A.2 – English Glossary

This glossary contains concise definitions of the fundamental terms of the linguistic model of recessivity. It makes it easy and fast to look them up and aims on providing an easily accessible support in getting familiar with the introduced model.

Dark lexicon or ***dark part of the lexicon*** [in German *dunkles Lexikon* or *dunkler Teil des Lexikons*] – The part of a lexicon on an individual or a collective level that consists of all linguistic information that have not yet been phenotypificated (see →*phenotypification*) by the carrier of the lexicon; this means these information have never been part of the products of a →*genesis of a signifier* or the →*genesis of a signified* the carrier has experienced. If we talk about a dark lexicon on a collective level it could also refer to information that is considered to be temporarily "lost" in accordance to the →*general pattern of recessivity*. (Regarding linguistic systems on individual level the term lexicon shall be understood as the "mental lexicon" by which we mean all the information within the linguistic system (not only lexical information), i.e. especially the →*genotype of language*, but also some linguistic metainformation. Regarding linguistic systems on collective levels we have to keep in mind that those levels are generated during processes of synchronization (see Herrgen/Schmidt 2011), which depend on phenotypifications. This means that the dark lexicon on collective levels consists of recessive information derived from the phenotypifications that built the lexicon on collective level.)

External linguistic store [in German *externer Sprachspeicher*] – A location →*linguistic elements* get stored in that is not part of a linguistic system itself or its carrying system (an external linguistic store could e.g. be a written text on a piece of paper or a digital audio recording of a speech). Thus, external linguistic stores do never (systematically) belong to a (possible) →*phenotypificator*. External linguistic stores are especially relevant as they might transmit or transform linguistic metainformation regarding linguistic elements they store when they get in contact with a phenotypificator (e.g. if a phenotypificator reads a text (that might have been written two thousand years ago)). In such a case, external linguistic stores can influence the probability distributions (regarding →*probabilities of phenotypification*) of the linguistic system the phenotypificator carries.

General definition of recessivity [in German *Allgemeiner Rezessivitätsbegriff*]
– This term describes any information that is not perceivable in a pheno-
type (see →*phenotypification*). To apply the general definition of reces-
sivity to a certain science, a definition of both a genotype and a phenotype
in accordance to the demands of the science is necessary (i.e. the defini-
tion of the →*phenotype of language* could never be identical with the def-
inition of phenotype in genetics). The adjective corresponding to the gen-
eral definition of recessivity is *recessive*. Thus, *recessive information* is in-
formation that does (currently) not belong to the phenotype. Recessive
information might be distinguished in a qualitative way by applying the
concept of →*levels of recessivity*.

Regarding recessivity in linguistics we can define all the →*possibilities
of phenotypification* of all →*linguistic elements* that are defined as reces-
sive according to the general definition of recessivity as a set R. We can
also define a set P representing all possibilities of phenotypification of all
linguistic elements that belong to the phenotype of language and a set G
being the genotype of language. Applying this, for example, to a certain
linguistic system on individual level, we can then conclude that, with re-
gards to this system, R and P are disjoint and both R and P are subsets of
G, and finally:

$$G = P \mathbin{\dot{\cup}} R$$

General pattern of recessivity [in German *Allgemeines Rezessivitätsmuster*] –
This pattern describes the return of a once phenotypificated (see →*phe-
notypification*) and temporarily recessive (see →*general definition of re-
cessivity*) information into the phenotype. To apply the general pattern of
recessivity to a certain science, a definition of both a genotype and a phe-
notype in accordance to the demands of the science is necessary (see e.g.
the →*genotype of language* and the →*phenotype of language*). The general
pattern of recessivity is defined by the following criteria: (1.) Information
that was part of the phenotype of A and which is older than B (which is
– at least to some degree – descendent of A) is (2.) recessive in B, but (3.)
returns in the phenotype of C (which is – at least to some degree – de-
scendent of B); we can also (4.a) rule out the possibility that C got the
information in question from any other source than B, but (4.b) it is, how-
ever, possible that something else than B had a positive influence on the
phenotypification of the information in question in C. (We could, for ex-
ample, define A, B, C to represent the same carrier system of a linguistic

system at three different points in time assuming constant change of the system caused by interaction with its environment.)

Note that the general pattern of recessivity does not necessarily apply to all recessive information: It is also possible that information that once was phenotypic becomes recessive for the rest of the time that the system the information is part of exists, or that there is recessive information that was never phenotypificated.

Genesis of a signified (triggered by a signifier) [in German *(ausdrucksgetriggerte) Inhaltsgenese*] – The process commonly known as *language perception* as it is described in the →*linguistic model of recessivity*. A genesis of a signified is considered to be triggered by the physical stimulus of a signifier and marks the starting point of a process of →*phenotypification* of information that belongs to a signified (the terms "signifier" and "information belonging to a signified" refer to the bilateral Saussurean sign). (See also the opposing term →*genesis of a signifier.*)

Genesis of a signifier (triggered by a signified) [in German *(inhaltsgetriggerte) Ausdrucksgenese*] – The process commonly known as *language production* or *natural language generation* as it is described in the →*linguistic model of recessivity*. A genesis of a signifier is considered to be triggered by a signified as a →*trigger* containing information that belongs to a signified marks the starting point of a process of →*phenotypification* of information that belongs to a signifier (the paraphrases "information belonging to a signifier" and "information belonging to a signified" refer to the bilateral Saussurean sign). The signified of the final bilateral sign created is not necessarily identical to the signified that worked as trigger; the process of phenotypification can lead to a modification of the trigger's information. (See also the opposing term →*genesis of a signified.*)

Genotype of language or **linguistic genotype** [in German *Genotyp von Sprache* or *sprachlicher Genotyp*] – The Set of all (superposing (see →*superposition*)) →*possibilities of phenotypification* of all →*linguistic elements* within a linguistic system (on individual level). The genotype of language is always a superset of the →*phenotype of language* and it is related to linguistic Metainformation containing probability distributions of the possibilities of phenotypification (see →*probability of phenotypification*) for every linguistic element. We can define the genotype of language as a set

G and the phenotype of language as a set P as well as all recessive possibilities of phenotypification as elements of a set R (see →*general definition of recessivity*); then P and R are disjoint and we can conclude:

$$G = P \mathbin{\dot{\cup}} R$$

If we take a look at the genotype of language on an individual level, the prevailing system usually provides a single channel to phenotypificate (i.e. a *homo sapiens*, for example, can only execute one phenotypification at a time; this restriction is not necessarily true for all linguistic systems and their carriers; an AI in future might execute many phenotypifications at the same time using multiple channels to phenotypificate and output linguistic information).

According to the →*single sign theory* the genotype of language G is defined as a constant set (i.e. the genotype of language of every linguistic system – at least on individual level – contains the same elements). A process of phenotypification leads to the phenotypification of a subset of G, which becomes equal to P.

With respect to collective levels, the term "genotype of language" can only be used in a figurative sense because collective levels are always considered to be abstract, model-like simplifications. They always depend on actually executed phenotypifications and corresponding synchronizations (see the concept of synchronizations introduced by Herrgen/Schmidt 2011; see also the term →*imaging*). Since linguistic systems on collective level are always limited and not fully functional systems on their own, there is no actual genotype on collective level as well.

Image – See →*imaging*.

Imaging – The process generating an *image* of a linguistic system on collective level (which is generated by a synchronization of two (or more) linguistic systems on individual level (see the concept of synchronizations introduced by Herrgen/Schmidt 2011)). Such a system on collective level is normally considered to be abstract and model-like, but images are the only way we can get hold of them as images are assumed to be always part of linguistic systems on individual level and thus physically saved in the same way the other information within these systems is saved. According to the →*linguistic model of recessivity* the existence of images on a physical memory (this could be e.g. structures in a human brain as well as technical hardware) is a prerequisite for the genesis of a speech community because upcoming communicative acts with the synchronizations

they will trigger allow the spreading of the results of previous synchronizations (i.e. the information of already existing images might become part of newly generated images in upcoming synchronizations; thus, they can be "saved" in linguistic systems on individual level, in which they were not saved before). An image rather contains linguistic metainformation (e.g. probability distributions regarding →*probabilities of phenotypifications*) than linguistic information itself. It can be understood as a memory unit for linguistic conventions/norms, which are evaluated and established during synchronization processes.

Linguistic element [in German *sprachliches Element*] – Basic unit of a linguistic category in the sense of an element of a linguistic system. According to systems theory (see e.g. Fagen/Hall 1956) a system consists of elements and the relations between those elements as well as the properties/attributes the elements have. Thus, a linguistic element is considered to be a part of a linguistic system and its constitution. Depending on how we define the linguistic system and its environment a linguistic element might be a phoneme in general or a lexeme in general, but it could also be a certain phoneme or lexeme defined by its properties and/or relation to other linguistic elements. A linguistic element as an "element" is defined as being indivisible; it can, however, in some cases be considered to be generated by smaller components (so the amount of information a linguistic element consists of can be different). This means that a linguistic element is rather an abstract part of the introduced model than a real entity in the world.

Because of the bilateral character of the linguistic sign (according to Saussure), we have to always make clear whether a linguistic element we work with is considered to be a whole sign, or only the signifier or the signified of a sign, or even only a certain aspect of a signifier (e.g. a certain phoneme) or a signified (e.g. a certain connotation). When not being phenotypificated (see →*phenotypification*) a linguistic element is fluctuating and instable – i.e. it is not defined in its concrete form. This means that we have to consider all →*possibilities of phenotypification* of this element being present at the same time and corresponding to their →*probabilities of phenotypification*. In the →*linguistic model of recessivity* we call this phenomenon →*superposition*. If we work with a linguistic element in a state of superposition we write it between two ~ (e.g. if we look at German /e/ we might define – at least –/e/, /eː/, /ɛ/, /ɛː/, /ə/, /əː/ as parts (i.e. possibilities of phenotypification) of the linguistic element ~/e/~); this notation

makes it clear that we have look at a linguistic element that is not pheno-typificated and, therefore, actually consists of all of its possibilities of phe-notypification.

In some circumstances – e.g. regarding the perception of more than one possible meaning of an ambiguous linguistic sign – (limited) superposi-tion might also appear in the product of a phenotypification of a linguistic element (i.e. not all possibilities of phenotypification superpose anymore, but some do). Because of the fact that linguistic signs are undefined as long as they are not phenotypificated, we can describe them, or rather their →*value*, by using a variable.

The assumption that linguistic elements that represent a bilateral sign are undefined as long as they are not phenotypificated, is justified by the fact that even information that seems to only belong to a signified (as e.g. a denotation or connotation) depends on the context this information oc-curs and on non-linguistic circumstances like the situation a communica-tion takes place. Those contexts and circumstances will define its actual form in the process of a phenotypification. The possibility to look at a certain meaning that is considered not to be phenotypificated is an ad-vantage of the introduced model providing further opportunities for re-search and formalizing language. Because of the fact that the co-occurring phonemes of a certain phoneme affect its realization (see e.g. sandhi or umlaut), we cannot assume a signifier to be stable when it is not pheno-typificated as well.

Linguistic model of recessivity [in German *linguistisches Rezessivitätsmodell*] – A model to represent, describe, and analyze (natural or artificial, human or non-human) language. The fundamental part of this model is the as-sumption that the informational basis of language is a →*genotype of lan-guage* of which a subset, the →*phenotype of language*, can be "perceived" by a →*phenotypificator*. This leads to a theory of recessive information in language (see →*general definition of recessivity*). In this context, percep-tion and the perceiving individual (the phenotypificator) play an essential role in constructing a linguistic reality. Furthermore, the probabilistic ap-proaches (see →*probability of phenotypification*) and the concept of lin-guistic →*superposition* are central aspects of the model that also impli-cates that certain re-interpretations of language production (see →*genesis of a signifier*) and language perception (see →*genesis of a signified*) are necessary.

The linguistic model of recessivity is linguistic (i.e. it is a model of linguistics and developed to be applied on language) as well as it has an information theoretical and systems theoretical foundation. Its genesis can be considered to have been interdisciplinary; nevertheless it is neither a model of genetics or biology nor a model of biolinguistics. The linguistic model of recessivity stands for the establishment of an informational linguistics and systems linguistics.

Phenotype of language or **linguistic phenotype** [in German *Phänotyp von Sprache* or *sprachlicher Phänotyp*] – The set of all linguistic information that is perceivable and actually perceived by a →*phenotypificator* (i.e. all linguistic information that is phenotypificated (see →*phenotypification*), e.g. phonological, morphological, lexical, or syntactical information). We can define the phenotype of language as a set *P*, all recessive →*possibilities of phenotypifications* as elements of a set *R* (see →*general definition of recessivity*) as well as the →*genotype of language* as a set *G*; so *P* and *R* are disjoint, both *P* and *R* are subsets of *G*, and we can conclude:

$$G = P \mathbin{\dot{\cup}} R$$

P is defined by a function (*f*) representing the process of phenotypification. This function can be interpreted as a "select operation" selecting a subset of *G* depending on the actual state of the linguistic system of the phenotypificator (*S*) as well as the actual state of the carrier system of the linguistic system (i.e. the phenotypificator as a system or a system "within" the phenotypificator) (*C*) at a certain point in time (*t*). So we can conclude:

$$P = f(G, S_t, C_t)$$

A phenotype of language needs to be generated by both a sender and a receiver in a communication; it is essential for both the →*genesis of a signifier* (commonly known as *language production*) and the →*genesis of a signified* (commonly known as *language perception*).

Phenotypification of linguistic elements [in German *Phänotypisierung sprachlicher Elemente*] – It refers to one of two different concepts. (1.) The process that selects (one or more) elements from the →*genotype of language* in order to transfer them to the →*phenotype of language*, i.e. the process that makes linguistic elements perceivable and perceived by a →*phenotypificator*. The phenotypificator is not part of the linguistic system that is involved in the phenotypification, but of the environment of this linguistic system; the phenotypificator is also "carrying" the linguistic

system (i.e. the physical memory the linguistic system is "saved" in belongs to the phenotypificator (for example, the phenotypificator could be a *homo sapiens* and the physical memory than would be the structures of a human brain)). A phenotypification can be formalized as a function (*f*) that defines a subset (*P*) of the genotype of language *G* depending on the current state of the linguistic system on individual level (i.e. the linguistic system belonging to / carried by the phenotypificator) (*S*) and the current state of the carrier system (i.e. of the phenotypificator) itself at a certain point in time (*t*):

$$P = f(G, S_t, C_t)$$

Furthermore, a phenotypification may refer (2.) to the result of the process just described above. A phenotypification shall not be confused with a *Spell-Out* as it is described by the minimalist program.

Phenotypificator [in German *Phänotypisierer*] – The individual or medium that executes a →*phenotypification*; therefore, it has to have linguistic information available in a linguistic system available and has to be able to process this information. A phenotypificator is usually considered to be a *homo sapiens*, but this is not a restriction: Also individuals of other species or even an AI (artificial intelligence) might be linguistic phenotypificators. With regard to a communication model like the one of K. Bühler (see Bühler 1999) both a *sender* and a *receiver* have to act as phenotypificators for a phenotypification is essential for the processes of →*genesis of a signifier* ("language production") and →*genesis of a signified* ("language perception").

Possibility of phenotypification of a linguistic element [in German *Phänotypisierungsmöglichkeit eines sprachlichen Elements*] – The possible form a →*linguistic element* may take as result of a →*phenotypification*. The possibilities of phenotypification of a linguistic element occur with different →*probabilities of phenotypification* depending on parameters like the situation, the context, the individual constitution of the linguistic system a →*phenotypificator* carries etc. As long as a linguistic element is not phenotypificated all possibilities of phenotypification of this element are superposing (see →*superposition*) relatively to their probabilities of phenotypification. Possibilities of phenotypification might have been phenotypificated in the past or will be phenotypificated in the future – but this has not necessarily to be the case (they might be recessive (see →*general definition of recessivity*) for a long time or – at least theoretically – forever).

Depending on the definition of the linguistic element in question it is possible to define a possibility of phenotypification to be as compositionally or non-compositionally generated as the linguistic element itself (so the amount of information a possibility of phenotypification consists of can be different).

Probability of phenotypification (of a possibility of phenotypification of a linguistic element) [in German *Phänotypisierungswahrscheinlichkeit (einer Phänotypisierungsmöglichkeit eines sprachlichen Elements)*] – The probability of a certain →*possibility of phenotypification* to be phenotypificated in the case of a →*phenotypification* of the →*linguistic element* the possibility of phenotypification belongs to. Differences regarding those probabilities are caused by parameters such as the situation or the context (e.g. phenotypifications of other linguistic elements in connection to the phenotypification of the element in question) a phenotypification takes place as well as past phenotypifications that might have left an image (see →*imaging*) in the phenotypificators linguistic system.

Single Sign Theory – Abbreviated as *SST*. The theory that argues that the →*genotype of language* is defined as a constant set being the core of every linguistic system. The genotype of language then is identical in every linguistic system and the →*phenotype of language* is a subset of the genotype that is generated during a →*phenotypification*. The actual form of the phenotype depends on the state of the linguistic system in question and the state of the carrying system (of the →*phenotypificator*) at the time of phenotypification.

Superposition – A term borrowed from physics to describe the overlapping of different states. Especially a non-phenotypificated (i.e. recessive) →*linguistic element* is considered to be undefined and instable: All →*possibilities of phenotypification* of this element are overlapping corresponding to their →*probabilities of phenotypification* – they are superposing. In certain circumstances such a superposition might also occur in the case of a phenotypification to some degree (i.e. a number of possibilities of phenotypification that is greater than 1 and smaller than the total number of possibilities of phenotypification get phenotypificated in parallel).

Trigger of a phenotypification [in German *Trigger einer Phänotypisierung*] –
The trigger of a process of →*phenotypification.* By processing the information of the trigger by the →*phenotypificator* a phenotypification gets
started. Regarding this, we have to distinguish between →*genesis of a signifier* (triggered by a signified / information of a signified) and →*genesis
of a signified* (triggered by a signifier / information of a signifier): In the
case of a genesis of a signifier the trigger contains information related to
a signified for which corresponding information of a signifier needs to be
generated during the process of a phenotypification; in the case of a genesis of a signified the trigger contains information related to a signifier for
which corresponding information of a signified needs to be generated.
Those "completions" of the Saussurean sign take place during the phenotypification process depending on the state of the linguistic system the
phenotypificator carries and the state of the carrying system itself. (Although there is a certain "goal" in both cases we have just described, this
does not mean that a phenotypificator could not also add information of
a signifier during a genesis of a signifier or information of a signified during a genesis of a signified – but such "completions" are only by-products;
a trigger does not necessarily contain a "full package" of information of a
signifier or a signified.)

Value of a linguistic element [in German *Wert eines sprachlichen Elements*] –
A term to refer to the form of a →*linguistic element.* The value can be
declared as a certain →*possibility of phenotypification*, or (e.g. regarding
→*superposition*) as a set of several possibilities of phenotypification of the
linguistic element, or as a variable (see →*variable as a value of a linguistic
element*).

Variable as a value of a linguistic element [in German *Variable als Wert eines
sprachlichen Elements*] – An abstract placeholder that refers to the set of
→*possibilities of phenotypification* (of a certain →*linguistic element*).
Every possibility of phenotypification in this set could be assigned to the
variable as an actual value. The set contains all possibilities of phenotypification that might be phenotypificated as value of the linguistic element
(e.g. in the context of a certain →*phenotypification*); every element of this
set is a potential actual value of the linguistic element in question – and
they are all represented by the variable.