice (e.g., COLT, Spada & Fröhlich, 1995; ITSOC, Fortune, 2014; SIOP, Echevarría, Vogt, & Short, 2010; TALOS, Ullmann & Geva, 1982; IQOS, Weitz, Pahl, Flyman Mattsson, Buyl, & Kalbe, 2010; Weitz, 2015). One such instrument which has recently been developed on the basis of the above framework is the *Teacher Input Observation Scheme* (TIOS) (Kersten et al., 2018). It includes 41 instructional strategies used in the L2 classroom, which are derived from the research presented here. It operationalises these strategies as *L2 teaching techniques*, which are defined as a “description of how a communicative behaviour or activity is carried out in the classroom at a given moment as the actual point of contact with the learner/s” (Kersten et al., 2019, p. 23; see also Cook, 2008, and Larsen-Freeman and Anderson, 2011, for more information).

It has to be pointed out that this descriptive definition precludes the use of general terms such as *scaffolding* or *negotiation of meaning* since they inherently contain a *function* and/or teachers' *intention* or *goal*; however, those are not possible to determine through mere observation and are thus not suitable as an item for an observational instrument. The TIOS also restricts itself to an observable and practically applicable level within a hierarchy of supercategories and subcategories of strategies (e.g., the selection of “prompt” in the hierarchy of “feedback → **prompt** → elicitation”) for data coding. This systematic classification of techniques (Bruhn & Kersten, 2018) allows for L2 classroom observation studies as well as teacher training and teachers' self-evaluation, and has been found to be especially beneficial for primary classroom levels.

The following sections describe the instructional strategies derived from the above framework for characteristics of classroom activities (Section 4) and modified L2 input, interaction including corrective feedback and output (Section 5). In these sections, I refer to respective techniques as operationalised in the TIOS (T) using “T,” plus the respective item number/s in the TIOS observation scheme [T+item number]. For instance, for task characteristics, which are operationalised in the TIOS in items 1-13, I use [T1-13], and so on.

In addition, for classroom practitioners, these instructional techniques discussed here may also serve as best practice recommendations for classroom application. The TIOS manual gives additional important practical information on the interpretation of each technique. It has been successfully used in teacher training events for early L2 acquisition but is not restricted to it. It has to be noted, however, that each technique has to be adapted to the actual learner group and might look very different when applied to young, adolescent or adult learners, or to beginners versus more proficient L2 learners (van de Pol, Volman, & Beishuizen, 2010). As L2 proficiency is highly variable even for young learners depending on the L2 programme they attend (Figure 4), teachers might need to recur to different adaptations of these techniques. Learners in a low-intensity fourth grade class might, for instance, need much more comprehension scaffolding than second grade learners in an intensive bilingual programme, while the choice of activities should also be geared at the cognitive level of different age groups. Finally, some empirical evidence for the effects of a combination of various techniques on young learners' L2 attainment is described, before the pedagogical implications for (early) L2 acquisition is summarised. The section closes with a final conclusion.

#### **4. CHARACTERISTICS OF COMMUNICATIVE-INSTRUCTIONAL ACTIVITIES IN WHICH THE L2 IS EMBEDDED**

##### **4.1 L2 ACTIVITIES**

Linguistic input is typically embedded in *language- and/or content-based activities* (Figure 1). Research in ISLA, and notably within the cognitive-interactionist framework, has centred around characteristics of activities with a high potential to facilitate L2 acquisition. I use the term activities here as a cover term to encompass both teacher-induced exercises or tasks (R. Ellis & Shintani, 2014). It is not the intention of this article to enter the fine-grained discussions in the field with respect to very specific task traits under scrutiny in many empirical studies. These investigations are vital to drive forward our knowledge base and inform classroom practice in very specific ways (for comprehensive overviews, see R. Ellis and Shintani, 2014; Long, 2015; Loewen, 2020 and Loewen and Sato, 2018). The following discussion gives a general overview of the main features of activities discussed in ISLA, where many researchers agree that they are effective to a certain extent for SLA, and which are in line with the theoretical models outlined above (see TIOS items [T1-13], Kersten et al., 2018). If not indicated otherwise, the following aspects are based on these sources.

The key properties of activities that are assumed to lead to intake, strong cognitive involvement and knowledge construction (Figure 2) are those that capture and hold the learner's attention, strongly activate their prior experiences (prior world knowledge and linguistic knowledge) [TIOS, item 8: T8], stimulate multiple senses using various channels of information and materials [TIOS, item 12: T12], and involve the learners actively at all times [T9], all the while being present in a positive, non-threatening learning environment. As experts have argued countless times, all these features converge mainly in activities which are based on *meaningful*

*content* [T1,2] (Krashen's, 1985, *meaning-focused instruction* was an important driving force for this discussion), which contain some kind of *open-ended* purpose [T1,10,11], and which are carried out as individual problem-solving activities (Heine, 2010) to ensure deep processing and knowledge construction [T7]. "Problem" may refer to both language- or content-related questions to be solved actively by the learner and may range from very small to very large dimensions (Long, 2015, p. 65ff). This is further corroborated by studies on autonomous problem solving (e.g., Danek & Wiley, 2020; Kizilirmak et al., 2016).

The recent rise in TBLT research, a teaching approach which is exemplary in integrating current research findings in this area and which provides a very good framework of the most important elements discussed here, can be seen against this backdrop. Another framework which provides this and is also compatible with TBLT is CBLT. Here, language and content learning are integrated in that subject content is taught through the L2 in bilingual programmes, for example, immersion programmes (e.g., Lightbown, 2014). The L2 is built up concurrently (hence the term *content and language integrated learning* or *CLIL* used as a cover term for bilingual programmes in the European context). Teaching a content subject can very well be centred around a task (in the TBLT sense) and should optimally be accompanied by the facilitating techniques mentioned in this overview.

Other aspects considered crucial for (language) learning as embedded in the construction and instruction of activities are an explicit awareness-raising function for the learners with regard to the learning objective (Section 3.2.1), and the linguistic forms and type of interactions required. To achieve this meta-level of understanding, activities need to be explicitly and comprehensibly linked to their specific learning goals [T5]. Furthermore, activities are considered effective if they provide opportunities for genuine interactions between learners and, relatedly, for genuine output (language use) [T10,11] (Figure 1). For incremental language learning to take place, they need to require specific linguistic elements [T6] which are necessary to complete the goal of the activity, and which can be attended to explicitly (Section 5), and which are increased in complexity over time.

Finally, learning activities have to be geared at the cognitive and linguistic levels of the target group to be comprehended and to become intake. Researchers pay increasing attention to learners' individual differences, which account for huge differences in academic attainment both in content knowledge and in linguistic terms (Dörnyei, 2005). For this reason, educators are called to construct differentiated activities that cater to different levels of readiness, interests and learning styles of heterogeneous groups of learners (Tomlinson & Moon, 2013) [T13]. Such measures pertain to the learning *content*, the learning *process*, the forms of presentation with which learners present the learnt content (*product*), and the learning climate (*affect/environment*).

## **4.2 INTERACTION AND NEGOTIATION OF MEANING AND FORM**

Comprehensibility is a necessary condition for most if not all types of learning. This is no different for activities carried out in the classroom. Comprehensibility can be ensured through ongoing interaction between teacher and learners, notably in a process referred to as *negotiation*

*of meaning* (NoM) and, with a focus on language, *negotiation of form* (NoF). These are considered the vital, SLA-driving processes in the cognitive-interactionist framework. Different forms of interaction and negotiation cover a wide range of techniques which refer to or combine all other external aspects of Figure 1, that is negotiating contents of classroom activities, modifying verbal input, encouraging learner output and giving corrective feedback, which is why a number of interactional techniques are covered within different sections of this article, and analogously, in different scales of the TIOS.

The first step to render an activity comprehensible is its delivery to the learners, that is, whether the activity is clearly introduced and explained and in what way it is modelled or demonstrated [T3,4]. These are followed by questions and comprehension checks combined with further explanations as a continual part of the instructional process [T25]. These last examples make clear that characteristics of chosen activities are inseparably intertwined with, and represent the basis for, the context in which language is encountered by the learners. The next section specifies characteristics of this linguistic context.

## **5. THE LINGUISTIC CONTEXT: QUALITY OF INPUT, INTERACTION AND THE SUPPORT OF LEARNER'S OUTPUT**

Scaffolding techniques which foster comprehensible input (Burmeister, 2006; Massler & Ioannou-Georgiou, 2010) are crucial especially in the early stages of SLA (Krashen, 1985). They refer to teachers' intentional "temporary support provided for the completion of a task that learners otherwise might not be able to complete" (van de Pol et al., 2010, p. 2). In L2 research, they are often related to linguistic *input quality*, a construct which has been defined in different ways in SLA. One strand of studies operationalises it as *native speaker-* vs. *non-native speaker-*input and defines it in terms of proficiency, richness/complexity or authenticity of the linguistic input, while other studies rather look at scaffolding techniques such as fostering comprehensibility, interaction, and L2 output.

Positive results for different aspects of input quality have been found in various studies (e.g., Graham, Courtney, & Marinis, 2017; Loewen & Sato, 2018; Weitz et al, 2010). *Linguistic input quality* is used here to describe the teacher's linguistic behaviour as the form in which the L2 is encountered by the learner in the classroom. These aspects of input are operationalised in the TIOS items T14-25. More specifically, this concerns how teachers modify *verbal input* in the L2 lexically, structurally and prosodically. *Input quality* in more general terms concerns teachers' communicative behaviour beyond speech modifications, notably how teachers shape their verbal interactions with the learners for example in terms of *authenticity of communication*, *negotiation of meaning*, how they accompany them with *non-verbal* scaffolds, types of *feedback* and *focus on form* including all strategies that are needed for these types of interactions. An important aspect of interaction is how teachers create opportunities for the productive *L2 output* of the learners. These issues were first raised in Krashen's *Comprehensible Input Hypothesis* (1985), Long's *Interaction Hypothesis* (1981, 1996) and Swain's *Output Hypothesis* (1985, 1995).

An example for L2 input for very young learners in a bilingual pre-school, in which the L2 educator displays numerous such techniques within a short content-based activity introduction, can be found in Kersten (2019b). Part “b” of Figure 4 shows an example of a teacher’s input modifications in an L2 primary classroom. It should be noted that classroom input obviously also contains the linguistic utterances of the peers. However, for the sake of simplicity, the focus remains on the teacher while it is clear that many aspects described here also pertain to input provided by peers.

## 5.1 VERBAL INPUT

In line with the models of cognitive processing presented in Figure 1 and Figure 2, verbal utterances have a high chance of intake if they are encountered frequently and demand recurring attention. This is in line with the *Frequency Hypothesis* (N. Ellis, 2012; Hatch & Wagner-Gough, 1976) which claims that the use of large amounts of input in which elements reoccur frequently and many examples of the same phenomenon are made accessible, these elements will be better stored in memory. In instructional contexts for young learners, this may be ensured by a large amount of input in general [T15,16] – intensive L2 programmes with many hours of foreign language teaching per week such as bilingual programmes yield higher L2 levels than non-intensive programmes which, in the German context, usually comprise two 45-minute lessons per week – and by any type of verbal input modification which increases the use of L2 elements. This includes recurring routines and rituals in the classroom [T18], repetitions of key elements [T19] and lexically and structurally rich language which provides paraphrases, synonyms and antonyms [T17]. Concrete speech modifications which promote comprehension include clear articulation [T21], a slower speech rate for certain aspects of the message if necessary for the group of learners [T22], prosodic elements with intonation and stress of certain key elements [T23] and, most importantly, pauses to help segment the incoming stream of sounds [T24] and to support recognition of key elements. For heterogeneous groups of learners (which, in fact, pertains to almost all groups we are talking about) these techniques would have to be adapted to different levels of learner skills [T20]. Finally, all these modifications are, of course, closely related to the L2 teacher’s overall proficiency in the L2 [T14], which is not self-evident in most L2 classrooms and a discussion in its own right (Carlson, 2020).

## 5.2 NON-VERBAL INPUT

Linguistic utterances in the classroom are usually accompanied by unintentional or intentional non-verbal cues [T26-30]. Type and amount of non-verbal support often depends on the language level of the learners and gets reduced, like other scaffolds, with increasing skills (van de Pol et al., 2010). Non-verbal techniques comprise the use of body language (facial expressions, gestures, mime) [T26], visual illustrations such as pictures, graphs, videos [T27], and actual hands-on materials often referred to as manipulatives [T28]. Non-verbal written forms of input include simple labels, phrases or single sentences and texts, which are highly dependent on the



learners' L2 level [T29] (Long, 2015). Non-verbal support can be made more permanent, and thus increase frequency, by displaying materials, written labels/texts and visual illustrations in the classroom [T30].

### 5.3 INTERACTION AND SUPPORT OF OUTPUT

Learners' productive L2 use and the feedback they receive about it has a central place in ISLA. First raised as part of Long's *Interaction Hypothesis* (1981, 1996) and Swain's *Output Hypothesis* (1995), the means to support learner output and the function of corrective feedback have received much attention in a multitude of studies. The *Interaction Hypothesis* emphasises that input is rendered comprehensible in interactive exchanges between learners and proficient L2 speakers, which contain many opportunities for comprehension checks, negotiation of meaning and explanations. The *Output Hypothesis* posits that a strong support of productive learner output is necessary because it provides learners with opportunities to monitor their speech production, test their hypotheses about and notice gaps in their interlanguage. *Corrective feedback* both with regard to content (especially crucial in meaningful activities and in CBLT) and to language is considered a means to focus the learner's attention on non-target-like representations, to render them more salient and to increase the chance of deep processing and subsequent storage.

Ways to foster output in the L2 classroom depend strongly on the language level of the learners and the choice of activities. Scaffolds such as prepared key vocabulary and phrases for learners' utterances on the targeted level [T36] are a helpful way to encourage beginning learners to use the L2 [T33]. In a meaningful task- or content-based context, questions which require open answers are part of the teaching approach [T31] and are considered especially beneficial as they increase the chance of widespread activation of conceptual structures both with regard to language and content (Figure 1) and make active retrieval from memory necessary. In some cases, especially if the activation of prior world knowledge concerning a meaningful problem is successful and requires strong learner involvement, beginning learners might not yet possess the necessary language skills to express their thoughts.

However, since language in content-based teaching contexts should not be learnt at the expense of the subject content, or even at the expense of widespread activation of the learners' associative networks in their mind, it might become necessary to allow learners to use the L1 to compensate for some gaps in the L2 [T34], and to use alternative non-verbal ways of expression [T35]. In such situations, it is vital to give learners enough time for their answers [T32] and to show appreciation for their productions [T37], which contributes to motivation and a positive classroom climate, or in Krashen's framework, lower the affective filter (Krashen, 1985; Dewaele & MacIntyre, 2014). The time spent for L2 learning in the classroom, and thus the learners' individual speaking opportunities, is naturally very limited, which is yet another argument for using interactive tasks that involve all learners actively in peer-peer interactions.

### 5.3.1 CORRECTIVE FEEDBACK

The term *corrective feedback* (CF) refers to any type of verbal reaction to a learner's non-target-like utterance which puts a focus on the (content or language) error [T38,39] (R. Ellis & Shintani, 2014). These reactions can range from very implicit to very explicit ways of pointing out the error. Researchers have suggested different taxonomies of how to classify types of error corrections. A common classification has been suggested by Lyster and Saito (2010), who differentiate between *recasts* [Tb,e], *explicit corrections* [Ta,d], and several different types of *prompts* [T40c,f]. *Recasts* are reformulations of the non-target-like utterance in a correct form without requesting further uptake by the learner – they represent an implicit form of feedback (which can easily be ignored by the learner especially if there is a strong focus on meaning in the exchange), even though there are ways to render recasts more explicit, for example by adding stress and intonation. Long (2015, p. 55) points out:

Recasts are crucial points at which implicit and explicit learning converge in optimal ways...The learner is vested in the exchange, as it is his or her message that is at stake, and so will probably be motivated and attending, conditions likely to induce intentional learning and facilitate noticing of any new linguistic information in the input. The fact that the learner will already understand all or part of the interlocutor's response (because it is a reformulation of the learner's own) also means that he or she has additional freed-up attentional resources that can be allocated to the form of the response and, again, to form–function mapping.

*Explicit corrections*, on the other hand, draw the learner's attention strongly to the error in that the error is pointed out explicitly (such as in “no, that's not correct, the correct word is ...”). Finally, *prompts* force (or “prompt”) the learner to reformulate their utterance themselves by marking the problem but without providing the correct answer. According to Lyster and Saito's classification, prompts consist of *clarification requests* (“Pardon me?”) [Tc1,f1], *repetitions* of the non-target-like form [Tc2,f2], *elicitations* which encourage the learner to reformulate (“What is that called in English? It's a...”) [Tc3,f3], and *metalinguistic clues* which comment on the correctness or give the learner a hint as to the type of error involved (“You need a comparative adjective,” in Lyster and Saito, 2010, p. 280) [Tc4,f4]. Different types of CF are thought to tap into different mental processes – recasts are processed in working memory while for prompts learners have to retrieve the correct form from long-term memory – which might explain their differential effects on L2 learning.

### 5.3.2 FOCUS ON FORM

Finally, the question of how and when to use corrective feedback most effectively in the language classroom has been discussed in the context of grammar-focused versus communicative classrooms (compare with *synthetic vs. analytic approaches*, Long, 2015). It has been argued that, especially in communicative meaning-based teaching, learners often do not attend explicitly to linguistic aspects which are not yet part of their knowledge base (their L1 system or their

current state of interlanguage). For that reason, researchers in ISLA point out the benefits of explicit teaching approaches which guide the learners' attention to those linguistic aspects which are not salient (enough) in the input to lead to implicit intake.

Long (2015) differentiates between *Focus on Form* and *Focus on Forms* approaches. *Focus on Form* refers to situations in which the teacher raises explicit awareness of certain linguistic elements at the precise moment when they arise or lead to a problem within meaningful communicative situations or tasks, so that learners can understand and analyse them in the context of the situation [T41]. In accordance with input processing models (Figure 1), the network of meaningful representational associations is supposed to be widespread and highly active at those times, presumably leading to better knowledge construction (Figure 4, part b). This is much less the case in *Focus on Forms* activities, that is, exercises, in which only very limited mental capacity is needed, L2 input is impoverished and the chances of deep processing within a wide network of associations is restricted (Figure 4, part a) (Li & Jeong, 2020).

In this context, Lyster's *Counterbalance Hypothesis* (2007) emphasises that, in order to increase saliency, it is most effective to guide learners' attention to elements which are incongruent with (or run counter to) "a classroom's predominant communicative orientation" (Lyster & Mori, 2006, p. 269). That means that in mainly form-focused classrooms attention is consciously directed at meaningful content while in meaning-based instruction it is directed at linguistic phenomena so that activities and feedback act as a counterbalance. This contrast, that is, the repeated change of focus between form and content, is presumed to increase awareness for gaps in the learners' knowledge and to strengthen links in memory, thus facilitating language acquisition.

Finally, some processing approaches suggest that corrective feedback can only be effective if it observes learners' developmental schedules, i.e., learners' assumed sequence in the acquisition of linguistic features of the L2. One such approach is Pienemann's (1989) *Teachability Hypothesis*. This hypothesis claims that intake is only possible if L2 morphosyntactic elements are either part of the already acquired developmental stages, or are one stage beyond the current level of the learner's interlanguage with regard to their complexity. The underlying framework, *Processability Theory* (PT) (Pienemann, 1998), assumes an implicational relationship of processing procedures with increasing complexity of linguistic forms, which means that stages cannot be skipped, and therefore learners are not equipped to internalise structures which are two stages beyond their current interlanguage level. This means for example that learners at stage 3 of the model would not be able to incorporate the 3<sup>rd</sup> person singular -s, as subject-verb agreement is only acquired at stage 5. This does not mean that learners are not able to explicitly attend to linguistic rules and to apply them in the context of an exercise where only declarative knowledge is required. They might be able to recite the rule when to use the -s and even add it correctly in a cloze test; they would, according to PT, however, be unable to use it implicitly in cases of creative production where automated knowledge is required. Corrective feedback which requires active self-correction would thus make most sense, according to developmental sequence approaches, if it refers to stages already acquired or "within reach" (from a processing perspective) for the

learner. It has to be noted, however, that not all ISLA researchers subscribe to a developmental order of acquisition.

## 6. IMPLICATIONS FOR THE L2 CLASSROOM

Numerous theorists have emphasised that communicative tasks and content-based approaches rather than exercises are best suited to fulfil the criteria summarised in the above sections. While language-focused exercises provide practice opportunities, support explicit knowledge about language and foster (restricted forms of) output, they can stimulate such cognitive processes as outlined in Figure 1 and Figure 2 only in a very restricted way (Li & Jeong, 2020; see Figure 4, part a, for an example from a language-based primary classroom). Usually, they mainly trigger explicit knowledge. Their lack of content focus makes comprehension scaffolding techniques and negotiation of meaning and form unnecessary, which are however considered major driving forces for deep processing. They do not require large representational networks which strengthen memory traces. Active individual knowledge construction hardly takes place. Low cognitive engagement is thought to diminish motivation and consequently attention, noticing and the chance of intake.

On the other hand, meaningful tasks (Figure 4, part b) and content-language integration (Figure 4, part c, for meaningful language use in primary classrooms) provide a much higher chance of rich modified input framed by numerous scaffolds, feedback and negotiation techniques, multisensory stimuli, activation of prior linguistic and world knowledge, deep processing and subsequent knowledge construction. Focus on content goals is thought to increase motivation and lower the affective filter. This type of language learning uses many different channels, triggers numerous sensory representations, and stimulates both implicit and explicit learning which can complement each other and cater to different learner aptitudes. That way, it increases the chance for each learner to construct knowledge in a way suitable to their cognitive skills and individual mental wiring. This might also be one reason why high cognitive skills seem to have a stronger impact in language-focused programmes which foster (more) explicit learning than in content-focused programmes which foster (more) implicit learning (Kersten, 2020; Tagarelli, Mota, & Rebuschat, 2011, 2015).

To suggest these teaching techniques incorporated in the TIOS and outlined in the previous sections as best practice examples for early L2 acquisition, empirical evidence is crucial. Two studies looked specifically at the combined effects of numerous of the above-mentioned instructional factors on the L2 acquisition of young learners. These two projects were carried out in bilingual pre-schools by the ELIAS group (Kersten, Rohde, Schelletter, & Steinlen, 2010), based on the observation scheme IQOS (*Input Quality Observation Scheme*, Weitz et al., 2010; Weitz, 2015), and the team that created the TIOS (Kersten et al., 2018). Kersten et al. (2018) did a reanalysis of the IQOS data with  $N=210$  children aged 3-6 and 21 teachers from nine bilingual pre-schools in Germany ( $n=7$ ), Belgium ( $n=1$ ) and Sweden ( $n=1$ ). The IQOS contains 15 items on teaching techniques pertaining to input quantity, quality, promotion of comprehensibility, and reaction to children's output, many of which are also part of the TIOS.



Figure 4. Examples from different instructional settings from 4<sup>th</sup> grade German L2 learners of English including teachers' total score rating (score out of 100%, rated on a Likert scale from 0-5 by two independent observers, see manual of the observation scheme, p. 2) in a TIOS study (Kersten et al., in preparation); S – student, T – teacher.

The study reports a high interrater reliability ( $r=.966$ ,  $p<.05^*$ ) and a high internal consistency ( $\alpha=.819$ ) for the instrument, IQOS. Children were tested twice over the course of one year for L2 lexicon using BPVS 2 (Dunn, Dunn, Whetton, & Burley, 1997) and L2 grammar with the ELIAS Grammar Test I (Kersten et al., 2010; Steinlen, Håkansson, Housen, & Schelletter, 2010), two picture pointing tests. A multilevel model using Mplus revealed a differential effect on the classroom level: L2 input quality as measured with the IQOS had a significant effect on the children's L2-grammar attainment at time 2, while L2 intensity predicted L2 lexical attainment at time 2. Other significant influences were found at the individual level for children's age, L2 contact duration and socioeconomic status, operationalised as frequency of *reading books to the children in the family*, for L2 lexicon and grammar achievement at time 1. The study concluded that input quality, operationalised as modified verbal and non-verbal input, interaction and promotion of output, seems to have a particularly strong effect on (more) explicit attention to grammatical forms as processed in working memory, while frequency operationalised as the intensity of L2 encounters seems to affect (more) implicitly acquired breadth of vocabulary knowledge. More research is needed to shed light on these differential effects and the role that particular scaffolding techniques play.

Kersten et al. (2019) carried out a pilot study with 17 L2 teachers in regular EFL and bilingual primary schools in Germany using the TIOS to operationalise L2 instructional techniques. EFL programmes started at grade 1 or grade 3 with two lessons of English per week, while in the bilingual immersion schools, all subjects except for German were taught in English starting in grade 1. Nine lessons were videotaped in each type of programme (one teacher taught a class in both programmes). Interrater reliability (IRR) of two independent raters was high (Krippendorff's  $\alpha=.882^*$  based on 687 cases, 1374 decisions, item-based IRR Pearson's  $r=.687^{**}$ - $1.000^{**}$  with  $p<.05^*$ ), as was internal consistency of the TIOS (Cronbach's  $\alpha=.905^*$  for 38 items). When comparing scores of a subset of these teachers, immersion teachers ( $n=9$ ) outperformed EFL teachers ( $n=7$ ) by 13.5 per cent points on the TIOS total score ( $p=.032^*$ ); the difference between the two groups was also significant for all scales ( $p<.05^*$ ) except for *support of output*.

As content-based programmes require increased scaffolding techniques to render content comprehensible, and as more of the immersion teachers were trained L2 teachers, this result was expected and taken as a sign for the construct validity of the instrument. The TIOS scores of ten teachers were then combined with L2 lexical and grammatical comprehension data of these teachers' respective students ( $N=183$ ,  $M_{age}=9;5$ , 93-140 months, 3.-4. grade, four EFL classes:  $n=83$ , six IM classes:  $n=100$ ). Students were tested for L2 lexicon using the BPVS 3 (Dunn, Dunn, Styles, & Sewell, 2009) and L2 grammar comprehension using the ELIAS Grammar Test II (Kersten et al., 2012). Results showed that the total score as well as *task characteristics* and *verbal input* correlated strongly with both receptive L2 skills. A regression analysis revealed that roughly 22 per cent of variance for receptive lexical skills and 21 per cent of variance for receptive grammar skills could be explained by the teachers' TIOS score (L2 lexicon:  $R^2=.218$ ,  $F(1, 167)=46.635$ ,  $T=6.829$ ,  $B=.834$ ,  $p<.001^{**}$ ; L2 grammar:  $R^2=.212$ ,  $F(1, 167)=45.026$ ,  $T=6.710$ ,  $B=.668$ ,  $p<.001^{**}$ ).

Results like these support the combined effectivity of techniques of instructional quality as described in this article and as operationalised using observational schedules such as IQOS and TIOS, thus lending further support to processing models as outlined in Figure 1.

## 7. CONCLUSION

The goal of this article has been to give an overview of L2 input and instructional principles which are currently discussed in the cognitive-interactionist approach in ISLA, and to outline their theoretical underpinnings concerning individual (language) learning mechanisms. Understanding these mechanisms in the learner's internal context is crucial to explain effects and effectiveness of teaching principles used in the L2 classroom. Relying on four models of second language acquisition, teachers' choice of classroom activities, their verbal and non-verbal input, interaction and feedback strategies were discussed in terms of scaffolding comprehensibility and inducing cognitive activation. It has been argued throughout the text that effective teaching techniques include those which lead to intake, deep processing and, consequently, knowledge construction and storage in the learner, and that this effect is mainly achieved by providing salience, noticing and awareness, by stimulating prior world knowledge, autonomous problem solving and a rich network of meaningful associations, and by ensuring a positive learning environment to induce a state of learning enjoyment.

These aspects are compatible with theoretical frameworks such as TBLT and CBLT. The *Teacher Input Observation Scheme* (TIOS, Kersten et al., 2018) operationalises these principles in the form of teaching techniques, which also serve as a structuring element for the discussion of practical L2 instruction to young learners in the second part of the article. While these principles generally apply across all age groups and proficiency levels, adequate age-appropriate scaffolding techniques which foster comprehension, engagement and cognitive stimulation are vital particularly for young learners at the beginning of their L2 acquisition. The article concludes with concrete examples and empirical evidence from pre-school and primary classrooms which testify to the effectiveness of L2 teaching techniques as represented in the TIOS.

In closing, I would like to quote Lotta, an immersion student of the teacher with the highest TIOS score in our data set who taught the 4<sup>th</sup> grade class in Figure 4 (part c). It highlights not only the high level of L2 attainment that can be reached by young learners in intensive L2 programmes where teachers provide excellent input quality; it also shows the importance of a positive, inspiring learning environment as emphasised in studies of foreign language enjoyment (Dewaele & MacIntyre, 2014). Asked about the highlight of her four years in primary schools, she answered:

*My highlight was actually every single second in the school...I will miss it, this atmosphere, and feeling confident in the class, and safe.*

## REFERENCES

- Böttger, H. (2016). *Neurodidaktik des frühen Sprachenlernens. Wo die Sprache zuhause ist* [Neurodidactics of early language learning. Where language is located]. Bad Heilbrunn: Klinkhardt.
- Bruhn, A-C., & Kersten, K. (2018). *Operationalizing teacher input: Empirical evidence on the effect of input on the L2 acquisition of young learners*. Paper presented at EUROSLA 28, Münster University.
- Burmeister, P. (2006). Frühbeginnende Immersion [Early immersion]. In U. O. H. Jung (Ed.), *Praktische Handreichung für Fremdsprachenlehrer* [Practical guideline for foreign language teachers] (pp. 385–391). Frankfurt a.M.: Peter Lang.
- Cameron, L. (2001). *Teaching languages to young learners*. Cambridge: Cambridge University Press.
- Carlson, C. (2020). *Elementary school L2 English teachers' language performance and children's second language acquisition*. Hildesheim: Universitätsverlag.
- Cook, V. (2008). *Second language learning and language teaching*. London: Hodder Education.
- Danek, A. H., & Wiley, J. (2020). What causes the insight memory advantage? *Cognition*, 205. Retrieved from <https://doi.org/10.1016/j.cognition.2020.104411>
- De Graaf, R., & Housen, A. (2009). Investigating the effects and effectiveness of L2 instruction. In C. J. Doughty & M. H. Long (Eds.), *The handbook of language teaching* (pp. 726–755). Malden, MA: Wiley-Blackwell.
- De Groot, A. M. B. (2015). *Language and cognition in bilinguals and multilinguals: An introduction*. London: Routledge.
- Dewaele, J-M., & MacIntyre, P. D. (2014). The two faces of Janus? Anxiety and enjoyment in the foreign language classroom. *Studies in Second Language Learning and Teaching*, 4(2), 237–274.
- Dörnyei, Z. (2005). *The psychology of the language learner: Individual differences in second language acquisition*. Mahwah, NJ: Lawrence Erlbaum.
- Dunn, L. M., Dunn, L. M., Whetton, C., & Burley, J. (1997). *British picture vocabulary scale* (2nd ed.). Windsor: NFER-Nelson.
- Dunn, L. M., Dunn, D. M., Styles, B., & Sewell, J. (2009). *The British picture vocabulary scale* (3rd ed.). London: GL Assessmt.
- Echevarría, J., Vogt, M. E., & Short, D. J. (2010). *Making content comprehensible for English language learners: The SIOP Model* (3rd ed.). Needham Heights, MA: Allyn & Bacon.
- Ellis, N. C. (2012). Frequency-based accounts of SLA. In S. M. Gass & A. Mackey (Eds.), *The Routledge handbook of second language acquisition* (pp. 193–210). London: Routledge.
- Ellis, N. C. (2016). Salience, cognition, language complexity, and complex adaptive systems. *Studies in Second Language Acquisition*, 38(2), 341–351.
- Ellis, R. (2003). *Task-based language learning and teaching*. Oxford: Oxford University Press.



- Ellis, R., Loewen, S., Elder, C., Reinders, H., Erlam, R., & Philp, J. (2009). *Implicit and explicit knowledge in second language learning, testing and teaching*. Bristol: Channel View Publications.
- Ellis, R., & Shintani, N. (2014). *Exploring language pedagogy through second language acquisition research*. London: Routledge.
- Fortune, T. (2014). *Immersion teaching strategies observation checklist*. Center for Advanced Research on Language Acquisition, University of Minnesota. Retrieved from <http://carla.umn.edu/immersion/checklist.pdf>
- Gass, S. M., & Mackey, A. (2015). Input, interaction, and output in second language acquisition. In B. VanPatten & J. Williams (Eds.), *Theories in second language acquisition* (2nd ed.) (pp. 180–206). New York, NY: Routledge.
- Gass, S. M., Behney, J., & Plonsky, L. (2020). *Second language acquisition: An introductory course* (5th ed.). New York, NY: Routledge.
- Gass, S. M., Spinner, P., & Behney, J. (2018). Salience in second language acquisition and related fields. In S. M. Gass, P. Spinner, & J. Behney (Eds.), *Salience in second language acquisition* (pp. 1–17). New York, NY: Routledge.
- Graham, S., Courtney, L., & Marinis, T. (2017). Early language learning: The impact of teaching and teacher factors. *Language Learning*, 67(4), 922–958.
- Hatch, E., Wagner-Gough, J. (1976). Explaining sequence and variation in second language acquisition. *Language Learning*, 4, 39–57.
- Heine, L. (2010). *Problem solving in a foreign language*. Berlin: De Gruyter Mouton.
- Housen, A., & Simoens, H. (2016). Introduction: Cognitive perspectives on difficulty and complexity in L2 acquisition. *Studies in Second Language Acquisition*, 38(2), 163–175.
- Hume, D. (1907). *An enquiry of human understanding and selections from A Treatise of Human Nature*. Chicago, IL: The Open Court Publishing.
- Kersten, K. (2019a). Die Ewigkeit in ihr Herz – Gedanken zu Erkenntnis in Wissenschaft und Glauben [*Eternity set in the human heart Epistemological reflections on knowledge in science and spirituality*] (pp. 209–226). In W. Greve & C. Jochum-Bortfeld (Eds.), *Nachdenken über Spiritualität: Warten – Suchen – Entscheiden* [*Reflecting on Spirituality: Waiting – Searching – Deciding*]. Hildesheim: Universitätsverlag & Olms Verlag.
- Kersten, K. (2019b). Einflussfaktoren im bilingualen Fremdspracherwerb [*Influencing factors in bilingual foreign language acquisition*]. In A. Rohde & A. K. Steinlen (Eds.), *Sprachenvielfalt als Ressource begreifen: Mehrsprachigkeit in bilingualen Kindertagesstätten und Schulen (Band II)* [*Understanding language diversity as a resource: Multilingualism in bilingual preschools and schools (Volume II)*] (pp. 35–70). Berlin: Dohrmann.
- Kersten, K. (2020). Der Zusammenhang von kognitiven Fähigkeiten und Zweisprachigkeit im frühen L2-Erwerb: Individuelle und externe Faktoren [*The relationship between cognitive abilities and bilingualism in early L2 acquisition: individual and external factors*]. In H. Böttger, J. Festman & T. Müller (Eds.), *Language education & acquisition research: Blick*

- auf den frühen Spracherwerb [Focusing early language acquisition]* (pp. 81–118). Bad Heilbrunn: Klinkhardt.
- Kersten, K., Schüle, C., & Steinlen, A. K. (2018). The effect of internal and external variables on early foreign language acquisition: Evidence from bilingual preschools. Paper presented at EUROSLA 28: University of Münster.
- Kersten, K., Bruhn, A-C., Koch, M., & Schriek, J. (2019). The effect of L2 input and cognitively stimulating tasks on second language acquisition. Paper presented at EUROSLA 29, Lund University.
- Kersten, K., Rohde, A., Schelletter, C., & Steinlen, A. K. (Eds.). (2010). *Bilingual preschools. Vol. I: Learning and development*. Trier: WVT.
- Kersten, K., Bruhn, A-C., Ponto, K., Böhnke, J., & Greve, W. (2018). Teacher input observation scheme (TIOS). *Studies on Multilingualism in Language Education, 4*.
- Kersten, K., Bruhn, A-C., Schriek, J., Ponto, K., Böhnke, J., & Greve, W. (in preparation). Operationalizing foreign language teaching strategies in primary school classrooms. Manuscript: Hildesheim University.
- Kersten, K., Piske, T., Rohde, A., Steinlen, A. K., Weitz, M., Couve de Murville, S., & Kurth, S. (2012). ELIAS grammar test II. *Studies on Multilingualism in Language Education, 1*.
- Kizilirmak, J. M., Galvao Gomes da Silva, J., Imamoglu, F., & Richardson-Klavehn, A. (2016). Generation and the subjective feeling of “aha!” are independently related to learning from insight. *Psychological Research, 80*(6), 1059–1074.
- Kormos, J. (2011). Speech production and the cognition hypothesis. In P. Robinson (Ed.), *Second language task complexity* (pp. 39–60). Amsterdam: Benjamins.
- Krashen, S. (1985). *The input hypothesis: Issues and implications*. New York, NY: Longman.
- Kuhl, P. K. (1999). The role of experience in early language development: Linguistic experience alters the perception and production of speech. In N. A. Fox, L. A. Leavitt & J. G. Warhol (Eds.), *The role of early experience in infant development* (pp. 101–125). Johnson & Johnson.
- Larsen-Freeman, D., & Anderson, M. (2011). *Techniques and principles in language teaching*. Oxford: Oxford University Press.
- Leow, R. P. (2015). *Explicit learning in the L2 classroom*. London: Routledge.
- Leow, R. P. (2018). Explicit learning and depth of processing in the instructed setting: Theory, research, and practice. *Studies in English Education, 23*(4), 769–801.
- Levelt, W. J. M. (1989). *Speaking. From intention to articulation*. Cambridge, MA: MIT Press.
- Li, P., & Jeong, H. (2020). The social brain of language: Grounding second language learning in social interaction. *npj Science of Learning, 5*(8). Retrieved from <https://doi.org/10.1038/s41539-020-0068-7>
- Lightbown, P. (2014). *Focus on content-based language teaching*. Oxford: Oxford University Press.
- Loewen, S. (2020). *Introduction to instructed second language acquisition*. New York, NY: Routledge.

- Loewen, S., & Sato, M. (2018). Interaction and instructed second language acquisition. *Language Teaching*, 51(3), 285–329.
- Long, M. H. (1981). Input, interaction and second language acquisition. *Annals of the New York Academy of Sciences*, 379, 259–278.
- Long, M. H. (1996). The role of the linguistic environment in second language acquisition. In W. C. Ritchie & T. K. Bhatia (Eds.), *Handbook of second language acquisition* (pp. 413–468). New York, NY: Academic Press.
- Long, M. H. (2015). *Second language acquisition and task-based language teaching*. Malden, MA: Wiley-Blackwell.
- Lyster, R. (2007). *Learning and teaching languages through content: A counterbalanced approach*. Amsterdam: Benjamins.
- Lyster, R., & Mori, H. (2006). Interactional feedback and instructional counterbalance. *Studies in Second Language Acquisition*, 28(2), 269–300.
- Lyster, R., & Saito, K. (2010). Oral feedback in classroom SLA: A meta-analysis. *Studies in Second Language Acquisition*, 32(2), 265–302.
- Massler, U., & Ioannou-Georgiou, S. (2010). Best practice: How CLIL works. In P. Burmeister & U. Massler (Eds.), *CLIL und immersion: Fremdsprachlicher Sachfachunterricht in der Grundschule [CLIL and Immersion: Content-based foreign language teaching in elementary school]* (pp. 61–75). Braunschweig: Westermann.
- Mitchell, R., Myles, F., & Marsden, E. (2019). *Second language learning theories*. London: Routledge.
- Pienemann, M. (1989). Is language teachable? Psycholinguistic experiments and hypotheses. *Applied Linguistics*, 10(1), 52–79.
- Pienemann, M. (1998). *Language processing and second language development: Processability Theory*. Amsterdam: Benjamins.
- Richards, J. C., & Rodgers, T. (2014). *Approaches and methods in language teaching* (3rd ed.). Cambridge: Cambridge University Press.
- Rosch, E. H. (1973). Natural categories. *Cognitive Psychology*, 4(3), 328–350.
- Rüschhoff, B., & Ritter, M. (2001). Technology-enhanced language learning: Construction of knowledge and template-based learning in the foreign language classroom. *Computer Assisted Language Learning*, 14(3–4), 219–232.
- Schmidt, R. (1990). The role of consciousness in second language learning. *Applied Linguistics*, 11, 129–158.
- Spada, N., & Fröhlich, M. (1995). *COLT – Communicative Orientation of Language Teaching Observation Scheme: Coding conventions and applications*. Macquarie University: National Centre for English Language Teaching and Research.
- Steinlen, A. K., Håkansson, G., Housen, A., & Schelletter, C. (2010). Receptive L2 grammar knowledge development in bilingual preschools. In K. Kersten, A. Rohde, C. Schelletter & A. K. Steinlen (Eds.), *Bilingual preschools: Learning and development (Vol. 1)* (pp. 69–100). Trier: WVT.

- Swain, M. (1985). Communicative competence: Some roles of comprehensible input and comprehensible output in its development. In S. M. Gass & C. G. Madden (Eds.), *Input in second language acquisition* (pp. 235–253). Boston: Heinle & Heinle.
- Swain, M. (1995). Three functions of output in second language learning. In G. Cook & B. Seidlhofer (Eds.), *Principle and practice in applied linguistics* (pp. 125–144). Oxford: Oxford University Press.
- Tagarelli, K. M., Mota, M. B., & Rebuschat, P. (2011). The role of working memory in implicit and explicit language learning. In L. Carlson, C. Hölscher & T. Shipley (Eds.), *Proceedings of the 33rd annual conference of the cognitive science society* (pp. 2061–2066). Austin, TX: Cognitive Science Society.
- Tagarelli, K. M., Mota, M. B., & Rebuschat, P. (2015). Working memory, learning conditions and the acquisition of L2 syntax. In Z. Wen, M. B. Mota & A. McNeill (Eds.), *Working memory in second language acquisition and processing* (pp. 225–247). Bristol: Multilingual Matters.
- Tomlinson, C. A., & Moon, T. R. (2013). *Assessment and student success in a differentiated classroom*. Alexandria: ASCD.
- Truscott, J., & Sharwood Smith, M. (2019). *The internal context of bilingual processing*. Amsterdam: Benjamins.
- Ullmann, R., & Geva, E. (1982). *The target language observation scheme (TALOS)*. York Region Board of Education, Core French Evaluation Project. Unpublished report, Ontario Institute for Studies in Education, Toronto.
- van de Pol, J., Volman, M., & Beishuizen, J. (2010). Scaffolding in teacher-student interaction: A decade of research. *Educational Psychology Review*, 22(3), 271–296.
- von Foerster, H. (1981). Das Konstruieren einer Wirklichkeit [*The construction of a reality*]. In P. Watzlawick (Ed.), *Die erfundene Wirklichkeit: Wie wissen wir, was wir zu wissen glauben?* 6. Aufl [*The invented reality: How do we know what we think we know? 6th ed.*] (pp. 39–60). München: Piper.
- Weitz, M. (2015). *Die Rolle des L2-Inputs in bilingualen Kindergärten* [*The role of L2 input in bilingual pre-schools*]. Frankfurt a.M: Peter Lang.
- Weitz, M., Pahl, S., Flyman Mattsson, A., Buyl, A., & Kalbe, E. (2010). The input quality observation scheme (IQOS): The nature of L2 input and its influence on L2 development in bilingual preschools. In K. Kersten, A. Rohde, C. Schelletter & A. K. Steinlen (Eds.), *Bilingual preschools: Learning and development (Vol. 1)* (pp. 5–44). Trier: WVT.
- Wolff, D. (2002). *Fremdsprachenlernen als Konstruktion: Grundlagen für eine konstruktivistische Fremdsprachendidaktik* [*Foreign language learning as construction: Foundations of a constructivist foreign language pedagogy*]. Frankfurt a.M: Peter Lang.

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