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Ph.D. thesis

The expression of motion in L2 Danish by Turkish and German
learners - the role of inter- and intratypological differences

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Acknowledgements

Writing this thesis has been quite a tour, sometimes de force, sometimes de plaisir, but always a journey to new knowledge, personal development and *Lebensweisheit*. Ever since I can remember, I have been fascinated by language and languages and thus I feel deeply happy to have had the opportunity to devote all of my time professionally into research on language. In the course of writing this thesis, all paths imaginable have been taken, up and down and around and forward and backward, sometimes in circles, never in a straight line. Likewise, the travelling manners of this journey were as manifold as there are conceptualizable colors in the sky. The thesis therefore moved bumpily, steadily, curiously, bravely stumblingly, doubtfully, smooth sailingly, edgily, but always towards new realms of linguistic knowledge.

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Table of Contents

Summary

This thesis deals with the expression of motion events in L2 Danish by Turkish and German learners. It focuses on the role of L1 language-specific patterns in the acquisition and use of an L2 from a cognitive typological perspective. Particular weight is placed on crosslinguistic influence phenomena that reflect the selection and organization of information (conceptualization) in an L2.

Motion events are interesting to study because we all perform them many times during any given day. Because of their physical ubiquity all languages are said to have the means to express motion events. According to Talmy's typology (2000) the languages of the world can be categorized into two groups depending on how they lexicalize the core cognitive component of a motion event, which is the Path a figure draws when moving. Some languages encode the Path in a verb (V-languages), some languages encode Path outside the verb in a satellite (S-languages). To express the Manner of motion, S-languages have a large repertoire of Manner verbs. V-languages do not have a rich Manner verb inventory and typically lexicalize Path in the main verb. Additionally, adverbs and prepositions (satellites in S-languages) can only designate locational meaning rather than directional meaning. Thus, to express directional meaning a Path verb is necessary.

These mapping patterns are learned as part of the acquisition of a first language. They become habitual to the speakers and therefore deeply entrenched. This habitual encoding is linked to habitual information selection. In S-languages, Manner is almost always chosen for expression in a motion event (Berman and Slobin 1994, Slobin 2004). Slobin (1996) hypothesizes that this makes speakers of S-languages attend more to Manner in the input. Conversely, speakers of V-languages are not tuned to focus on Manner by their language, since Manner is not often expressed. This L1-acquired information filter determines thus how we conceptualize motion events. Slobin (1996) calls this Thinking-for-Speaking. These deeply entrenched conceptualization patterns are assumed to play a role in L2 acquisition as well (Cadierno 2004, 2008, Robinson and Ellis 2008). The nature of this role is the topic of this thesis.

Previous research in this domain is abundant. However, results are still somewhat inconclusive. Some studies find L1 feature in an L1 and an L2 and attribute this to processes of information selection; in particular it is claimed that learners maintain their L1 patterns. Conversely, other studies attribute L1-like phenomena in the L2 to structural influences.

We contribute to this discussion in a number of ways. First, we investigate a new inter- and intratyplogical language setting. Second, we investigate a rather dense data set. Thirdly, we extend analyses to the question of what meaning do learners assign to the semantic components Path and Manner. Fourthly, we explore the verb meaning in the learner language for the first time.

A total of 99 informants participated in the study: native speakers of Danish (n 21), German (n 25), and Turkish (n 25); German learners of Danish (n 14); and Turkish learners of Danish (n 14). Participants belonging to the L2 informant groups used Danish at their work place and interacted with Danes on a daily basis.

The participants were asked to give descriptions of motion events based on a stimuli set. The stimuli in this study were 37 video clips, each 3- to 4-seconds long, showing a great variety of motion events performed by humans, primates, and a range of different animals (Vulchanova et al., 2012).

To answer the overarching questions regarding the details of the expression of motion events we conducted four studies, each highlighting a different angle.

Study I investigated differences in the semantic segmentation for motion events across adult speakers of Danish, German and Turkish by investigating verb use across scenes. Results show that German speakers used the highest number of different motion verb types (n = 69), followed by Danish speakers (n = 41) and Turkish speakers (n = 36). Danish speakers showed a preference for three motion verb types, which resulted in the coarsest segmentation of the semantic space. In German, the variation among speakers was higher, showing a preference for seven different verb types. Turkish speakers showed a preference for six different verb types, three of which were Path-based verbs: *inmek* 'move down', *dönmek* 'turn' and *tirmanmak* 'climb up'. Hyponyms occurred in all three languages, albeit only to a very limited degree in Turkish. The highest number of hyponyms were observed in German. They typically expressed a more fine-grained conceptualization of *laufen/gehen* 'walk. Turkish only showed hyponymy for *yürümek* 'walk'. In Danish, the highest number of hyponyms were special cases of *løbe* 'run'.

The motivating factors for variability in the linguistic categorization of Turkish speakers were Path distinctions as well as some Manner distinctions. Path verbs were used in almost all scenes showing non-horizontal movement. Scenes with horizontal movement showed a

variation between Manner verbs and Path verbs. Conversely, Path did not play a role in categorization for Danish and German. The fact that Turkish speakers preferred the expression of Path, and German and Danish speakers the expression of Manner in the verb is in line with expectations derived from Talmy's motion typology. Danish NSs showed a preference for three categories not displaying the lexical richness of manner verbs associated with S-language, at least not in the given task.

These results confirm on the one hand that there are differences across languages with respect to which kind of information is selected to describe motion events. On the other hand, they show that languages of the same type also differ from one another with respect to fine-grained differences.

Study II investigated categorization patterns and meaning organization by means of cluster analysis, but this time in the learner language, in order to understand the process of information selection in an L2.

The German learners employed the largest number of motion verb types (48). They also showed the highest degree of diversity of motion verbs used, i.e. many different verbs were used relatively often across speakers. The Turkish learner group used 28 different types, Danish native speakers used 41 types showing a higher degree of agreement in the scene descriptions. The three most frequently used verbs were identical in all groups: *løbe* 'run', *kravle* 'crawl', and *gå* 'walk'. However, they were used with different frequency: Danish NSs 75% of all scenes, German learners 61%, Turkish learners 86% of all scene descriptions. The three most commonly used verbs did not share the same extension in the semantic space. German learners kept a finer-grained distinction in their description, as reflected by the use of more specialized verbs. This means that both learner groups assigned a meaning to the verbs that differed from the preferred meaning expressed by Danish NSs. The Turkish learners seem to create a broad category reflected in *gå* that can cover for a lack of Path verbs. The use of the other verbs correlated with translation equivalents and not with the use of the verbs by Danish NSs. These observations suggest that Turkish learners relied on the conceptual categories of their L1 in their choice of the L2 verb.

We showed that semantic categorization in an L2 is influenced by the structure of the learners' L1 semantic space. This is in turn evidence for L1 influence in information selection in the L2.

Study III explores the nature of crosslinguistic influence by investigating how German and Turkish learners of Danish express the Path element in motion events, paying special attention to the semantics of Path. Results show that German learners express Path as frequently as Danish NSs, whereas Turkish learners encode Path not as often. Both learner groups prefer a simple Path encoding. They therefore do not express as much Path detail as Danish NSs. The meaning of the Path expression selected in Danish L2 is mostly similar to the meaning selected for expression in the L1s, and at the same time often different from Danish NSs. Regarding the preference of a simple Path encoding in both learner groups we assume an L1 influence. The fact that less linguistic material is used even at an advanced level might point to the fact that the habitual L1 encoding of a simple Path prevents learners from realizing the complexity of the Path expression in Danish. The structure of the L1 and the degree of descriptivity related to the structure thus lead to a structure induced transfer effect that entails different, i.e. less specific, conceptualizations of Path. This is corroborated by the finding that the meaning of the Path expression selected in Danish L2 is mostly similar to the meaning selected for expression in the L1s, but at the same time often different from Danish.

We can thus observe an intricate interplay between surface form and degree of descriptiveness. This is directly linked to the process of information selection.

Study IV investigates how the L1 influences the L2 by looking at the expression of the Manner component in the learner language. Results show that Danish and German NSs as well as German and Turkish learners in L2 Danish express Manner very frequently. Turkish NSs express Manner to a lesser degree. German learners use the highest number of Manner devices in a description on average. Thus, German learners express Manner in more detail compared to Danish NSs. This can be attributed to the higher density of Manner expressions. There is no difference with regard to the overall number of Manner verbs used between German learners in L2 Danish and Danish NSs. However, German learners use more types. The Turkish learners at first glance look very much like the Danish native speakers. They use the same amount of Manner verbs and do not differ with regard to density. However, the overextension of *gå* as already discussed in Study II plays an important role in the interpretation of the results. The higher density in the descriptions of the German learners might be explained by a reliance on L1 information selection patterns. German learners strive to maintain the fine-grained semantic distinctions. For the Turkish learners, we argue that a transfer-to-nowhere situation might have caused the overuse of

gå. In fact, a look at previous literature reveals similar observations made by other researchers. We argue that an L1 influence becomes clear first when one looks into what information is selected for expression.

All four studies together thus provide a comprehensive investigation of the expression of motion events in German, Danish, Turkish and in L2 Danish for speakers with a German and a Turkish background. From a typological perspective, studies I, III and IV offer detailed information on the influence of the Talmian typology in the expression of motion in German, Danish and Turkish. From an L2 perspective studies II-IV explore potential loci for crosslinguistic influence at the morpho-syntactic as well as the semantic and conceptual level. The findings offer further evidence for Slobin's Thinking for Speaking hypothesis and the conceptual transfer hypothesis.

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Resumé

Hvordan udtrykker tyrkiske og tyske lørnere motion events (bevægelsesbegivenheder) i dansk som andet sprog? Hvilken rolle spiller inter- og intra-typologisk variation?

Denne afhandling belyser, hvordan tyske og tyrkiske lørnere taler om motion events i dansk som andetsprog. Den fokuserer påsprogspecifikke mønstre i modersmålet og hvilken rolle disse spiller i indlæringsprocessen af et andetsprog ud fra et kognitivt typologisk perspektiv. Der lægges særligt vægt på tværsproglige indflydelsesfænomener, der afspejler valg og tilrettelæggelse af information (konceptualisering) i andetsproget.

Bevægelsesbegivenheder er interessante at studere, fordi vi alle udfører dem mange gange i løbet af en dag, som for eksempel falde ud af sengen, slæbe sig til arbejde og skynde sig hjem. På grund af deres fysiske allestedsnærværelse siges alle sprog at have forudsætningerne til at udtrykke motion events. Ifølge Talmys (2000) typologi kan alle sprog i verden kategoriseres i to grupper afhængig af, hvordan de sætter ord på den kognitive kernedel af en motion event, som er den "Path" (bane) en figur tegner, når den bevæger sig i rummet. Nogle sprog, indkoder Path i et verbum (V-sprog), andre sprog indkoder Path uden for verbet i en satellit, som typisk er et adverbium. Disse sprog kaldes S-sprog. For at udtrykke en bevægelsesmåde har S-sprog et stort repertoire af "Manner verbs" (mådeverber), som udtrykker den måde en figur bevæger sig på. V-sprog har ikke mange Manner verbs og foretrækker at udtrykke Path i verbet ved hjælp af Pathverber. Satellitterne kan ofte kun udpege en placeringsmæssig betydning snarere end en retningsbestemt betydning. For at udtrykke en retningsbestemt betydning er et Path-verbum nødvendigt.

Sprogspecifiske mønstre, som de ovennævnte, læres som en del af første sprogtilegnelsen. De bliver en del af sprogbrugerens daglige rutiner og er derfor dybt forankret i deres konceptualisering. Det vil sige, at denne vanemæssige kodning er knyttet til et vanemæssigt informationsvalg. I S-sprog bliver Manner næsten altid udtrykt i en bevægelsesbegivenhed. Slobin (1996) antager, at dette gør S-sprogbrugerne mere opmærksomme på Manner i inputtet. Omvendt er V-sprogbrugerne ud fra deres sprog ikke vant til at iagttage Manner, da denne ofte ikke bliver udtrykt. Dette informationsfilter, som tilegnes i førstesproget, bestemmer således, hvordan vi konceptualiserer bevægelsesbegivenheder. Slobin kalder denne proces for "Thinking for Speaking". Disse dybt forankrede konceptualiseringsmønstre antages at spille en rolle i andetsprogstilegnelsen (Cadierno

2004, Cadierno 2008, Robinson and Ellis, 2008), idet de forbliver sprogbrugerens base til informationsvalget i andetsprogsbrugen. Karakteren af den rolle et først sprog spiller i andensprogstilegnesle er emnet for denne afhandling .

Tidligere forskning på dette område er ret omfattende. Resultaterne er dog ikke entydige. Nogle undersøgelser finder spor af førstesproget i en lørnerens andetsprog, som menes at kunne føres tilbage til at være motiveret ud af førstesprogets konceptualisering. Derimod forklarer andre undersøgelser førstesprogetsindflydelse ud fra strukturelle egenskaber/påvirkninger. Vi bidrager til diskussionen om konceptuel oprindelse af indflydelsen fra et førstesprog på et andetsprog ved at undersøge a) nye inter- og intratyplogiske sprogkombinationer, b) ved at undersøge en forholdsvis stor datamængde, c) ved at udvide analyserne til spørgsmålet, hvilken Path-betydning og hvilken Manner-betydning lørnere udtrykker i dansk som andetsprog, og d) ved at udforske verbets betydning i lørnernes sprog ved hjælp af clusteranalyse. I alt 99 informanter deltog i undersøgelsen: dansktalende (n 21), tysktalende (n 25) og tyrkisktalende (n 25), tysk-danske lørnere (n 14), og tyrkisk-danske lørnere (n 14). Deltagerne, der tilhører lørnergrupperne, talte dansk på deres arbejdsplads og interagerede med danskere på en daglig basis.

37 videoklip blev brugt som stimuli i denne undersøgelse. Videomaterialet var 3 - 4sekunder lange ogviste et stort udvalg af motion events af mennesker, primater samt en række forskellige dyr (Vulchanova et al, 2012).

For at besvare de overordnede spørgsmål om detaljerne i udtryk af motion events gennemførte vi fire undersøgelser fra fire forskellige vinkler:

Den første undersøgelse handlede om forskelle i den semantiske segmentering af motion events mellem dansk, tysk og tyrkisk. Resultaterne viste, at de tysktalende deltagere brugte det højeste antal af forskellige bevægelsesverber (n = 69), efterfulgt af dansktalende (n = 41) og tyrkisktalende (n = 36). De dansktalende deltagere viste en præference for tre bevægelsesverber, hvilket resulterede i den mest grovkornede segmentering af det semantiske rum. På tysk var variationen større, idet de tysktalende viste en præference for syv forskellige verber. Tyrkisktalende viste en præference for seks forskellige verber, hvoraf tre var Path-baserede verber, nemlig *inmek* 'bevæge sig ned ad', *dönmek* 'bevæge sig rundt' og *tirmanmak* 'bevæge sig op ad'. Hyponymer fandtes i alle tre sprog, omend kun i meget begrænset omfang på tyrkisk. De fleste blev observeret på tysk og udtrykte

typisk en mere finkornet konceptualisering af *laufen/gehe*n 'gå'. Tyrkisk viste kun hyponymy for *yürümek* 'gå'. På dansk optrådte det højeste antal hyponymer ved særlige tilfælde af *løbe* 'run'. De motiverende faktorer for variationen i den sproglige kategorisering i tyrkisk var Manner samt Path. Path-verber blev brugt i næsten alle scener, der viste ikke-horisontale bevægelser fremad. Scener med horisontale bevægelser viste en variation mellem Manner-verber og Path-verber. Omvendt spillede Path ingen rolle i kategoriseringen for dansk og tysk. At tyrkisktalende primært udtrykte Path, og tysk- og dansktalende udtrykte Manner i verbet er i overensstemmelse med forventningerne, der stammer fra Talmys bevægelsestypologi. De dansktalende viste en præference for tre kategorier. De viste ikke den leksikalske rigdom af Manner-verber forbundet med andre sprog af samme type, i hvert fald ikke for den givne opgave.

Disse resultater bekræfter på den ene side, at der er forskelle på tværs af sprog med hensyn til hvilke oplysninger, der bliver valgt til at beskrive motion events. På den anden side viser de, at sprog af samme type også adskiller sig fra hinanden med hensyn til, hvor mange detaljer der bliver udtrykt.

I den anden undersøgelse blev kategoriseringsmønstre og konceptuelle betydningsrelationer undersøgt ved hjælp af cluster-analyse, men denne gang i lørnersproget. Vi undersøgte, hvilken rolle førstesprogets rutiner har for at udvælge den information, man vil udtrykke, når man vil udtrykke sig i andetsproget, dvs. hvilken rolle førstesprogskonceptualiseringen spiller i brugen af andetsproget.

De tyske lørnere brugte det største antal af motion-verbtyper (48). De viste også den højeste grad af forskellighed i brugen af anvendte bevægelsesverber. Mange forskellige verber bruges relativt ofte på tværs af lørnerne. Den tyrkiske lørnergruppe brugte 28 forskellige verbtyper, og de dansktalende brugte 41 typer. Således viste der sig en højere grad af enighed i beskrivelserne af scenerne. De tre mest anvendte verber var identiske i alle grupper: *løbe* 'run', *kravle* 'kravle', og *gå* 'walk'. De blev dog brugt med forskellig frekvens: Dansktalende brugte ét af de tre verber i 75% af alle scener, de tyske lørnere i 61%, og de tyrkiske lørner i 86% af alle scenebeskrivelser.

De tre mest anvendte verber deler ikke den samme udvidelse i det semantiske rum i dansk talt af dansktalende, dansk brugt af tyske lørnere, og dansk brugt af tyrkiske lørnere. Tyske lørnere bevarede en finere skelnen i deres beskrivelser, som afspejlede brugen af mere specifikke verber. Tyrkiske lørnere viste et overforbrug af *gå*. Det betyder, at begge

lørnergrupper tildelte de danske verber en mening, som afveg fra den foretrukne betydning udtrykt af de dansktalende. Vi formoder at de tyrkiske lørnere skaber en bred kategori, som er afspejlet i *gå*, der kan kompensere for en mangel på Path-verber. Brugen af de andre verber på dansk korrelerede med oversættelsesækvivalenter og ikke med dansktalendes brug af verber. Disse observationer tyder på, at de tyrkiske lørnere har trukket på de begrebsmæssige kategorier fra deres modersmål, når de skulle vælge et dansk verbum. Vi kunne således vise, at den semantisk kategorisering i andetsproget bliver påvirket af strukturen fundet i opdelingen af det semantiske rum, som lørnerne havde tilegnet sig som børn.

Den tredje undersøgelse udforskede karakteren af indflydelsen fra førstesproget på andetsproget ved at undersøge, hvordan tyske og tyrkiske lørnere på dansk udtrykker Path-elementet i en motion event med særlig fokus på semantikken af Path. Resultaterne viste, at de tyske lørnere udtrykte Path lige så ofte som dansktalende, mens tyrkiske lørnere ikke kodede Path i samme grad. I modsætning til dansktalende foretrækker begge lørnergrupper at udtrykke Path på en simpel måde. De udtrykker derfor ikke lige så mange detaljer om Path som dansktalende. Betydningen af Path-udtrykket, som lørnerne vælger, svarer for det meste til det, der er valgt til udtryk i lørnernes første sprog, og dette er ofte forskelligt fra dansk. I forhold til en præference for en simpel Path-kodning i begge lørnergrupper antager vi derfor en påvirkning fra deres førstesprog. At mindre sprogligt komplekst materiale anvendes selv på et avanceret niveau kunne pege på, at førstesprogskodningen af en simpel Path, forhindrer lørnere i at realisere kompleksiteten af Path-udtryk på dansk. Strukturen af førstesproget og den tilhørende grad af beskrivelseskraft fører således til en strukturinduceret transfer-effekt, som medfører forskellige, dvs. mindre specifikke konceptualiseringer af Path. Dette bekræftes af observationen, at betydningen af Path-udtrykket, som lørneren har valgt på dansk, for det meste ligner de udtryk, som de ville vælge i deres respektive førstesprog. Disse er ofte forskellige fra dem, som dansktalende ville vælge. Vi kan således iagttage et indviklet samspil mellem formen på overfladen og graden af den beskrivende kraft. Dette er direkte knyttet til processen af informationsvalget.

Den fjerde undersøgelse analyserer, hvordan førstesproget påvirker andetsprogstilegnelsen ved at fokusere på udtrykket af Manner-komponenten i beskrivelser af motion events i lørnersproget. Resultaterne viser, at dansktalende og tysktalende samt tyske og tyrkiske lørnere med dansk som andetsprog udtrykker Manner i høj grad. Tyrkisktalende udtrykker Manner i mindre grad. Tyske lørnere bruger det højeste antal Mannere.elementer i en

beskrivelse i gennemsnit. Således udtrykker tyske lørnere sig mere detaljeret sammelignet meddansktalende. Dette kan tilskrives en højere tæthed for Manner-udtryk i det tyske sprog. Der er ingen forskel med hensyn til det samlede antal Manner-verber, der anvendes mellem tyske lørnere i dansk som andetsprog og dansktalendes brug af manner-verber. Dog ses det, at de tyske lørnere bruger flere typer. De tyrkiske lørnere ligner de dansktalende ved første øjekast. De bruger lige så mange verbtyper og afviger ikke med hensyn til tæthed, en overbruget af *gå,* som allerede omtalt i undersøgelse II, spiller en vigtig rolle i fortolkningen af resultaterne. En højere tæthed i beskrivelserne af de tyske lørnere kan forklares ved en *reliance* (vedhæftning) ved førstesprogets informationsudvælgelsesmønstre. Tyske lørnere stræber efter at fastholde de finkornede semantiske distinktioner. For de tyrkiske lørnere, argumenterer vi, at en 'transfer-to-nowhere'-situation kunne have forårsaget overforbruget af *gå*. Lørnerne kunne ikke identificere verbtyper som kan udtrykke Path. Dette kompenserer de for ved brugen af *gå* i de tilfælde, hvor de ikke kan finde den struktur, de leder efter. Et kig på tidligere undersøgelser afslører lignende observationer. Vi argumenterer for, at indflydelsen fra førstesproget først bliver entydig, når man undersøger, hvilke oplysninger der er blevet valgt til udtryk.

Tilsammen udgør alle fire undersøgelser således en omfattende analyse af, hvordan lørnere i dansk som andetsprog og ikke mindst folk med dansk, tysk eller tyrkisk som deres førstesprog udtrykker motion events. Fra et typologisk perspektiv tilbyder undersøgelser I, III og IV således detaljerede videregående oplysninger til Talmy's typologi for udtryk af motion events i tysk, dansk og tyrkisk. Fra et andetsprogstilegnelsesperspektiv, hvilket var vores hovedfokus, belyser undersøgelser II-IV potentielle muligheder for en påvirkning fra førstesproget på andetsproget på morfo-syntaktisk niveau såvel som på det semantiske og konceptuelle niveau. Resultaterne leverer yderligere beviser for Slobins "thinking for speaking"-hypotese og "conceptual transfer"-hypotesen.

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Part 1: Thesis overview

1. Introduction

In the course of a day, we engage in many activities: we try to get out of bed, we rush to work, and we dance home in happy anticipation of a nice dinner with red wine. Cognitive linguists refer to such activities as motion events. In German, the same exercises would probably be expressed slightly differently. You would try to come out of your bed, hurry to work, and also dance your way home. In Turkish, you would exit your bed, go fast to work, and then go home in a dancing fashion. Different constructions are at work in different languages to express the directionality or the manner of movement. There are also different metaphors at work to express manner of motion in verbs, e.g., Danish *pile* 'to arrow' or German *flitzen* 'move as fast as having been shot with an arrow'. Turkish does not offer a manner verb here to cover the same meaning. In general, Turkish does not have as big an inventory—let alone metaphorical variation—in the domain of motion verbs. This crosslinguistic diversity is as fascinating as it is challenging for second language (L2) learners. They have to discover these differences through the "filter" of their first language (L1). There are intriguing theories about why languages display such diversity and systematicity in diversity in seemingly universal domains and what this diversity means for an L2 learner. These theories and their implications for second language acquisition are the subject of this thesis.

The overarching purpose of this study is to understand how learners tackle differences in the expression of motion between their L1 and their L2. In particular, the goal is to examine whether German and Turkish speakers of L2 Danish can learn to provide or omit information on certain motion components. Is this information selection influenced by the learner's particular L1? How does the meaning of the semantic components of the languages in question vary? Does this variation in meaning play out in an L2 context and how? Are there other constraints on the expression of motion? The frameworks of cognitive typology (Talmy, 1985, 2000), the Thinking for Speaking (TfS) hypothesis (Slobin, 2000), as well as the conceptual transfer hypothesis (Jarvis & Pavlenko, 2008) are used to account for phenomena in L2 acquisition. Inevitably, such an approach to L2 acquisition will not be complete without also touching on the question of linguistic relativity and research on language and cognition. If such an influence exists, it should certainly become visible as an influence of the L1 on the L2.

The contributions of this thesis relate to different areas. We present an empirical study using an original data set to investigate the expression of motion in Danish, German, and Turkish

and in L2 Danish. First, rather than taking Talmy's typology and its lexicalization patterns as a given, we examine if and how they are actually put to use. We thus make a contribution to the typology in that we show inter- and intratypological details in the use of language that have not been covered by the original typology. To ensure methodological rigor for the research of crosslinguistic influence (Jarvis, 2000), we have a three-language set-up: the target language or L1 group, one group of learners with typologically different L1 and L2 (i.e., Turkish learners of L2 Danish), and a group of learners with typologically similar L1 and L2 (i.e., German learners of L2 Danish). This set-up allows us to evaluate the role of inter- and intratypological influence. We are thus able to inform research on Thinking for Speaking in L2, as well as related research on conceptual transfer. Two of our studies, one L1 and one L2 study, are based on an application of cluster analysis, which to our knowledge has not been used previously in L2 acquisition studies on crosslinguistic influence. Moreover, in addition to detailed analyses of the lexicalization patterns in the L1s and L2s involved, we account for the actual meaning of the morpho-syntactic forms most frequently used to express semantic components, thus focusing on the interplay between structure and meaning.

The present thesis is an anthology that comprises four individual papers. Two papers have been published, one paper is forthcoming. Study I, "Semantic categories in the domain of motion verbs by adult speakers of Danish, German, and Turkish," appeared in 2013 in *Linguistik* online, 61. Study II, which was written together with Teresa Cadierno, "Variation in the categorization of motion in L2 Danish by German and Turkish native speakers," appeared in 2013 in a volume edited by Juliana Goschler and Anatol Stefanowitsch, entitled *Variation and change in the encoding of motion events*. Study III, "The expression of Path in L2 Danish by German and Turkish learners," has been accepted for publication in VIAL and will appear in early 2014. Study IV, "The expression of Manner in L2 Danish by German and Turkish learners," is almost ready for submission.

Study I ("Semantic categories in the domain of motion verbs by adult speakers of Danish, German, and Turkish") presents the results of a naming study of 37 instances of motion by Danish, German, and Turkish native speakers. Naming patterns reflected physical similarities of the input, as well as typological predictions, with an interesting exception in the German *gehen/laufen* 'run/walk' category. Study II ("Variation in the categorization of motion in L2 Danish by German and Turkish native speakers" with Teresa Cadierno) shows how verb choices in Danish L2 are largely motivated by the meaning of L1 verb

preferences. Study III ("The expression of Path in L2 Danish by German and Turkish learners") demonstrates that Path expression in Danish is typically more complex than in the learner's L1s - German or Turkish. The complexity of the L2 Path expressions is not fully mastered by the learners. This shows how the interplay between structure and meaning in the L1 influences L2 acquisition on both levels. Study IV ("The expression of Manner of motion in L2 Danish") illustrates how a learner's L2 performance might appear to resemble that of native speakers if one only applies typological criteria. However, L1 traces of information selection prevail in the expression of Manner of motion in an L2 once the meaning of components is taken into consideration.

This thesis consists of two main parts. The individual papers appear together in Part II of this thesis. Part I makes the four papers easily accessible for the readers by providing an insight into the theoretical framework and studies this research is based on. To that end, Part I consists of eight chapters. Chapter 1 introduces the overarching question of the role of crosslingusitic differences in L2 acquisition. Chapter 2 provides an overview of the theories that have inspired L1 research concerned with questions regarding whether crosslinguistic differences lead to different choice and organization of relevant information in motion event description. It consists of three sections. In the first section, we provide an overview of Talmy's cognitive typology that divides languages into two main groups depending on where the semantic component of Path is expressed. In the second section, we review applications of these typological patterns to empirical analyses of crosslinguistic variation in terms of narrative styles and language development. In the third section, we discuss the TfS hypothesis, which was proposed by Slobin (1987, 1996b) on the basis of the findings from the empirical studies. In Chapter 3, we illustrate how this research into L1 acquisition and use has inspired research in L2 acquisition that investigates how L1 TfS patterns influence L2 acquisition. We explain the conceptual transfer hypothesis (Jarvis & Pavlenko, 2008) and its relation to TfS in SLA research. We illustrate how both approaches link to the question of information organization in L2. This leads us to a brief description of how L2 research can play a role in the study of linguistic relativity and vice versa. Thus, Chapters 2 and 3 contextualize the objectives of this thesis. Chapter 4 specifies the research questions and goals of the entire investigation. Chapter 5 describes the methodology of the study: the research instrument and the informant groups. It furthermore provides a detailed overview of the data collection procedures and the different coding strategies applied in the four studies. In addition, it explains the statistical methods of cluster analysis and the

calculation of the Simpson diversity index in more detail than was possible in the individual papers. Chapter 6 gives detailed summaries of Studies I-IV as well as short highlights of each study. In Chapter 7, we discuss the limitations of our investigation. Directions for future research are presented in Chapter 8. Part II contains the four individual studies.

2. Talmy's motion typology and Slobin's Thinking for Speaking Hypothesis

2.1. Talmy's typology

Talmy, in his seminal work (1985, 2000a, b), was one of the first linguists to discuss crosslinguistic regularities in the mapping of conceptual structures onto lexical forms. In particular, he focused on motion schemas or motion events. In his work, Talmy identified motion as a universal cognitive concept that exists and is expressed in all languages. He considered how surface forms (grammatical categories such as nominal, prepositional, and verb constituents) relate to the semantic/conceptual equivalents, Figure, Ground, Path, and Motion (Talmy, 2000a:2–3, 11, 14; cf. Filipovic, 2007:16). According to Talmy, the four basic components of a motion event can be defined as follows:

Motion: Presence of Motion

Figure: The moving object

Ground: The reference object with respect to which the figure moves

Path: The course followed by the Figure with respect to the Ground

A motion event in its entirety, i.e., as a macro-event, consists of a main framing event (motion) and optional co-events (Manner and Cause). In recent developments of Talmy's motion event typology (2000b), Path is considered the main component of such a macro event, also called the "core schema." The core schema provides the frame for an optional sub-ordinate co-event, i.e., Cause or Manner. If a motion event contains not only information regarding the core-schema Path, but also information regarding Manner or Cause, the attention of the language user can be distributed in several ways. Talmy refers to this cognitive process as "windowing of attention." Speakers can omit ("gap") or express ("window") different aspects of the event and thereby influence the listener's attention (Talmy, 2000a). Consequently, Talmy builds up a two-way typology on observations regarding the lexicalization of the semantic component of Path. Morpho-syntactically, Path can be either expressed in the verb or in a "satellite," which is defined as "the grammatical constituent other than a noun-phrase or a prepositional phrase complement that is in a sister

relation to the verb root" (Talmy, 2000b, p. 102). Examples include English verb particles (e.g., *run out)* and German verb prefixes (e.g., *herauslaufen).* The Path component denotes the trajectory of the Figure. It can be further divided into Vector, Conformation, and Deixis. The Vector comprises the main and universally occurring Path elements AT, TO, FROM, VIA, ALONG and ALENGTH. The Deixis component can express motion toward or away from the speaker. The Conformation component of Path describes the main geometric schema of a Path (Talmy, 2000a). Talmy later states "a language might not express the whole Path in the verb or a satellite, but just one or two parts there, with the remainder expressed in a separate constituent" (Talmy, 2009).

Languages that typically encode Path in the verb are called "verb-framed" languages (V-languages), and languages that encode Path in a satellite and/or preposition are referred to as "satellite-framed languages" (S-languages) (Talmy, 2000b, 2009). It is important to note that languages might have both options for lexicalization, but usually show a clear preference for one of the two options, the characteristic one, which is "colloquial, frequent and pervasive" (Talmy 2000b, p. 166).

Table 1 below illustrates that the "co-event" Manner is typically expressed in the main verb in S-languages. Conversely, in V-languages, which typically conflate Motion and Path in the verb (Path verbs), Manner is often omitted since it is difficult to construct in a sub-ordinate constituent. S-languages typically have a rich Manner verb lexicon (conflating motion and co-event) compared to V-languages. In contrast, V-languages typically have a larger Path verb inventory compared to S-languages.

S-languages

German

Figure	Motion+Manner	Path	Ground
Das Mädchen	rennt	ins	Zimmer

Danish

Figure	Motion+Manner	Path	Ground
Pigen	Løber	ind i	værelset

V-language

Turkish

Figure	Ground	Manner	Motion+Path
Kız	Odaya	(koşarak)	giriyor

Table 1. Examples of S-language and V-language lexicalization patterns.

Other scholars have expanded upon Talmy's typology. Particularly relevant to our research are the following points. Berthele (2004, 2006) stresses the need to not only focus on the variation between languages of the same type, but also to take intratypological differences into account. He shows that a Swiss German dialect has more in common with French than with German, in that the dialect variant of German rarely expresses Manner. From another angle, Croft et al. (2010) discuss the phenomenon of "double framing" for cases in which Path is expressed in the verb as well as in a satellite. They borrow a French example from Aske (1989): *monter en haut/ descendre en bas* 'go up above / descend below'. This shows both kinds of constructions, S-framed as well as V-framed. A similar criticism has been raised with regard to the fact that semantic components can be expressed in many different form classes—an issue also referred to as distributed semantics: "spatial relational semantic information [...] is irreducible to the individual contributions of members of any single lexical form class" (Sinha & Kuteva, 1995, p. 193). Talmy (2009) also accepts prepositions as a means to express Path. Consequently, and following Filipovic (2007), we do not maintain a satellite/preposition distinction. Our analysis of the expression of Path (Study III) covers all the form classes that can express Path. We thus take the fact into account that in German prepositions are often the only loci for Path expression (cf. Berthele, 2006). We also need to cover nominal case marking as a possible Path marker in Turkish. This is also addressed by Wälchli (2001), who subsumes prepositions, satellites, and nominal case marking for Path under a larger category called "adnominal encoding" (Wälchli, 2001, p. 301). Finally, Slobin (2003, 2006), in his development of the typology, suggests a third type of language, which he called equipollently framed languages (e.g., Thai or Mandarin Chinese). In these languages, Manner and Path have a roughly equal morpho-syntactic status. In other words, they are both expressed by verbs and it is difficult to decide which one should be considered the main verb.

In the next section, we describe Slobin's application of Talmy's cognitive typology to psycholinguistics and first language acquisition. We introduce his influential TfS Hypothesis. We also present suggestions raised in the literature regarding a cline of Manner salience that might be more appropriate in descriptions of language than a strict dichotomy between S-and V-languages. It should be mentioned that a similar cline for Path salience has been suggested by Ibarretxe-Antuñano (2009b). However, since we will only evoke the Manner salience cline, we do not describe the Path salience cline in more detail.

2.2 Slobin's Thinking for Speaking Hypothesis (TfS)

In his studies on the rhetoric styles across different languages, Slobin and colleagues used the picture book *Frog, Where Are You?* (Mayer, 1969) as an elicitation tool. In the first *Frog* volume "Relating events in narrative: A crosslinguistic developmental study," edited by Berman and Slobin (1994), narrations in five languages were collected.

Slobin and colleagues have shown that there is a relation between language type and narrative style. Native speakers (NSs) of typologically different languages (S- vs. V-framed languages) tend to focus on different aspects of motion events in narrative discourse (Slobin, 1996a; Slobin & Berman, 1994, 1996b; see Slobin, 2004 for an overview). For example, speakers of S-languages tend to encode more detail about the movement along paths, leaving the settings to be inferred, whereas speakers of V-languages tend to encode more detail explicitly about the scene setting, leaving the paths to be inferred. Examples in (1) and (2) illustrate these tendencies in English and Spanish (Slobin, 1996, p. 204):

(1) The deer threw him off over a cliff into the water.

(2) Lo tiró. Por suerte, abajo, estaba el río. El niño cayó en el agua.

   '(The deer) threw him. Luckily, below, was the river. The boy fell into the water.'

In (1), one can infer that there is a cliff above the water because of the detailed description of the trajectories. Conversely, in (2), the static description "below was the river" allows the listener to infer that the Figure moved from some elevated place down to the water. These preferences are related to the grammatical resources that are available for the expression of motion in the two types of languages. S-languages, such as English, permit compact expression in a single clause, whereas V-languages, such as Spanish, have to express complex trajectories in several clauses.

Important differences have also been found with respect to the expression of Manner of motion. Aske (1989) and Slobin and Hoiting (1994) note that in V-languages, the use of Manner verbs in motion events is restricted to situations without boundary crossing. Thus, it is possible to say "run in the park" (without leaving it) but not "run into the park" (Aske, 1989; Slobin & Hoiting, 1994).

Of high relevance to our research is the fact that the lexicons of S-languages contain a wider variety of Manner of motion verbs. This more elaborated lexicon entails a higher degree of expressive power of Manner verbs. Slobin (1997) describes two different types of Manner

verbs: first-tier verbs, which are neutral and are used for everyday activities, e.g., running, and second-tier verbs denoting more specific or "exceptional" Manner of motion, like *dashing* or *scrambling*. All languages are said to have first-tier Manner verbs, whereas, in general, V-languages do not have many, if any, second-tier Manner verbs. Consequently, the lexicon of V-languages is usually smaller with regard to Manner of motion verbs compared to S-languages. An explanation offered by Slobin (1997) is that the expression of Manner is neutral in S-languages since it is always expressed. This means that when Manner is salient it needs to be marked explicitly by second-tier verbs, which can express more fine-grained semantic information. Slobin demonstrates that one verb in a V-Language may be translated to many words in an S-Language as evidence to support this point of view. He uses an example from Özçalışkan (2002): "In a study of novels in English and Turkish, she finds 23 English verbs that are used in contexts where Turkish uses the single verb *yürümek* 'walk': *walk, drift, ebb, flounce, linger, lumber, march, meander, roam, rustle, stride, tread, worm one's way, hike, pace, ramble, snake, trample, trot, swarm, forge, hurry, rush*" (cited in Slobin, 2006). Additionally, Slobin (2006) observed that in translations from V-languages to S-languages, translators add Manner information. The Manner salience patterns thus resemble the pattern of the target language, not the source language. He further estimates that in V-languages about a hundred motion verbs exist, whereas there are up to several hundred in S-languages.

Since all languages can, but not necessarily do, express Manner, Slobin (2004) points out the benefits of this fact for analysis of narrative style over an analysis. Path is obligatory in the expression of motion events for S-and V-languages. Manner on the other hand is optional, can range from general to specific and thus displays a high degree of variation. To exploit inter- and intra-typological variation, Slobin suggests placing languages on a Manner salience cline. Manner salience can be defined as "the level of attention paid to Manner in describing events" (Slobin 2004). It is related to codability in the following way. In S-languages there are many linguistic means that are easily accessible for the coding of Manner. V-languages do not have the verb slot available for Manner, and due to the difficulty of expression, or low codability, they often leave out Manner information unless it is communicatively important in a given context. However, some V-languages, like Basque and Japanese, have a rich and expressive list of mimetics and are therefore not on the extreme end of low-Manner salience (Brown, 2007; Ibarretxe-Antuñano, 2009a). On a Manner salience cline, then, languages lie between two extreme points, high-Manner

salience and low-Manner salience. High-Manner salient languages (e.g., Russian) have an easily accessible slot for the encoding of Manner and a large and expressive repertoire of Manner verbs. This is the main verb slot in S-languages, which can be filled with one of the many Manner verbs. There is, however, some degree of variation in this regard between languages of the same type. In Germanic languages, for example, Manner is expressed less frequently then in Slavic languages. Crucially, in Russian, for example, it is virtually impossible to express motion without a mention of Manner (Slobin, 2006, p. 66). Thus, Russian is more to the extreme end of the Manner salience cline than German. In low-Manner salient languages (e.g., Spanish), Manner is subordinated to Path, but there are also intratypological differences; Italian speakers seem to express Manner more frequently than Spanish speakers (Slobin, 2004, 2006).

Slobin's work on crosslinguistic differences in narrative contexts has led him to propose his influential TfS hypothesis. As shown above, language provides us with means to talk about events, and since these means appear to be different crosslinguistically, one question that has been addressed in Slobin's research is whether speaking a certain language makes speakers prefer a certain kind of perspectivation over another. Already in the first "Frog volume" Berman and Slobin state:

> "frequent use of forms directs attention to their functions, perhaps even making those functions (semantic and discursive) especially salient on the conceptual level. That is, by accessing a form frequently, one is also directed to the conceptual content expressed by that form. Since such content is organized, by language, into compact systems—devoted to some kinds of distinctions and excluding others—particular conceptual domains come to be organized in a speaker's mind, becoming the basis of thinking for speaking." (1994, p. 640)

This preference can be seen as a consequence of the fact that the language one speaks habitually encodes a semantic element in a specific surface form, what Talmy called lexicalization patterns. The resulting association between function and form, Slobin argues, tunes speakers to focus on the semantic element usually encoded in their language. This will have an effect on speakers' TfS patterns in the long run. The habitual encoding mechanisms will make speakers focus on the more readily encodable entities from the real world input. According to Slobin, effects in speaking time "present the critical interface between language and cognition" (2003, p.180). For Slobin (1996b p. 76) "the expression

of experience in linguistic terms constitutes thinking for speaking—a special form of thought that is mobilized for communication". He defines thinking for speaking as a process that "involves picking those characteristics of objects and events that (a) fit some conceptualization of the event, and (b) are readily encodable in the language". His definition of TfS thus takes into account the process-like nature of information selection for speaking.

3. Conceptual Transfer and Thinking for Speaking in L2

3.1. Some key concepts and terminology in L2 research

Examining second language acquisition, we need to establish working definitions for the terms we apply. In this thesis, acquisition and learning are used interchangeably. As stated in Ortega (2009), there was an attempt to separate the two in SLA research in the early 1980s, but in current studies such a distinction is not typically made. With Ortega (2009), we consider L1 to refer to the language (in case of monolingual children) or languages (in case of bilingual children) that a child learns from their parents, family, and caretakers during the first years of language development. We use L2 or second language to refer to any language that is learned afterwards. We refer to the people who acquire and use a second language as L2 speakers, L2 users, or L2 learners. Ortega (2009) points out the implication that is underlying the dichotomy between the idea of "an L1 speaker" and "an L2 speaker." Often one is tempted to understand L2 acquisition as a process in which an L2 learner builds up the L2 by adding to and modifying existing L1 knowledge. This is in fact the perspective from which the present investigation examines L2 acquisition. However, one has to bear in mind that an L2 can also influence an L1, as shown, for example, in Brown (2007). That leads to another interesting perspective, namely to investigate the effects of L2 acquisition on the nature of the bilingual mind, as addressed in, e.g., Alferink and Gullberg (2012). We discuss these issues in more detail in the limitations section.

3.2. Crosslinguistic Influence

Knowledge in the L1 can be considered an important factor for L2 learning. In fact, the influence of the L1 on the L2 can be illustrated with a variety of anecdotes. For example, a TV commercial for a well-known language school shows a German navy officer answering an emergency call "we are sinking, we are sinking" with "what are you sinking about?" Another one features a poor tourist looking to buy sheep cheese in France, asking for

"fromage de mouton." Research carried out to answer questions regarding how, when, where, and why such an influence takes place is referred to as transfer research or crosslinguistic influence (CLI) research. As indicated by our anecdotal examples, influence of one language on another can happen in all layers of language, e.g., at the phonetic level (foreign accents), at the syntactic level, and at the conceptual-semantic level. Research on the latter has recently become the focus of attention for SLA researchers and researchers looking at the phenomenon of linguistic relativity alike.

We follow Kellerman's (1984) characterization of transfer or crosslinguistic influence and use it as a working definition: "Let us say it [transfer] is a cover term for a number of unspecified processes which lead to L1-like behavior in the L2. […]" (Kellerman, 1984 , p. 104). This definition attempts to be broad and thus inclusive, but, on the negative side, it may lack precision. It is similar to the definition used by Jarvis and Pavlenko (2008, p. 1): "the influence of one person's knowledge of one language on that person's knowledge or use of another language".

It is rather difficult to capture all the nuances of this intricate phenomenon, since through the development of L2 research, transfer has emerged, disappeared, and re-emerged on several occasions, or as Kellerman puts it: "The history of cross-linguistic influence in second–language learning is akin to the history of Poland in Europe, with ever-changing expansions and diminutions of its territory and even occasional disappearances off the map (Kellerman, 1984, p. 120)." (A brief history of the different phases of research on transfer can be found in Jarvis and Pavlenko (2008)). This vivid history is part of the difficulty in defining the phenomenon, a matter that is also referred to in Odlin (2003). He states that cross-linguistic influence or transfer can encompass several distinct phenomena, e.g., the transfer of the properties of L1 (which Odlin defines as behaviors resembling those of L1), processes such as avoidance, or the constraints imposed by the L1 on the L2.

Jarvis and Pavlenko (2008) have recently provided a very comprehensive overview of all the aspects that are part of the CLI phenomenon. They review a vast number of theoretical as well as empirical studies on the issue. Furthermore, they stress the need for a framework that can facilitate a comparison of different aspects of crosslinguistic influence. For this purpose, they suggest a scheme that lists possible aspects of transfer research. According to their scheme, our studies fall within the following aspects of the CLI dimensions they list (Table 2.):

Dimension	Aspect of dimension
Knowledge	semantic, lexical and syntactic
Direction	forward
cognitive level	linguistic and conceptual
type of knowledge	implicit
Intentionality	unintentional
Mode	productive
channel	written
Form	verbal
manifestation	probably overt as well as covert

Table 2. Dimensions of transfer according to Jarvis and Pavlenko (2008).

Jarvis and Pavlenko (2008) demonstrate "how the scope of CLI extends beyond linguistic transfer into areas that we will describe as conceptual transfer" (p. xii). They establish the conceptual transfer hypothesis, which is particularly relevant for our research. We discuss this hypothesis in more detail in the following section.

3.3. Conceptual Transfer

As Jarvis and Pavlenko (2008) state, many studies investigated the phenomenon of transfer on the basis of similarities and differences of structural properties of the L1 and the L2. They argue that investigations of transfer could benefit if they also took the conceptual level into account. It means that studies on transfer should expand their focus onto "conceptual categories that correspond to lexical and grammatical categories" (p. 112) in the L1 and the L2.

In developing the idea of conceptual transfer, Jarvis and Pavlenko (2008) start with a definition of concepts. They closely follow the psychologist Murphy (2004), who differentiates between language independent concepts, which are experience based, and language dependent or language-mediated concepts, which are shaped during L1 acquisition. With regard to language-independent concepts, Murphy (2004) mentions that "people have published books of concepts that do not have words, but which ought to." One example is "the moist residue left on a window after a dog presses its nose to" which according to Murphy "is a well-known concept and should be called *pupkus*" (p. 389). An example for a language-dependent concept could be the German word *Fernweh,* describing a desire to travel to faraway countries. This word is often considered as being untranslatable into English. In fact, a search on thefreedictionary.com suggests a specific term for it, "wanderlust," which itself can be speculated to have been borrowed from German to express the concept in English. Jarvis and Pavlenko (2008) further divide language-

mediated concepts into lexical and grammaticized concepts. Lexicalized concepts are linked to words, e.g., *Fernweh* or *book,* whereas grammaticized concepts are linked to morpho-syntactic categories, such as number, gender, or aspect. As they explain, in a one-language setting a concept is often observable in the form of a word. However, in a setting where more than one language is involved, mapping between a concept and a word is not straightforward, since concepts can be language dependent and there rarely is congruence between language-mediated concepts of different languages. In an L2 context this would give rise to conceptual transfer.

The question thus arises as to how a person who knows two or more languages handles different language specific concepts. What are the effects of an interaction for cases where a one-to-one mapping between concepts and words does not exist? According to Jarvis and Pavlenko (2008), answering these questions requires differentiation between semantic and conceptual transfer. They define semantic transfer as those cases of crosslinguistic influence in which homonymy for two L1 concepts triggers the inappropriate use of an L2 word representing one of the concepts (p. 75, p. 121; cf. Odlin 2005, p. 5–6). Conversely, conceptual transfer covers cases where the linguistic segmentation of the semantic space for given domains in the L1 is not congruent with the L2, e.g., if the L2 provides a finer-grained segmentation that might not be detected by the learners. A straightforward definition of conceptual transfer is difficult, as the phenomenon of transfer itself.

Jarvis (2011) gives a three-level description of conceptual transfer that includes the levels of observation, approach, and hypothesis. Anecdotal evidence on the level of observation points to the fact that, often, when learners use translation equivalents, their utterances seem a little off-target. At the approach level, these language differences are studied from the perspective of cognitive linguistics with a focus on crosslinguistic differences. Thirdly, conceptual transfer can be understood as a hypothesis, "[m]ore specifically, it refers to the hypothesis that certain instances of crosslinguistic influence in a person's use of one language originate from the mental concepts and patterns of conceptualization that the person has acquired as a speaker of another language" (p. 3). As he explains further, conceptual transfer is a cover term for conceptualization transfer and concept transfer. Conceptualization transfer relates to the selection of information for expression when one is about to produce an utterance. Concept transfer refers to the attempt (successful or not) where a concept stored in long-term memory is selected for expression in an L2 (Jarvis

2012, p. 116). Conceptual transfer is thus seen to take place at the stage of the conceptualizer in an adaptation of Levelt's (1989) model for speech production.

Odlin (2005, 2010) defines conceptual transfer in relation to linguistic relativity. Conceptual transfer refers to "cases of linguistic relativity that involve a second language" (2005: p. 5). He argues "that such an influence might affect either comprehension or production, and such influence could, of course, affect comprehension or production in a second language (or a third, a fourth, etc.)" (ibid.). In the following section, we discuss the application of Slobin's TfS hypothesis in L2 acquisition. Slobin's TfS hypothesis has often been referred to as a weak interpretation of linguistic relativity (e.g. Han & Cadierno, 2010).

3.4. TfS in L2 acquisition

Slobin's TfS hypothesis states that "the expression of experience in linguistic terms constitutes thinking for speaking—a special form of thought that is mobilized for communication." Thus thinking for speaking involves picking those characteristics of objects and events that (a) fit some conceptualization of the event and (b) are readily encodable in the languages." (Slobin, 1996, p. 76). When acquiring a first language, these patterns of TfS are learned by the child and over time become established as habitual patterns for the expression of experience. One way of testing the TfS hypothesis is to look at its possible consequences for L2 acquisition. Slobin assumes that the "training" in information selection speakers received during acquisition of their first language must be "resistant to restructuring in adult second language acquisition" (Slobin 1996, p. 89). He concludes that studying those aspects that prove difficult for speakers of a second language that share the same L1 background will be beneficial and informative for testing the TfS hypothesis, what he then refers to as "first language thinking in a second language."

Cadierno (2004), Cadierno and Lund (2004) and Negueruela et al. (2004) first formulated questions for the study of second language acquisition that build on these considerations. From these questions, testable hypotheses can be derived, drawing on Talmy's motion event typology for the systems that differ between two languages. The questions are: how do learners with typologically different L1s and L2s acquire the characteristic meaning-form mappings of the L2? And how does the performance of this kind of learner compare to learners whose L1 and L2 share the same typological patterns? Or in relation to Slobin's TfS hypothesis, as summarized in Cadierno (2008), "...how and to what extent do adult L2 learners adapt to their thinking for speaking in an L2 that is typologically different from

their L1, and how does the adaption of this type of learner compare to that followed by learners whose L1 and L2 share the same typological patterns?" (p. 258). A large number of studies that deal with phenomena related to TfS in SLA, conceptual transfer, or bilingual cognition have emerged since then and have provided us with deep insights into the matter (summaries of the relevant literature can be found in the individual studies). Our investigation contributes to this literature by investigating the semantics of motion verbs, using descriptions of motion events in German, Danish, and Turkish. We carefully describe similarities and differences between the verb semantics of the languages included in the study. In particular, we detail taxonomic depth and extension patterns. Furthermore, we inform studies on crosslinguistic influence by examining the extent to which the L2 forms produced by L2 learners have the same meaning as ascribed to them by NSs, an issue that has not been thoroughly addressed in previous research. It is addressed in Study II. Moreover, in studies that are inspired by TfS in SLA, it has become increasingly evident that finer-grained measures are needed to further underline if the observed phenomena are TfS effects or linguistic in nature (cf. Carroll et al., 2012). We therefore focus on the meaning expressed in the semantic components of Manner and Path in addition to analyses on lexicalization patterns in Studies III and IV. Thus, we build on the fact that different typological form-function mappings (lexicalization patterns) are related to different features of a language's lexicon. To illustrate, in S-languages the lexicon is more refined in terms of Manner verbs. This oftentimes means that the V-language learner of an S-language not only has to understand that Manner is mapped onto the main verb but more critically, has to learn an array of new—Manner based—meanings. That is to say, learners might have learned the appropriate L2 lexicalization patterns, but that does not mean that they have learned to select the same information for expression as native speakers of the particular language. Most typologically- motivated research has investigated onto which morpho-syntactic form and to which degree learners map the semantic components of Manner and Path. To our knowledge, not many studies to date have investigated which Manner components (e.g., first- or second-tier Manner verbs) and which meaning of the Manner components are expressed in an L2 (but see Carroll et al., 2012). Likewise, not many studies have examined which Path components (vector, source, goal) are selected for expression (but see Daller et al., 2011). Finally, it is important to take the available means in the L1s and the L2s into consideration. A correct mapping of semantic components onto the correct form in an L2 might result from the fact that the L2 might not offer options: for example, when the L2 is an S-language it might only provide Manner verbs or general

33

motion verbs. The learner is likely to use these. It is not clear, then, which meaning the learner associates with these verbs. In contrast, for a learner of a V-language with an S-language background, the universality of Path might lead to an easier acquisition of Path verbs. The meaning of Path can be considered already present in the learner's mind as it is expressed frequently in an S-language as well.

3.5. A brief comparison of Conceptual Transfer and TfS in SLA

TfS and conceptual transfer are similar in that both examine how the information selection process prior to speaking influences L2 use. As Jarvis (2011, p. 3) points out, conceptualization transfer "allows" for language specificity to start at the level of the conceptualizer in Levelt's (1989) model of speech production. Even though not explicitly mentioned, TfS must also start at the same level, since it is in the conceptualizer that information is selected for expression. A difference between TfS and conceptual transfer is that conceptual transfer can also refer to a transfer process of concepts stored in long-term memory. Thus, Jarvis (2011) claims that conceptual transfer can also inform linguistic relativity proper, whereas TfS is limited to the thinking that happens during verbalization.

Research on the expression of Motion in an L2 thus touches issues regarding L2 acquisition as well as questions concerning "linguistic relativity," in particular Slobin's influential TfS hypothesis. In the same vein, our investigation can be viewed to be informative for both strands. The L2 acquisition side of our studies focuses on questions regarding what is influencing L2 speech and when, why, and how such influences occur. It follows the lines of research initiated by Cadierno (2004) and Jarvis and Pavlenko (2008). Both lines of research investigate whether our online thinking in preparation for speaking has an influence on how we speak in the L2 and if this influence can be said to be rooted in L1 habitual thinking patterns acquired during childhood. They differ, however, with respect to the aspects they focus on. On the one hand, Cadierno (2004), and other studies following her work (e.g., Cadierno & Ruiz, 2006; Larrañaga et al., 2012) also build on Talmy's and Slobin's work. They mainly investigate the motion construction as a whole. They thus look at how the influence of the L1 on the L2 appears at the discourse level. Mainly, these studies are based on analyses of how the structural level of language, in particular verbs and "satellites," relates to Talmy's semantic categories, in particular Path and Manner and the discursive consequences of these lexicalization patterns. On the other hand, Jarvis and Pavlenko (2008) mostly focus on the influence that L1 concepts that are usually expressed in one word or one grammatical form can have on the use of L2 word forms or grammatical

forms. Effects here become especially visible when category boundaries of "meaning elements" differ between L1 and L2, when categories in the L1 do not exist in the L2 or vice versa, i.e., when a one-to-one mapping of an L1 concept on an L2 form is not possible. To bring the two lines of research together and get an overall and more comprehensive picture of the expression of motion events, we conducted four studies. Studies I and II investigate which meaning elements are expressed in motion verb use. Study I maps out the meaning in the semantic space of motion for Danish, German, and Turkish. Study II maps out the meaning of Danish verbs used by German and Turkish learners. The main focus of these two studies is thus the meaning element expressed in the L1 and the L2. Studies III and IV investigate how semantic components are expressed in the learner language, thus following the TfS in L2 approach. All four studies are based on the same data set.

3.6. Methodology to identify transfer

Jarvis (2000) (also Jarvis & Pavlenko, 2008) advocates the use of a common and more rigorous standard methodology in investigating transfer phenomena in learner language. He argues that in order to clearly distinguish transfer from other sources of peculiarities in learner language, one must consider three types of evidence: intra-group homogeneity, inter-group heterogeneity, and similarities between native language and learner language performance. Intra-L1-group homogeneity is found when learners with the same L1 show similarities when using the same L2. This helps to show that the learner's L1 background correlates with the observed language behavior in the L2 (with regard to a specific feature). Inter-L1-group heterogeneity is found when learners of the same L2 with different L1s differ in their L2 performance for a given feature. This helps to rule out developmental or universal factors as the cause of transfer. Lastly, L1 influence can be seen in intra-L1-group congruity between L1 and L2 performance. This is found when a learner's L2 use is similar/parallel to the use of the same feature in the learner's L1. These three observable effects show L1 influence as a plausible cause of the observed learner language patterns. They can further help to demonstrate what aspects of the L1 cause the learner language patterns. Furthermore, Jarvis (2000) argues that a large sample size from an appropriate population is important. The use of the same material between researchers would also help to enhance focus and reduce diffusion, thus adding to the comparability of results.

4. The present investigation

This thesis has two main goals. First, it studies the expression of motion events in German, Danish, and Turkish with help of an original data set. By employing fine-grained measures, inter- and intra-typological differences are examined. Second, with respect to L2 acquisition, the thesis investigates the expression of motion events in L2 Danish by German and Turkish learners. It further attempts to identify the nature of possible crosslinguistic influences. Study I investigates the categorization of motion events by addressing the overall question of which meaning is expressed in the motion verbs used by Danish, German and Turkish native speakers. It differs from study II-IV in that it addresses the issue from an L1 perspective. From an L2 perspective, studies II-IV address the overarching question of how the selection of information in an L1 influences the selection of information in an L2. Study II uses insights of the first study to investigate how L1 categorization has an impact on the categorization of motion events in L2 Danish. Additionally, in study III and study IV, we examine in detail how the semantic components Path and Manner are expressed in German, Danish, Turkish, and the learner languages.

All four studies together provide a comprehensive investigation of the expression of motion events in German, Danish, Turkish, and in L2 Danish for speakers with a German and a Turkish background. From a typological perspective, Studies I, III, and IV offer detailed information on the influence of the Talmian typology in the expression of motion in German, Danish, and Turkish. From an L2 perspective, Studies II–IV explore potential loci for crosslinguistic influence at the morpho-syntactic as well as the semantic and conceptual level. The findings provide further evidence for Slobin's TfS hypothesis and the conceptual transfer hypothesis.

A summary of each of the four individual studies is presented in Chapter 6. The following sections address methodological aspects that are relevant for the investigation.

5. Methodological aspects

5.1. Research instrument

The stimuli in this study were 37 video clips, each 3- to 4-seconds long, showing a great variety of motion events performed by humans, primates, and a range of different animals. They were generously provided to us by Prof. Mila Vulchanova from the Norwegian University of Science and Technology in Trondheim. Originally designed to map out the Manner verb inventory across different languages (Vulchanova et al., 2012a), the videos

also lend themselves to the examination of the expression of Path because the descriptions of the informants included Manner and Path information. Thus, descriptions of the short video clips provide a good testing ground to see if differences between the L1 and the L2 cause crosslinguistic influence.

The video clips were embedded in a Web page with instructions in the native language of the L1 informants and in Danish for the learner groups. Participants viewed each clip as often as they liked and typed their answers into a response box. The response box was preceded by the appropriate translation of "please, describe what you see." The L1 informants answered in their native language; the L2 learners answered in Danish.

Data elicitation for the five groups was conducted online, with the researcher accessible in person or via chat in case of questions or technical problems. There were two example items that showed non-motion events, to prepare the participants for the length of each clip. Other input regarding the actual task was minimized; no hints or clues were given as to how to answer the elicitation question. This was done to prevent a possible manipulation by the researcher.

5.2. Participants

The design of our study aims to facilitate the identification of transfer phenomena. We follow Jarvis' (2000) suggestions for a rigorous methodology in the study of transfer (see section 3.6.). Thus, we included five groups in the study, three native speaker groups and two learner groups. The native speaker groups consisted of 25 German speakers, 25 Turkish speakers, as well as 21 Danish speakers as a control group. The learner groups consisted of 14 German learners of Danish and 14 Turkish learners of Danish. This allowed us to make both inter-group and intra-group comparisons. The learners were asked to fill out a linguistic background questionnaire based on The Language Background Questionnaire (Gullberg & Indefrey, 2003). However, even though we obtained data about, e.g., age of arrival, duration of stay, as well as information on the proficiency of languages other than Danish, we did not use these as variables in this study.

Twenty-one Danish native speakers took part in the study. Nineteen were students at the University of Southern Denmark, one was a Ph.D. student and one a teacher. The twenty-five Turkish informants were all students at the Bosporus University in Istanbul. The twenty-five German informants had more diverse professional backgrounds. There were six students, a soldier, a chef, a Ph.D. student, three associate professors, a scientist, an IT

expert, a person working for factory security, two speech therapists, a translator, a dental assistant, a producer, a watchmaker, an industrial clerk, an engineer, a project leader and one person that did not specify their professional background. The German subjects were located all over Germany.

The fourteen German learners had differentiated professional backgrounds: three were not working at the time of recruitment. The others were affiliated with the university, including two Ph.D. students, a postdoctoral researcher, three associate professors and one university professor, two teachers, one physical therapist, and one person working in a fun park. Given their job or family situation, the participants actively used Danish on a daily basis. Age range was between 22 and 55, with an average of 33.

The fourteen Turkish learners also had different professional backgrounds: cleaning person, pizza baker, IT consultant, system administrator, on maternal leave, social worker, job consultant, hairdresser, associate professor, Ph.D. student, IT developer, Turkish teacher, and two people currently unemployed (age range: 26–58, M: 34.7). Like the German subjects, the Turkish learners used Danish on a daily basis with their spouse and/or at work.

Due to the lack of a placement test for Danish as a foreign language, we adopted the DIALANG Vocabulary Size Placement test for Danish. The test is lexicon-based. A total of 75 test items have to be classified as nonsense words or real Danish words. This test is a very good predictor of performance on all skill areas, which are defined as reading, writing, listening, and grammar (Alderson, 2005, p. 79–94).

Most Turkish participants (n=11) and most German participants (n=13) completed the DIALANG placement test. One German learner and three Turkish learners did not complete the placement test. They were included in the sample based on their self-assessment, the researcher's assessment by means of an oral interview, and a high reported use of the target language.

The percentages of the correct answers of the placement test were computed for each group. A nonparametric Wilcoxon test shows that the means of the two populations were comparable. On average, the German learners scored 83%, whereas the Turkish learners scored an average of 75%.

5.3. Sampling

In this section, we describe the methodology used in constructing the data set based on Babbie (2012).

Data were collected from two different populations: native speakers of three languages, i.e., Danish, German, and Turkish, and advanced learners of Danish with two different linguistic backgrounds, i.e., German and Turkish. The subject populations were not defined further (no difference regarding gender, age, etc. for the native speakers, or age of arrival, length of residence for the learner population was made). A subset of the learner population was then selected for the data collection based on level of L2 proficiency.

Our sampling technique was non-probabilistic in nature. It can be further categorized into convenience sampling and snowball sampling.

Non-probability sampling is a technique where subjects are recruited in a process that does not give all the individuals in the population equal chances of being selected. Convenience sampling is a non-probability sampling technique where subjects are selected because of their convenient accessibility and proximity to the researcher. The subjects are selected because they are easiest to recruit for the study, and the researcher does not consider selecting subjects that are representative of the entire population. The disadvantage of non-probability sampling in general and convenience sampling in particular is that an unknown proportion of the entire population is not sampled at all. This means that the sample may not represent the entire population accurately. Therefore, the results cannot be used in generalizations concerning the entire population. Snowball sampling is a non-probability sampling technique that is used by researchers to identify potential subjects in studies where subjects are hard to locate or if the study is limited to a very small subgroup of a bigger population. It works like a chain referral. After observing initial subjects, the researcher identifies more subjects with the assistance of the initial subjects. Snowball sampling contradicts many of the assumptions supporting conventional notions of random selection and representativeness.

Since it is impossible to assess the total size of the overall population, the eligibility criteria for the native speaker groups were simply to be a native speaker of the language in question. Eligibility for the learner groups was based on subjects' level of proficiency. This was assessed by means of a language test (see section 5.2).

In recruiting the German and Turkish learner participants, the researcher employed various strategies. One strategy involved visiting a local language school to select participants. However, some potential subjects had to be excluded as they failed to reach the desired level of language proficiency. The researcher then started a non-random snowball sampling to find an appropriate number of participants. This proved to be a successful strategy. Subjects for the native speaker groups were selected from the researcher's friends and from a kind of snowball sampling in that friends invited their friends to participate.

The final sample size is a result of two interrelated factors: an orientation towards the sample size used in previous studies and the number of participants that could be recruited in a reasonable amount of time.

5.4. Coding

The first two studies are concerned with the question of the meaning of verbs used in the motion descriptions. Hence, in our coding we extracted only the verbs from our data set. We then used cluster analysis in order to determine the meaning extension of the verbs. Very simply put, the scenes a verb could be used to describe reflected its meaning. With the help of cluster analysis, we were thus able to derive meaning categories for native speakers of Danish, German, and Turkish in our first study. In the subsequent study, we extracted the verbs from the learner descriptions and derived the corresponding meaning categories using cluster analysis. We were then able to see differences in the use of Danish verbs by the learner groups as compared to the use by Danish native speakers. We accounted for how the meanings of the L1 verbs influence the use of L2 Danish verbs and discuss the L2 Danish verbs' meaning.

Whereas the first two papers focused on the analysis of motion verb semantics, the third and fourth study investigated the use and meaning of Path and Manner expressions in Danish, German, and Turkish and L2 Danish. The coding followed a set of questions. Is Path or Manner expressed? How often is it expressed? Which morpho-syntactic devices are applied? What is the meaning of the individual morpho-syntactic device?

5.5 Cluster analysis

Majid et al. (2007) introduced cluster analysis as a new technique "for synchronic comparison of word meaning in different languages" (p. 181). Cluster analysis can help to inform questions regarding the similarity in semantic categories. We applied cluster analysis in Studies I and II. In Study I, we investigated the semantic categories in the motion

domain by German, Danish, and Turkish native speakers. In Study II, we used cluster analysis to investigate the semantic categories in L2 Danish by German and Turkish learners. Cluster analysis is an important tool for classifying data into smaller classes or categories, creating meaningful taxonomies, groups, or clusters based on combinations of independent variables. In our description, we follow Burns and Burns (2008). Cluster analysis maximizes the similarity of cases within each cluster, while maximizing the dissimilarity between groups that are initially unknown. Each cluster thus describes, in terms of the data collected, the class to which its members belong. Items in each cluster are similar in some ways to each other and dissimilar to those in other clusters. A cluster is thus a group of relatively homogeneous cases or observations. In this sense, Cluster Analysis creates new groupings without any preconceived notion of the nature of clusters or number of clusters. The number of clusters that the analysis will yield is unknown. The methods implementing cluster analysis rely on dissimilarities or distances between objects when forming the clusters. In such a case, hierarchical clustering and Ward linkage with Euclidean distance are the major settings that are usually applied (Burns & Burns 2009: 556). Euclidean distance computes distances between objects in a multidimensional space and it is the most frequently used distance measure. The linkage criterion we chose is called Ward's linkage. In this method, cluster membership is assessed by calculating the total sum of the squared deviations from the mean of a cluster. The criterion for fusion is that it should produce the smallest possible increase in the sum of the squared errors. Hierarchical cluster analysis starts with every observation as a separate cluster, i.e., there are as many clusters as there are cases. Clusters are then combined sequentially, reducing the numbers of clusters, repeating each step until only one cluster is left. A tree diagram can be produced to show the linkage points.

In our approach to the analysis of verb meaning, we closely followed Majid et al. (2007). However, we differ in that we use Euclidean distance and Ward linkage instead of Jaccard similarity ratio and average linkage. Euclidean distance together with Ward linkage should result int a finer-grained analysis, since Euclidean distance takes into account the actual number of verbs used . In Studies I and II, we had a total of 3663 descriptions, distributed among various groups of subject as follows: 777 descriptions by Danish native speakers, 925 by German native speakers, 925 by Turkish native speakers, as well as 518 descriptions by German and 518 by Turkish learners of Danish. This large number of descriptions and corresponding verb tokens for each group was organized into meaningful and manageable

smaller groups by means of cluster analysis. An analysis of the clusters produced by this methodology allows us to understand the meaning boundaries of verbs.

5.6 Simpson diversity index

Majid et al. (2007) introduced a measure of diversity that is helpful in the investigation of the nature of the verb lexicon in languages. It is more informative than a type/token analysis in that it takes the relative abundance of types into account.

In general, a diversity index is a mathematical measure of diversity in a given set of data. As introduced by Majid et al. (2007), it can be used to provide information about the composition of the lexicon and use of verbs in a given domain, in our case motion, in a language. This means that with regard to lexicon composition and use, we investigate more than simply motion verb richness (i.e., the motion verb types and overall tokens); we also take the relative abundances of different motion verb types into account. Consider two sets of motion event descriptions containing 100 motion verb tokens each and composed of 10 different motion verb types. One set of motion description has 10 tokens of each type; the other has one individual token of each of nine types, and 91 tokens of the tenth type. The first set is more diverse, but both data sets have the same type/token richness. By taking relative abundances into account, a diversity index depends not only on type richness but also on the evenness, or equitability, with which tokens are distributed among the different types. Thus, the Simpson diversity index provides important information about rarity and commonness of types in a data set. The ability to quantify diversity in this way is an important tool for us in trying to understand the structure of the motion verb lexicon. The formula is specified in Studies I and II.

6. Summaries of the individual studies

6.1. Study I: Semantic categories in the domain of motion verbs by adult speakers of Danish, German, and Turkish.

This study investigated differences in the semantic segmentation for motion events across adult speakers of Danish (n=21), German (n=25), and Turkish (n=25) by focusing on the use of motion verbs. Thirty-seven short video clips showing a variety of species moving in many different ways were used as stimuli. We examined three languages, two of which (Danish and Turkish; for German see Phelps & Duman, 2012), to our knowledge, have not been previously investigated with regard to how they segment the semantic space of motion verbs. The study thus relates to findings presented by Malt et al. (2008), Vulchanova et al.

(2012), Phelps and Duman (2012), and Malt et al (2013) that examine the segmentation of semantic space of motion as well. Our method of choice to investigate possible principles behind motion categorization is cluster analysis (as explained in more detail in section 5). We asked the following research questions:

1. Which verbs are used in the descriptions of the videos and how frequently?

2. What are the semantic characteristics of the motion verbs employed across the three languages in terms of

a. their extensions in the semantic space, i.e., their semantic boundaries?

b. hierarchical relations, i.e., taxonomic depth/meaning relations/structure of the semantic space across the three languages?

c. certain features as salient for categorization, i.e., parameters for segmentation?

3. How do the semantic characteristics relate to the typological structure of the three languages? What is the relation between features and typological membership?

The main results can be summarized as follows:

1. German speakers used the highest number of different motion verbs (n=69), followed by Danish speakers (n=41) and Turkish speakers (n=36).

2a. Danish speakers showed a preference for three motion verbs, which resulted in the coarsest segmentation of the semantic space. In German, the variation among speakers was higher, showing a preference for seven different verbs. Turkish speakers showed a preference for six different verbs, three of which were Path-based verbs: *inmek* 'move down', *dönmek* 'turn', and *tirmanmak* 'climb up'.

b. Hyponyms occurred in all three languages, albeit only to a very limited degree in Turkish. The highest number of hyponyms were observed in German. In German, hyponyms typically expressed a more fine-grained conceptualization of a motion event, e.g., *taumeln* 'stagger, sway' as a hyponym of *gehen* 'walk' also transmits more information about the nature of the walk. Most hyponyms in German were special cases of *laufen/gehen* 'walk'. Turkish only showed hyponymy for *yürümek* 'walk'. In Danish, the highest number of hyponyms were special cases of *løbe* 'run'.

c. In Turkish, Path verbs were used in almost all scenes showing non-horizontal movement. Scenes with horizontal movement showed a variation between Manner verbs and Path

verbs. Conversely, almost no Path verbs were used by the Danish and German informants. Thus, variability in the linguistic categorization of Turkish speakers was motivated by Manner as well as Path, whereas Path did not play a role in categorization for Danish and German.

3. The fact that Turkish speakers preferred the expression of Path, and German and Danish speakers the expression of Manner in the verb is in line with expectations derived from Talmy's motion typology. Curiously, Danish NSs mostly used three different motion verbs, thus showing a preference for three categories, and did not display the lexical richness of Manner verbs associated with S-languages, at least not in the given task. It is not clear why they did not make more use of the fine-grained Manner verbs, which do exist in Danish.

These results confirm on the one hand that there are differences across languages with respect to which kind of information is selected to describe motion events. On the other hand, they show that languages of the same type also differ from one another with respect to fine-grained differences.

6.2. Study II: Variation in the categorization of motion events by Danish, German, Turkish, and L2 Danish speakers

The results of Study I provided the baseline for the investigation of how German and Turkish learners of Danish would express motion events in their L2. Similar to Study I, Study II investigated categorization patterns and meaning organization by means of cluster analysis, but this time in the learner language. To understand the process of information selection in an L2, we asked the following research questions:

1. What verbs do L2 learners use to describe motion events? How do they compare to L1 Danish NSs' verb use?

2. What are the boundaries of the semantic categories in the learner language?

3. What is the learner's task in restructuring the Danish L2 semantic categories?

4. How do L2 learners reconstruct meaning? What role does typological difference play?

The results can be summarized as follows:

1. The German learners employed the largest number of motion verb types (48). Furthermore, the German learners showed the highest degree of diversity of motion verbs used, i.e., many different verbs were used relatively often across speakers. The Turkish learner group used 28 different types; Danish native speakers used 41 types. Both the Turkish learners of Danish and the Danish NSs displayed a higher degree of agreement in

the descriptions of the scene descriptions. The three most frequently used verbs were identical in all groups: *løbe* 'run', *kravle* 'crawl', and *gå* 'walk'. However, they were used with different frequency: Danish NSs 75% of all scenes, German learners 61%, Turkish learners 86% of all scene descriptions.

2. Overall, we showed that the three most commonly used verbs did not share the same extension in the semantic space of motion. This means that neither learner group used Danish motion verbs in a target-like fashion. German learners used cognates that were semantically more restricted in the target language (TL) (e.g., *løbe* cannot be used to describe slow events in Danish, whereas *laufen* in German can) or that meant something else (e.g., *hoppe* was not used by Danish NSs to describe the movement for a koala on the ground). Turkish learners overused the Danish verb *gå* 'walk'. It seems that *gå* was used for cases where a Path verb exists in Turkish and where Danish does not offer an equivalent alternative.

3. The task for the German learners can be characterized as moving from a complex system of description to a simpler one. They had to learn how to make fewer semantic distinctions. The task for the Turkish learners was twofold. Turkish learners had to learn that Path typically cannot be expressed in the verb. Additionally, they had to understand the extension of the Danish Manner verbs *kravle*, *løbe,* and *gå*, in that these have a different extension than the Turkish counterparts.

4. German learners kept a finer-grained distinction in their description, as reflected by the use of more specialized verbs. This leads us to think that the German learners rely on the semantic distinctions made in the L1. At the same time, German learners used *løbe* 'run' analogous to German *laufen* for slow and fast events. This difficulty to change from a multi-term system to a single-term system (*kravle* in Danish NSs' descriptions vs. *kravle, klatre, hoppe* in German learners' L2 Danish descriptions) as well as from a single-term system to a dual system (*løbe* in German learners' L2 Danish vs. *løbe, gå* in Danish NSs' production) reflects a reliance on the L1 semantic conceptual categories. As such, it presents instances of conceptual transfer for the German learners.

The Turkish learners' displayed an overuse of the motion verb *gå*. This can be assumed to reflect difficulties with the mapping of Manner information onto the main verb, or alternatively, the absence of Path verbs. The Turkish learners seemed to create a broad category reflected in *gå* that can cover for a lack of Path verbs. Additionally, they described

a scene showing a bug moving on a twig with the verb *gå,* whereas Danish NSs preferred *kravle* 'crawl'. This choice seemed to be motivated by the fact that Turkish NSs used *yürümek* 'walk' in their descriptions of the same scene. In other words, a bug *walks* in Turkish, whereas it *crawls* in Danish. These observations suggest that Turkish learners relied on the conceptual categories of their L1 in their choice of the L2 verb. On the one hand, the lack of Path verbs leads to a rather broad category. On the other hand, we can observe conceptual transfer for the bug scene.

Overall, we showed that semantic categorization in an L2 is influenced by the structure of the learners' L1 semantic space. This is in turn evidence for L1 influence on information selection in the L2.

6.3. Study III: The expression of Path in L2 Danish by German and Turkish learners

The third study explored the nature of crosslinguistic influence by investigating how German and Turkish learners of Danish expressed the Path element in motion, paying special attention to the semantics of Path. The acquisition of Path expressions in L2 Danish is particularly interesting since in this language Path is typically coded in two surface elements. This complex encoding allows for a more detailed Path description in Danish compared to German or Turkish. The nature of an L1 influence would thus be visible on the structural as well as on the conceptual level. We devised a coding system consisting of four categories that encompasses all the morpho-syntactic possibilities to encode Path across the three languages to allow for crosslinguistic comparison. In particular, we asked the following research questions:

1. Do the participant groups (i.e., the Danish NSs, the German NSs, the Turkish NSs, the German learners of Danish, and the Turkish learners of Danish) differ with respect to the overall frequency of expression of Path? What is the proportion of Path in all the descriptions?

2. How complex are the descriptions of Path used across the five groups? How many different Path devices are expressed?

3. What meanings/subcomponents of Path are expressed?

4. How can we account for differences between Danish native speakers and the learner groups' production of Danish as an L2?

The main results can be summarized as follows:

1. German learners expressed Path as frequently as Danish NSs, whereas Turkish learners did not encode Path as often.

2. Both learner groups preferred a simple Path encoding. They therefore did not express as much Path detail as Danish NSs.

3. The meaning elements selected for the Path expressions in Danish L2 were mostly similar to the meaning elements selected for expression in the L1s, and at the same time often different from those selected by Danish NSs.

4. The overall frequency of Path encoding in the learner groups resembled the frequencies observed in German and Turkish L1 data, respectively. We concluded that the Turkish learners were influenced by their L1. Since German and Danish NSs encoded Path to the same extent, we cannot establish whether the German learners "learned" the correct way of lexicalization or were influenced in a positive way by their L1. With regard to the Turkish learners, the nature of the L1 influence seemed structural in nature. Path should be conceptually present for the Turkish learners, because it is a universal component of a motion event and because it is expressed in Turkish L1.

Regarding the preference of a simple Path encoding in both learner groups, we assumed an L1 influence. The fact that less linguistic material is used even at an advanced level might point to the fact that the habitual L1 encoding of a simple Path prevents learners from realizing the complexity of the Path expression in Danish. The structure of the L1 and the correlated degree of descriptivity thus lead to a structure-induced transfer effect that entails different, i.e., less-specific L1-based conceptualizations of Path. This is corroborated by the finding that the meaning of the Path expression selected in Danish L2 was mostly similar to the meaning selected for expression in the L1s, but at the same time often different from Danish.

We can thus observe an intricate interplay between surface form and degree of descriptiveness. This is directly linked to the process of information selection.

6.4. Study IV: The expression of Manner in L2 Danish by German and Turkish learners

Study IV investigated how the L1 influenced the L2 by looking at the expression of the Manner component in the learner language. We conducted quantitative as well as qualitative analyses. To that end, we asked the following research questions:

47

1. Across all five groups, is Manner explicitly mentioned?

2. Which morpho-syntactic resources are primarily used to express Manner?

    a) verb

    b) converb

    c) adverb

    d) other (categories converged across languages)

3. Are Manner expressions stacked across the descriptions? Do learners resort to the combination of lexical resources to gain a higher degree of descriptivity?

Qualitative analysis:

4. What can we observe regarding the diversity of Manner expression in Danish, German, and Turkish in terms of

a. number of first- and second-tier verbs?

b. different Manners expressed in converbs, adverbs, and other Manner devices?

5. Do differences regarding the diversity of Manner expression have an implication on the acquisition of L2 Danish?

The main results can be summarized as follows:

1. Danish and German NSs as well as German and Turkish learners in L2 Danish expressed Manner very frequently. Turkish NSs expressed Manner to a lesser degree.

2. Danish and German NSs as well as German and Turkish learners in L2 Danish expressed Manner (not exclusively) in the verb. Turkish NSs expressed Manner in the verb to a lesser extent. The option of expressing Manner in a converb was used by Danish NSs to a certain degree, and to a higher degree by Turkish NSs. It was not used by German NSs, German learners, or Turkish learners in L2 Danish. German learners used the option of expressing Manner in an adverb more frequently than Danish NSs, Turkish NSs, and Turkish learners. There were only small differences regarding the use of other Manner devices across all five groups.

3. German learners used the highest number of Manner devices in a description, on average.

4. The German learners expressed Manner in more detail and in a more diverse fashion compared to Danish NSs. This can be attributed to the higher density of Manner expressions. There was no difference with regard to the overall number of Manner verbs used by German learners in L2 Danish and by Danish NSs. However, German learners used more types (note: Danish NSs only used three different verbs to describe three out of four scenes). The Turkish learners, at first glance, looked very much like the Danish native speakers. They used the same amount of Manner verbs and did not differ with regard to density. However, the overextension of *gå,* as already discussed in Study II, played an important role in the interpretation of the results.

5. The higher density in the descriptions of the German learners might be explained by a reliance on L1 information selection patterns. German learners strived to maintain the fine-grained semantic distinctions. For the Turkish learners, we argued that a transfer-to-nowhere might have caused the overuse of *gå*. In fact, previous literature reveals similar observations made by other researchers (e.g., Cadierno, 2010; Hendriks & Hickmann, 2011). We argued that an L1 influence on the conceptual level becomes clearer first when one looks into what information is selected for expression.

6.5. Highlights of Studies I–IV

Highlights of Study I: Naming choices in three languages were examined for 37 instances of human locomotion. Naming patterns reflected salient physical similarities among the instances, with an interesting exception in the German *gehen/laufen* category. The languages differed most notably in how many named distinctions were made. We could observe that motion typology also played a role in the segmentation of the semantic space of motion.

Highlights of Study II: The naming choices made by L2 Danish learners seemed motivated by learners' L1 use. German learners kept fine-grained distinctions; Turkish learners overused *gå*. L1 TfS patterns and conceptual transfer are possible explanations for the German learners. The creation of a new broader category might explain the Turkish learners' use of *gå* (as a result of lack of Path verbs in Danish). In both cases, transfer motivated by meaning expressed in L1s can explain the L2 use of target-like forms with non-target like meaning.

Highlights of Study III: The expression of Path in Danish is complex. The meaning is typically distributed over two form classes. The learner's L1 typically reflects simple Path

marking. In L2 Danish, complexity is not achieved by most learners. Furthermore, an analysis of the content expressed showed that learners expressed semantic content similar to content expressed in their L1 but different from Danish.

Highlights of Study IV: The frequency of expression of Manner in the L1s was very similar. With regard to Manner density, we observed that Turkish learners performed like Danish NSs: Target-like with regard to Manner density. Conversely, German learners displayed a higher Manner density using Manner adverbials. We were also able to show that the content of the Manner expression in the L2 has its roots in the L1.

7. Limitations

In addition to limitations regarding the representativeness of our analysis, as explained in Chapter 5.2, the present thesis suffers from some limitations in relation to issues regarding linguistic relativity and crosslinguistic influence.

If we look at our study from the perspective of linguistic relativity, then one limitation is that we do not investigate the effects of language on non-linguistic cognition. Rather, as Jarvis and Pavlenko (2008) put it, what we look at is the influence of language through cognition on language again. We deal exclusively with verbal data. We did not look at effects of language on memory, categorization, or other cognitive tasks. There are some studies that take that perspective and measure, e.g., a language effect on perception (Athanasopoulos, 2009), event recognition (Filipovic, 2011), or similarity judgments (Czechowska & Ewert, 2011). Furthermore, our focus on verbal data leaves out the investigation of other modalities, e.g., gestures and eye-movement, that can shed light onto the question of to what extent linguistic and non-linguistic cognition are co-dependent. Studies that examine the use of gestures include, e.g., Stam (2006), Brown and Gullberg (2008), Hickmann, Hendriks, and Gullberg (2011), while Schmiedtova (2011) and Flecken (2011) explore eye tracking. These studies are able to make a link between languages influenced by each other and the influence language has on other cognitive abilities.

With regard to our study as informing the phenomenon of crosslinguistic influence, there are other limitations to account for. First, since we limit ourselves to the investigation of unidirectional transfer in the direction of the L1 on the L2, we cannot make any statements about what influence the L2 might have on the L1. It follows that we start with the assumption that L2 learners possess a stable L1 system. We therefore exhibit the monolingual bias concern as raised by, e.g., Ortega (2011). We cannot observe the possible

interactions between an L1 and an L2 that are listed by Jarvis and Pavlenko (2008, p. 246–248) that require an investigation of the learners' performance in both their languages. Excluded from the present investigation are thus attrition effects, i.e., the loss of L1 typical preferences as a result of an increasingly dominant L2. Likewise, related effects such as bidirectional or reverse transfer, i.e., an influence of the L2 on the L1, the internalization of new L2 categories that were originally absent in the L1 or convergence, i.e., cases where the bilingual L1 and L2 performance differs from monolingual speakers of both languages, equally need data from both the language learner's languages. In the discussion of our results, we evoke only two of the concepts sketched in Jarvis and Pavlenko (2008): conceptual transfer and possible restructuring. Our studies are based on an observation of learners' production in their L2 for a specific task. We compare the learners' L2 production to native speakers' production on the same task. Moreover, our studies are based on elicited data from different groups of subjects on the same task. We do not know how the learners' performance would vary with respect to non-elicited interactional performance. Furthermore, our studies cannot account for long-term effects of an L1 influence on the L2, nor can we inform questions regarding a path of learning or restructuring with certainty. In addition, we do not account for the nature of the input the learners have received or how the environment or the dominant sociolinguistic settings might influence conceptualization (cf. Daller et al., 2012).

Nevertheless, our methodological design complies with the criteria established in the literature for methodological rigor in the study of CLI (Jarvis 2000). Furthermore, we investigate a unique combination of languages from different types. Our setting is also justified since, for Studies I and II, it allowed for the mapping out of the Manner inventory in the L1s and the learner language for both learner groups and yielded a very high number of different Manner verbs compared to previous studies. This enabled us to carry out a fine-grained analysis of the Manner verb semantics in the L1s and the role verb semantics play in the L2. Additionally, in studies III and IV we were able to focus on the overall expression of Path and Manner holistically in their respective morpho-syntactic mappings as well as in detail, zooming in on the preferred construal and meanings expressed, for a very wide range of different motion event descriptions. The data density thus justifies a narrow focus and a quasi-experimental set-up.

8. Future research

With regard to pedagogical implications, studies on L2 learner instruction, which would make learners aware of construal differences, would inform us about the possibility of teaching new ways of TfS and the specificities of learning to orient towards new ways of construal. Studies that focus on comprehension to complement the many production studies are needed (cf. Cadierno, 2013).

Future research in the area of transfer in the broader sense can spread in many other different directions. With regard to when transfer is triggered or how, researchers might want to attempt to include more variables to see, e.g., how social setting or age of arrival can influence transfer (cf. Daller et al., 2010).

For future research regarding SLA and linguistic relativity or TfS, as laid out in great detail by Athanasopoulos and Bylund (2013), studies could be augmented with investigations of non-linguistic effects of language on cognition, following the studies by, e.g., Filipovic (2011) or Flecken (2011). Athanasopoulos and Bylund (2013) advocate a methodological shift away from surface production towards co-verbal behavior such as gestures, attention allocation during speech to be measured with, e.g., eye tracking, and ERPs (event-related potentials) in semantic production to be measured with EEG scans. They argue that it is in these co-verbal production channels that one can see cognitive processes involved in speech production. An integration of co-verbal behavior would help to examine the degree of correlation between linguistic and non-linguistic cognition. Furthermore, an extension of the domains under scrutiny, beyond the motion domain or tense/aspect, could help to understand the nature and the occurrence of possible language effects on linguistic and non-linguistic cognition. Studies on emotion (e.g. Wierzbicka, 1999) or object categorization (e.g. Malt and Sloman, 2003) would thus equally benefit from the above mentioned augmentation and shed light on the question whether or not differences in languages are connected to differences in non-linguistic cognition. As Jarvis (2013) points out, most of our knowledge on conceptual transfer stems from investigations on narrative tasks. We do not know what types of transfer might occur in L2 learners conceptualization of, e.g., forms of reasoning and problem solving tasks other than narratives.

As Robinson and Ellis (2008) point out, most studies dealing with SLA and transfer or SLA and TfS lack a clear integration of a model of language production. A similar point is raised by Jarvis (2013) who states that "there is also still a great deal to be discovered about the

relationship between conceptualization transfer and concept transfer" (p. 116). He points out that we still do not know much about the relationship between conceptualization transfer and concept transfer, in particular with respect to the mental templates (or schemas) that people rely on when conceptualizing or forming temporary representations of events and situations in their working memory. As Jarvis continues, according to Langacker (2008), these schemas are stored in long-term memory and therefore constitute concepts or, as Jarvis says, knowledge. Thus, crosslinguistic differences in event construal may very well reflect not just conceptualization or processing differences, but also knowledge differences. We still need to discover if speakers of different languages actually have different structured event schemas, or whether they differ simply in terms of which schemas they tend to access to in particular contexts. This is related to suggestions for future research made by Treffers-Daller (2011). She argues that it would be interesting to see the implications of SLA studies for Levelt's (1989) model of speech production. An interesting starting point could be deBot's (1992) attempt to extend Levelt's model to L2 speech production. Especially in the TfS in SLA framework, reference to bilingual production is only implicit and based on assumptions made from L1 developmental studies. Little is known about processing an L2 and models of mechanism of transfer, i.e., how exactly L1 lexicalization patterns and the correlated selection of information influence the same processes in the L2, and at what level of the speech production process.In the discussion of Studies III and IV, we point to this, stressing the importance of bearing in mind that the organization of language production is not very well researched and usually not taken into consideration in L2 studies. In particular, it is not clear at which level of speech production transfer could or would occur. In conceptual transfer and TfS, transfer starts at the level of the conceptualizer by definition (in Slobin's terms the anticipation stage), but then whether or not there is one bilingual conceptualizer or two monolingual conceptualizers is not clear. Even less clear is how the bilingual conceptualizer would interact with a formalizer or two formalizers, for that matter. It is therefore only in the form of questions for future research that we can comment on the organization of the two languages in the L2 learner's mind.

Accordingly and with regard to the question of whether or not knowledge is transferred, one ultimately has to address the question of whether the L2 learner is a bilingual and different from monolinguals of both his/her languages. In fact, this question has been raised by Cook (1991, 2008) and continues to attract interest in studies of simultaneous bilingualism (e.g., Alferink & Gullberg, 2013), but has been somewhat neglected in SLA

studies. We still do not know much about how and from where L2 learners start building an L2 system that may or may not be independent of their L1, or how they are more than just "two monolinguals in one person" (Grosjean, 1989).

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Part 2: The individual studies

Study 1: Jessen, M. (2013). Semantic categories in the domain of motion verbs by adult speakers of Danish, German, and Turkish. Linguistik online, 61(4/12).

Semantic Categories in the Domain of Motion Verbs by Adult Speakers of Danish, German, and Turkish[*]

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Abstract

Languages differ in the ways they divide the world. This study applies cluster analysis to understand how and why languages differ in the way they express motion events. It further lays out what the parameters of the structure of the semantic space of motion are, based on data collected from participants who were adult speakers of Danish, German, and Turkish. The participants described 37 video clips depicting a large variety of motion events. The results of the study show that the segmentation of the semantic space displays a great deal of variation across all three groups. Turkish differs from German and Danish with respect to the features used to segment the semantic space – namely by using vector orientation. German and Danish differ greatly with respect to (a) how fine-grained the distinctions made are, and (b) how motion verbs with a common Germanic root are distributed across the semantic space. Consequently, this study illustrates that the parameters applied for categorization by speakers are, to some degree, related to typological membership, in relation to Talmy's typological framework for the expression of motion events. Finally, the study shows that the features applied for categorization differ across languages and that typological membership is not necessarily a predictor of elaboration of the motion verb lexicon.

1. Introduction

While one can easily be buried in a *kiste* in Danish, it would be rather odd to be found six feet under in a *Kiste* in German. This has to do with the range of these cognate words in their respective languages. While in Danish a *kiste* relates more to a coffin than to a box, it only covers boxes in German. The motion event that might have led to this unfortunate situation could be described as *Er balancierte auf einem Hochseil*, conflating the act of walking and keeping the balance in German, whereas *He was walking on a tightrope* for English relies on the listener's world-knowledge to infer the keeping of the balance.

Different languages offer different means of conveying how motion is expressed; i.e., motion events can be coded by various combinations of lexical items and grammatical morphemes. Semantic event representation is not solely done in the verb. However, verbs are used to refer to relations between entities and are thus the core of encoding events. Therefore, the aim of the present study is to address the linguistic encoding of motion events with a specific focus on the semantics of motion verbs; i.e., it

aims at discovering to what extent and in what respect languages vary in the lexical labels used to express motion events. Cluster analysis can give important insights with respect to the semantic organization of verbs in a certain domain, as shown, e.g., for cutting and breaking verbs (Majid et al. 2007). In combination with an illustration of the verb range, we show in specific terms how languages differ in their lexicalization patterns. Special focus will be put on common recurring patterns of categorization and differences in categorization. It is not that obvious why languages should differ with respect to category names, since all humans do see the same world. This argument, however, could also account for the diversity of categories across languages, since it leaves open the question as to how speakers decide which structures of the input are relevant to categorization.

In fact, several studies have shown that languages vary with respect to the number and nature of the semantic categories they distinguish within a given domain. This has been substantiated for artifact categories (e.g., Malt et al. 1999) and verb categories, more specifically "cut and break" events (e.g., Majid et al. 2007; Goddard/Wierzbicka 2009) and "put and take" events (Kopecka/Narasimham 2012) as well as for verbs denoting emotion, more specifically pain (Reznikova et al. 2012). Another example of how languages differ in their categorization can be cited with respect to taxonomic depth, where the lexical inventory of satellite-framed languages (S-languages) seems to offer many hyponyms for manner-of-motion verbs. In German, e.g., *schlendern, bummeln,* and *trotten* can all be considered hyponyms of *gehen* 'walk', whereas verb-framed languages (V-languages) do not show variation along these lines (for detailed examples, see, e.g., Slobin 2006).

The present study examines in detail how speakers of two S-languages, German and Danish, and one V-language, Turkish, describe motion events, with special focus on the extension of terms in semantic space (i.e., their "range of meaning") and taxonomic depth (i.e., how many hyponyms there are). Differences in the extension of verbs across languages, as made visible by cluster analysis, are accounted for by particularly considering typological factors. Commonalities are accounted for in terms of natural constraints, which may give rise to common cross-linguistic ways of conceptualizing motion.

2.   Review of literature

2.1   Lexicalization

In Talmy's motion event typology, the basic assumption is that motion can be considered a universal cognitive concept that is lexicalized across languages. Differences across languages arise with respect to how the framing event, i.e., the motion as such, is expressed (Talmy 2000b: 226–228, 1991: 488–490).

> The Figure is a moving or conceptually movable entity whose site, path, or orientation is conceived as a variable the particular value of which is the relevant issue. The Ground is a reference entity, one that has a stationary setting relative to a reference frame, with respect to which the Figure's site, path, or orientation is characterized (Talmy 2000a: 184).

Hence, elements that constitute a motion event are:

a.   **Figure**: the moving entity;

b.   **Ground**: the object in relation to which the Figure is moving;

c.   **Path:** trajectory of the Figure's movement, i.e., the association function between Figure and Ground;

d.   **Motion**: the actual movement or activating process; and

e.   the **Co-event**: manner or cause of the motion.

Depending on where the Path element is expressed in the sentence, Talmy suggested a two-way typology for the languages of the world: Verb-framed languages (V-languages), for languages that encode the Path element in the verb, and Satellite-framed languages (S-languages), encoding the Path element outside the verb.

Descriptions of the participants shall serve as examples, see (1) to (3):

(1) German (S-language)

Die	*Affen*	*gehen*	*um*	*den*	*Baum*	*herum.*
The	monkeys	walk	around	the	tree	around.

'The monkeys walk around the tree.'

(2) Danish (S-language)

To	*aber*	*går*	*rundt*	*om*	*et*	*træ.*
Two	monkeys	walk	around	around	a	tree.

'Two monkeys walk around a tree.'

(3) Turkish (V-language)

Maymunlar	*ağacın*	*etrafında*	*dönüyor.*
Monkeys	tree's	side	circle.

'Monkeys circle a tree.'

This kind of typological classification often crosscuts the more traditional word order typologies. With respect to these typologies, Danish, English, and Spanish fall into the same group, SVO (subject – verb – object), whereas Turkish belongs to the SOV (subject – object – verb) group. German is often referred to as lacking dominant word order, employing SVO in main clauses and SOV in sub-clauses. However, in Talmy's motion verb typology, Spanish and Turkish belong to the same group, and German falls together with English and Danish. In the remainder of the paper, 'typology' and 'typological' are used to refer to the Talmian binary typology, unless stated otherwise.

Studies applying Talmy's binary typology to find out how conceptual structures might influence linguistic structure have mostly shown that the lexicons of S-languages contain a wider variety of manner-of-motion verbs (e.g., *dash, swoop, scramble*). The speakers of these languages tend to provide more frequent and varied manner information than speakers of V-languages when describing motion events (see Slobin 2004 for an overview; Özçalişkan/Slobin 1999 for Turkish in particular).

However, observations deviating from this pattern are, for example, described in a study by Naigles et al. (1998). In this study, designed stimuli rather than picture book elicitations were used. The researchers find that Spanish speakers used a higher number of motion verbs than English speakers. Similarly, Kopecka (2010) finds in a study looking at the expression of motion in written prose that Polish has fewer manner verbs than English.

2.2 Categorization

Another issue that has received growing attention in recent years is the categorization of events, for example, events involving material destruction, "cutting and breaking" events (Majid et al. 2007), or "carry" and "put" events (Bowerman 2005; Kopecka/Narasimham 2012). These studies observed cross-linguistic differences with respect to the partitioning of the semantic space. For example, English speakers can make a more fine-grained description of a cut event by choosing either *cut* or *slice*, whereas

Swedish speakers do not have this option; i.e., the Swedish term *skära* covers 'cut' and 'slice', collapsing the distinction between the two (Majid et al. 2007).

A further domain that displays cross-linguistic differences with respect to the partition of the semantic space is the domain of motion. In a study investigating naming patterns by speakers of three different S-languages (Bulgarian, English, and Norwegian) and one V-language (Italian), Vulchanova et al. (2012) propose a more fine-grained feature analysis than the one suggested by Talmy (1991). Their parameters include, but are not limited to, locomotion media (e.g., terrestrial vs. aquatic vs. air), gait phase (e.g., suspended vs. supported vs. aerial), posture and stance (e.g., upright vs. low body; erect vs. sprawling legs), temporal spacing of footfalls (symmetrical vs. asymmetrical), and figure orientation. Discussing the importance of the features across languages, they notice that phase, posture, velocity, path, and vector orientation are relatively robust features used for distinction. They found, for example, a clear distinction between non-supported, high-velocity, high-energy gaits (running) and supported, slow-to-normal velocity motion gaits (walking) in all their languages. There were, however, differences in the categorization of "walking" events, where the speakers of the languages under investigation varied in how fine-grained they subdivided this type of motion event. This is in line with the results reported by Malt et al. (2008), who also found a categorical distinction between high- and low-velocity gaits, and a more fine-grained distinction within these two categories in English, Spanish, Japanese, and Dutch, for example the difference between *shuffling* and *marching*. Malt et al. (2008) concluded that this is because categorization is constrained by very salient, naturally occurring discontinuities that "cry out to be named" (Berlin 1982: 11). Hence, in some cases categorization seems to be more than just a matter of construction/construal on the part of the language user. These natural constraints can be of help in accounting for commonalities across languages.

As explained in detail in Malt et al. (2011) and Malt et al. (in press), one could take on two perspectives with respect to how meaning is mapped onto words, and hence where variation or common patterns respectively arise from. One perspective is that those linguistic categories carved out often and in a similar fashion across languages reflect structure in the input. In turn, variation might be due to a varying selection of features used in the lexical partitioning. To explain variation then is to identify these features and to explicate how they are applied across languages.

Furthermore, the typological structural characteristics of a language might factor into the selection of features. In Turkish, for example, Path is the element encoded in motion verbs (as in V-languages in general), whereas in S-languages Manner is mainly encoded in the verb. This syntactic salience seems to have given rise to a more elaborate manner verb lexicon in S-languages and, albeit in somewhat more limited terms, to a more comprising path verb inventory for V-languages. As shown in Gennari et al. (2002), these typological differences have an influence on how scenes are encoded in memory. Thus, it might be possible that they are also relevant to other cognitive processes, in particular to categorization.

Very few studies have used cluster analysis as a tool for mapping out semantic space for a given domain so far. Two studies that made use of cluster analysis in two different verbal domains are Majid et al. (2007) and Vulchanova et al. (2012). Both studies use an extensional grid against which they map their production data. The extensional grid in both cases is composed of a set of videos. Usually, a real "etic grid" captures possible value combinations of the parameters in question (Bohnemeyer et al. 2007). However, in the studies mentioned above and in the current study, the videos are not fully controlled for certain features. Rather, they represent a very wide segment of motion-event reality in that they show a broad range of species and movements in the case of the videos collected by Vulchanova et al. (2012), or videos representing a wide scope of cutting and breaking events. Thus, the videos are especially useful for mapping out the verbal inventory of the languages in question and for collecting preferred descriptions by multiple speakers. Another advantage of the use of video-stimuli over picture description or narration tasks, where motion has to be inferred, is that videos actually show the dynamic events and are thus likely more useful to trigger more naturalistic descriptions (cf. Navarro/Nicoladis 2005).

68

The present study contributes to the discussion of the semantics of motion events by focusing on the semantics of motion verbs. Using the same stimuli, it follows the line of investigation initiated by Vulchanova et al. (2012). The contribution is twofold: on the one hand, it will point out similarities and differences with respect to the initiating study; and on the other hand, by looking at descriptions of motion events in German, Danish, and Turkish, this contribution describes similarities and differences between the verb semantics of the languages of the experiment. In particular, it will detail taxonomic depth and extension patterns. Based on these observations, an analysis of how the typological structural properties of the languages of the experiment might contribute to word meaning is conducted. Furthermore, the analysis describes to what degree typological membership plays a role in the semantics of motion verbs.

To answer these overarching issues, this study addresses the following research questions:

1. Which verbs are used in the descriptions of the videos and how frequently?

2. What are the semantic characteristics of the motion verbs employed across the three languages in terms of

   a. their extensions in the semantic space, i.e., their semantic boundaries?

   b. hierarchical relations, i.e., taxonomic depth/meaning relations/structure of the semantic space across the three languages?

   c. certain features as salient for categorization, i.e., parameters for segmentation?

3. How do the semantic characteristics relate to the typological structure of the three languages? What is the relation between features and typological membership?

3. Participants and method

3.1 Participants

Native speakers of Danish (n = 21), German (n = 25), and Turkish (n = 25) viewed and described a series of 37 video clips. The lion's share of the participants was composed of university students or research employees; each participant was a resident in his or her native country. The participants were asked to fill out a linguistic background questionnaire based on the *Language Background Questionnaire* (Gullberg/Indefrey 2003). Participants generally reported a good to very good knowledge of English.

3.2 Stimuli

The stimuli in this study were 37 video clips, each 3 to 4 seconds long, of a great variety of motion events performed by humans, primates, and a range of different animals (Vulchanova et al. 2012). The video clips were embedded in a web page with instructions in the relevant language. Participants viewed each clip and typed into a response box. The response box was preceded by the appropriate translation of *Please, describe what you see* according to the native language of the participant.

Data elicitation for the three groups was mainly conducted online, with the researcher accessible in person or via chat in case of questions or technical problems. Input regarding the actual task was minimized; no hints or clues were given as to how to answer the elicitation question. This was done to prevent a possible manipulation bias. Nevertheless, even though it was web-based, this study also shares features with face-to-face studies and is not a web-study that excludes clarification possibilities.

3.3 Methodological assumptions

The elicitation can be described, in the sense of Taylor (2007), as a mixture of naming; i.e., informants were asked to name a randomized series of videos in terms of mapping. They could use the same verb several times, thus indicating a possible range of motion scenes that could be named by this verb. This way, motion verbs together with their extensional range could be elicited. When all informants agreed in naming a scene by the same verb, this could be taken as indirect evidence that the scene is a good example of a verbal concept. Variable responses, on the other hand, could be considered as indirect evidence that the scene is marginal with respect to at least one of the verbs. Furthermore, it is commonly assumed that a word's extension is a function of its intension (i.e., its meaning).

Cluster analysis is considered a tool for making visible which verbs are used how frequently for which scenes. In addition, it provides information as to how the verbs used in the descriptions relate to each other; i.e., it can be used to identify several kinds of semantic relations between the verbs, such as taxonomic inclusion, synonymy, overlap (partial synonymy), and contrast. The resulting clusters can further be examined to see if there are certain common features of the clips that the verbs pick out. These features could provide a motivation for the lexical partitioning of the domain. However, in our case, the features to be identified as such have to be interpreted very carefully, since the clips were not controlled for predetermined features.

3.4 Procedure

The main verbs were extracted from the participants' answers. In the few cases in which the participants provided incomplete sentences, the verbal element of the clause was counted (e.g., *en løbende abe* 'a running monkey'). Other linguistic devices (e.g., adverbs or converbs) that express path or manner information are also important to the description of motion events (Talmy 1985), but an analysis of their contribution lies beyond the scope of this paper and will be the subject of another article.

A video clip-by-verb matrix (with the scenes in rows and the verbs in columns) was created for each of the three informant groups, showing the frequency of occurrence for each verb per scene. The resulting matrices were analyzed using cluster analysis. Cluster analysis is a statistical tool that allows us to group together scenes that were described with the same verb or verbs. Thus it makes visible the number of categories used for a given semantic domain, and provides information about category boundaries across languages as well as about the relationship among categories (Majid et al. 2007). For example, verbs that describe motion might have a hierarchical relationship; *spadsere* 'stroll', e.g., is a hyponym of *gå* 'walk' in Danish. The cluster analysis used in this experiment uses Euclidean distance and Ward linkage in a hierarchical agglomerative clustering. This procedure differs slightly from Majid et al.'s (2007) procedure, in that the use of a different distance measure allows for the capturing of differences in the frequency of usage of a verb (rather than just noting whether a certain verb appeared or not). Each clip starts out as a separate cluster, and then at every step the clusters are merged to form larger clusters based on similarity. In our analysis, the calculation of similarity is based on the frequency of the use of verbs across clips. To the extent that clips are described with the same verb(s), they are more similar to one another and are more likely to be in the same cluster. Clips that are never described by the same verb(s) will end up in separate clusters. Clusters are assumed to represent categories across the languages and capture the main groupings based on the distribution of verbs across the whole stimulus set.

4. Results

4.1 Frequency analysis

A simple count of the main verbs used in the speakers' descriptions revealed the following picture (Table 1):

	number of speakers	*number of scene descriptions*	*number of motion verbs*	*% of answers + motion verbs*	*mean SimpD*	*number of type of motion verbs*
Turkish	25	925	825	89.19	0.5	36
German	25	925	919	99.35	0.4	69
Danish	21	777	646	79.36	0.6	41

Table 1: Summary of frequency analysis

German speakers used the highest number of different motion verbs (n = 69), followed by Danish speakers (n = 41) and Turkish speakers (n = 36). Almost every description by the German speakers included a motion verb (99.35%), compared to 89.19% of the Turkish speakers' descriptions and 79.36% of the Danish speakers' descriptions. In the cases where no motion verbs were used, participants generally reported on the context ("training" for scenes in the gym, "participating in a race" for the scene depicting a walking competition, or more general descriptions like "a dog in a cage").

4.1.1 Agreement between speakers

In order to determine the degree of agreement in the naming patterns as expressed by the speakers of the three languages, Simpson's Diversity Index (D)[1] was calculated (following Majid et al. 2007). D

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[1] Simpson's Diversity Index can be explained in the following manner: We are interested in how diverse the speakers' use of verbs for a given scene is. In order to measure this diversity, we first count all the different verbs used for describing a given scene. Let $V = \{v_1, v_2, \ldots, v_M\}$ be the set of unique verbs used by the speakers to describe the scene in question. Suppose there are a total of M such verbs. Furthermore, suppose verb v_i is observed n_i times. Let N denote the total number of responses collected for a scen; consequently, $N = \sum_{i=1}^{M} n_i$. One can then easily compute the share of each verb within all the responses as the ratio of the number of times a given verb is used and the total number of responses. That is,

$$share\ of\ v_i \equiv s_i = \frac{Number\ of\ times\ v_i\ is\ used}{N}$$

When speakers use a large variety of verbs, naturally the share of each verb will be very small, provided we have a sufficiently high number of total responses and a rather diverse set of responses. On the other hand, when the speakers use only a few verbs to describe the scene, each verb will have relatively high shares and we would have a quite concentrated set of responses. Simpson's Diversity Index is a commonly used measure of diversity (or, alternatively, concentration) that summarizes the above intuition for a given set of responses and is calculated on the basis of the following formula:

$$D = \sum_{i=1}^{M} \frac{n_i(n_i - 1)}{N(N - 1)}$$

If one verb is used in most of the responses, that verb will have a very high share while all the others will have small shares, implying a large value of D. If one verb is used by all the respondents, D will take a value of 1. On

captures both the number and the distribution of verbs used. The higher the value of D, the more consistency there is in the responses; in other words, there is a higher likelihood that speakers of a given language use the same verb to describe a given scene. D was measured for each clip and for each language separately. Then the mean D for each language was calculated to assess the overall consistency for each language. Danish speakers were the most consistent (D 0.7), followed by Turkish speakers (D 0.5) and German speakers (D 0.4). This result is in line with respect to the number of different types used by speakers of each language, where German speakers used the highest number of different verb types.

4.1.2   The gloss trap

A remark on the role of the glosses used in this paper seems important. The "gloss trap", as described by Stringer (2010: 102: "it is extremely difficult to find true matches in the open-class lexicons of any two languages), is a notion that is highly relevant to this study. Since one of the main points is to show that motion verbs across languages describe very different areas of the semantic space of motion, it almost seems beside the point to provide English glosses, as these most certainly will not cover the exact same meaning as the term they are used to gloss. However, to give the reader a feel for the wide variety of meanings encoded, glosses will be provided. The reader is kindly asked to handle these glosses not as translation equivalents, but merely as weak pointers to a possible common meaning.

4.1.3   Verbs used

For each language, the overall number of verbs was counted together with the frequency of a verb used to describe a given clip. The Danish speakers produced the simplest pattern: 75% of all the scene descriptions included either *kravle* 'crawl' (25.7%), *løbe* 'run' (25%), or *gå* 'walk' (23%). For Turkish and German speakers, the patterns were less simple, since the three most frequently used verbs account for 47.6% and 61.2% of all scene descriptions. The verbs in Turkish were *yürümek* 'walk' (26.5%), *koşmak* 'run' (17.8%), and *ilerlemek* 'move forward' (16.9%). The verbs used by German speakers were *laufen* 'run/walk' (23%), *krabbeln* 'crawl' (12.6%), and *gehen* 'walk' (12.1%). A complete list of the motion verbs used together with their frequencies can be found in the Appendix.

The simple frequency count and the level of agreement among speakers seem to point to a language-dependent segmentation of the semantic space. The very high number of motion verb types used by German informants was reflected in the relatively low degree of agreement in the scene descriptions.

4.2   Cluster analysis

To gain a deeper understanding of the structure of categories underlying the informants' descriptions (or simply put: to get an overview as to which verbs can be used for which scenes), a cluster analysis of the collected data was conducted. The following sections describe the results of respective cluster analysis for the individual languages, first for Danish, followed by German, and finally for Turkish.

4.2.1   Danish

Figure 1 shows the result of the cluster analysis for Danish.

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the other hand, if all N responses contain a unique verb in the description, the contribution of each verb in the above sum will be exactly 0, and D will take the value of 0, indicating a very diverse set of responses.
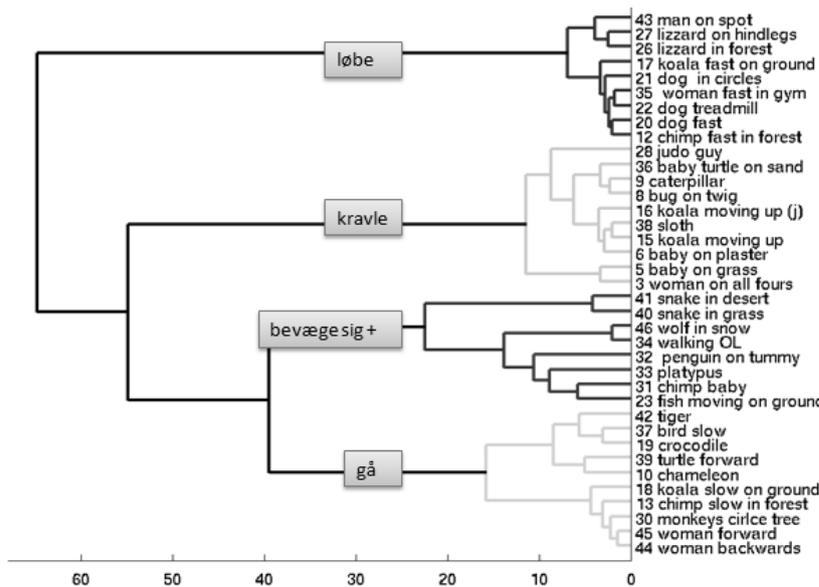
Figure 1: Cluster tree for Danish

For Danish, the cluster analysis confirmed the semantic categories obtained in the frequency analysis. Native speakers of Danish partitioned the semantic space presented in the video clips into four main categories. As illustrated in Figure 1, three categories reflect the use of the three most frequent verbs: *løbe* 'run', *gå* 'walk', and *kravle* 'crawl', describing fast vs. slow movement forward, and slow movement with close contact to a ground/surface. The fourth category is defined by a frequent use of the general motion verb *bevæge sig* 'move', as well as a variation of rather specific motion verbs (e.g., *mave sig* 'move on tummy', *sno sig* 'slither').

The *bevæge sig* cluster seems to function as a residual class, as it comprises events that do not fit into the other categories. These events include a fish moving forward on the ground using its fins and a baby sea turtle trying to reach the water through deep sand. It also contains two scenes showing two different snakes moving.

A categorical distinction is present in Danish between high-velocity gait and slow gaits, which are further subdivided into *kravle* 'crawl' and *gå* 'walk' events (also observed by Malt et al. 2008 and Vulchanova et al. 2012). The likely parameter for the distinction between *kravle* and *gå* seems to be visible use of legs/limbs (*gå*) and/or close contact to the surface (*kravle*).

With respect to taxonomic depth, the majority of the less frequently used motion verbs could be considered to be more specific versions of the main clusters. The verbs that were used in variation on *løbe* and *gå* are more fine-grained with respect to their semantics (e.g., *fise* 'sprint', *spæne* 'sprint' as hyponyms for *løbe*; and *spankulere* 'stroll', *slentre* 'saunter' as hyponyms for *gå*.) Interestingly, no hyponym for *kravle* appeared in the data. However, the verbs that predominantly occur in variation on *bevæge sig* can be regarded as hyponyms of *krybe* 'creep', e.g., *mave sig* 'move on tummy' or *orme sig* 'move like a worm'. *Krybe* is not used very often. Most hyponyms in the data represent kinds of running, followed by hyponyms for walking.

4.2.2 German

For German, the frequency analysis and Simpson's Diversity Index pointed to a less unanimous picture with respect to the semantic categories, as illustrated in Figure 2. The cluster analysis reveals that the categories for German are not as clear-cut as those for Danish. There are two types of categories: categories that are clearly defined by the use of one single verb across speakers, and categories that show the recurrent use of several verbs across speakers.
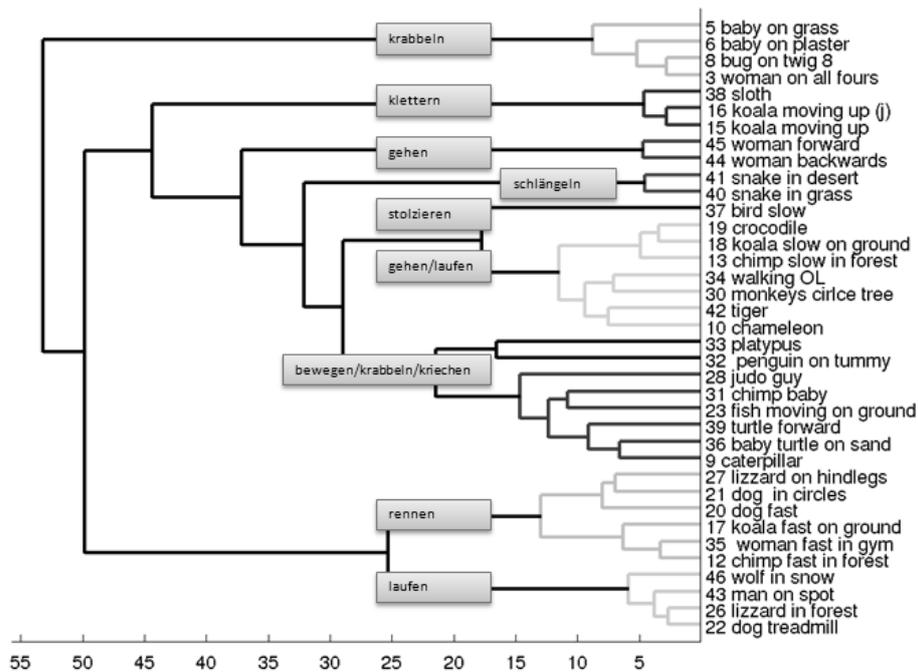
Figure 2: Cluster tree for German

The categories that are clearly defined by the use of one verb are *krabbeln* 'crawl', *klettern* 'climb', *gehen* 'walk', *schlängeln* 'slither', and *laufen* 'run' (fast). The categories that show a regular variation of same type verbs are *laufen/gehen* 'run/walk', *bewegen/krabbeln/kriechen* 'move/crawl/creep' – with a slightly more frequent use of *bewegen* 'move' compared to the other verbs, and *laufen/rennen* 'run/spurt'. The most frequent German verb *laufen* occurred in three of the categories, which indicates a broad meaning.

Many of the verbs that were less frequently used can also be identified as more fine-grained alternatives to *gehen* 'walk', e.g., *schlendern* 'amble', *schreiten* 'stride', or as alternatives to *laufen* 'run', e.g., *flitzen, sausen* 'dash'. Hyponyms of *gehen/laufen* (slow) show the highest variability, followed by *laufen* (fast). Verbs within the *bewegen/krabbeln/kriechen* cluster cannot be described in terms of hyponymy, but rather represent very specific classes themselves, e.g., *paddeln* 'moving as if using a paddle', or *schaufeln* 'moving as if using a shovel'.

Two of the distinct categories seemed to be motivated by the moving figure: *sich schlängeln* 'slither' for the scenes that show two different kinds of snakes moving, and *stolzieren* 'strut, move on long legs' for the scene depicting a long-legged bird walking. *Stolzieren* is used in competition with *laufen* (slow) and seems to collocate with nouns referring to birds with long legs.

4.2.3 Turkish

For Turkish, the frequency analysis and Simpson's Diversity Index suggested that it lay between German and Danish with respect to well-defined categories, as illustrated in Figure 3.
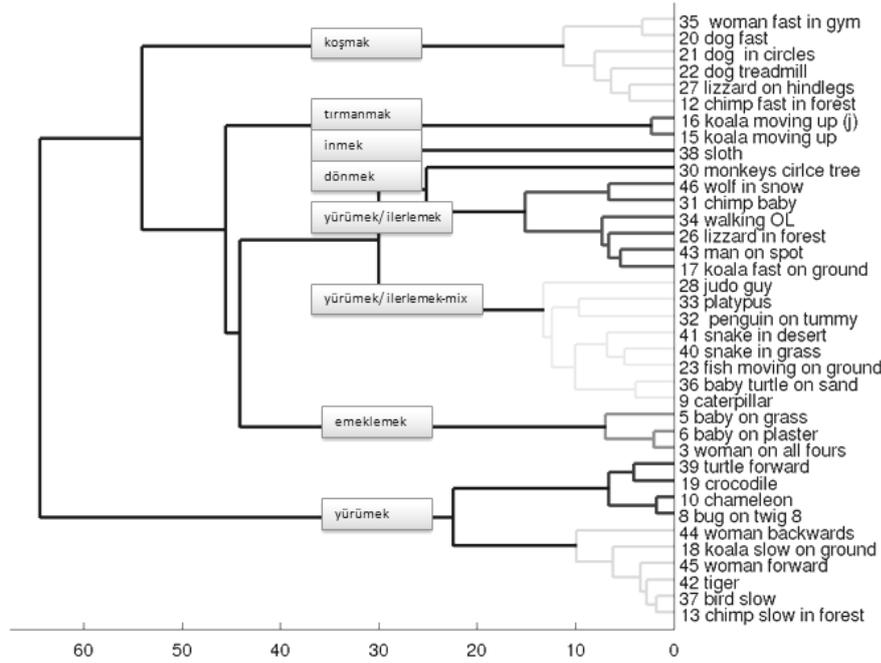
Figure 3: Cluster tree for Turkish

Clearly defined categories are *inmek* 'move down', *dönmek* 'turn', *ilerlemek* 'move forward', *tırmanmak* 'climb up', *emeklemek* 'crawl', *yürümek* 'walk', and *koşmak* 'run'. One category that shows an even distribution of two verbs is *yürümek/ilerlemek* 'walk/move forward'. The cluster analysis further produced a cluster that is characterized by a large degree of variation in the choice of motion verbs, the *yürümek/ilerlemek* mix-cluster.

For four of the categories (*inmek* 'move down', *dönmek* 'turn', *ilerlemek* 'move forward', and *tırmanmak* 'climb up'), vector orientation is the motivating feature. For *yürümek* 'walk' and *koşmak* 'run', the salient feature seems to be speed (normal vs. fast). Thus, like Danish, Turkish also displays a categorical distinction between high-velocity events and slow events. Fast events are described by *koşmak* 'run' and include scenes showing, among others, a chimp running into a forest and a dog running very fast around a tree.

With respect to taxonomic depth, Turkish displays a greater variety of parallel definite categories, but it is hard to determine whether there is taxonomic depth at all. The data show some variation for *emeklemek* 'crawl', with one of the potential hyponyms being *apalamak*, which can only be used to describe a baby's movement. In the Turkish data, there were two verbs that encode 'moving forward': *hareket etmek* and *ilerlemek*. Furthermore, there are four different verbs that can very loosely be translated as 'to wander': *dolaşmak, dolanmak, gezmek,* and *gezinmek*. These terms seem to vary along the lines of purposefulness or state of mind. Another example of motivating parameters being related to a certain state of mind might be *koşturmak* 'run slowly/jog because of being in a hurry'. So, if there is taxonomic depth in Turkish, it seems to be motivated by "a state of mind"-frame rather than a "kind of"-frame.

5.   Comparison across languages

As shown in the previous section, the languages under investigation differed in the number of categories used to describe the semantic space of motion, which goes hand in hand with different extension patterns and regarding taxonomic depth. First, let us consider the latter.

With respect to taxonomic depth, the languages under investigation distinguished different numbers of hyponyms for different hypernyms. German speakers offered the highest degree of variation with

respect to more fine-grained distinctions; Danish speakers used more hyponyms than Turkish speakers, whereas Turkish speakers used more categories than Danish speakers. This is also reflected in the degree of consistency of responses.

To illustrate, Turkish appears to have the least variation with respect to hyponyms. As discussed above, one hyponym for *emeklemek* 'crawl', *apalamak*, occurred in the data. It was only used once. Furthermore, four terms that denote 'moving around aimlessly' – *dolaşmak*, *dolanmak*, *gezmek,* and *gezinmek* – seem to be hyponyms of *yürümek* 'walk' in the data. Nevertheless, in general, the moving can also be done by foot, vehicle, etc. Hence, these four verbs do not just represent different kinds of walking. Moreover, there was virtually no taxonomic depth within the path verb categories; i.e., scenes described by *inmek* 'move down', *tırmanmak* 'climb up', and *dönmek* 'turn' were almost exclusively described by those verbs. One exception can be seen in *dönmek* 'move around' and *daire cizmek* 'draw a circle', where the latter, however, is used in a figurative fashion, and in the use of *cıkmak* 'exit' instead of *inmek* 'move down', which occurred only once.

Vertical variation within categories in German and Danish was observed within the manner verbs, with German speakers using the highest number of terms in more fine-grained descriptions of *gehen/laufen* 'run/walk',' (*taumeln* 'sway', *schreiten* 'stride', *stelzen* 'stalk', *trotten* 'trot', and *tapern* 'totter', to name just a few) and Danish speakers of *løbe* 'run' (e.g., *fise* 'dash', *spæne* 'sprint', and *pile* 'dash').

The languages also varied with respect to how they semantically categorize motion events; i.e., they varied with respect to the building block meanings assigned to the verbs. Before considering three examples, a note of caution seems appropriate: As mentioned above, the principles of categorization that might create the given segmentation of the languages in this study can only be assessed tentatively, since the stimuli clips were not controlled for varying features or components. However, a comparison of the segmentation lines across the languages does reveal some interesting patterns, as illustrated by Figures 4 to 6.

First, Danish grouped slow-velocity and close contact to the surface events together, making no distinction in the verb as to upward or downward motion (i.e., *kravle* 'crawl' events). Figure 4 shows the extension pattern of the Danish verb *kravle* 'crawl', i.e. those scenes for which *kravle* was the dominant verb used. These scenes include two scenes showing a koala moving up a tree, once in a "normal" fashion and once in a jumping manner; a sloth moving down a tree; a baby turtle moving forward in sand; a baby crawling on grass; a baby moving forward on stretched limbs; a bug and a caterpillar moving on a twig; a woman moving forward on all fours; and a man moving forward on the ground using his knees and elbows.
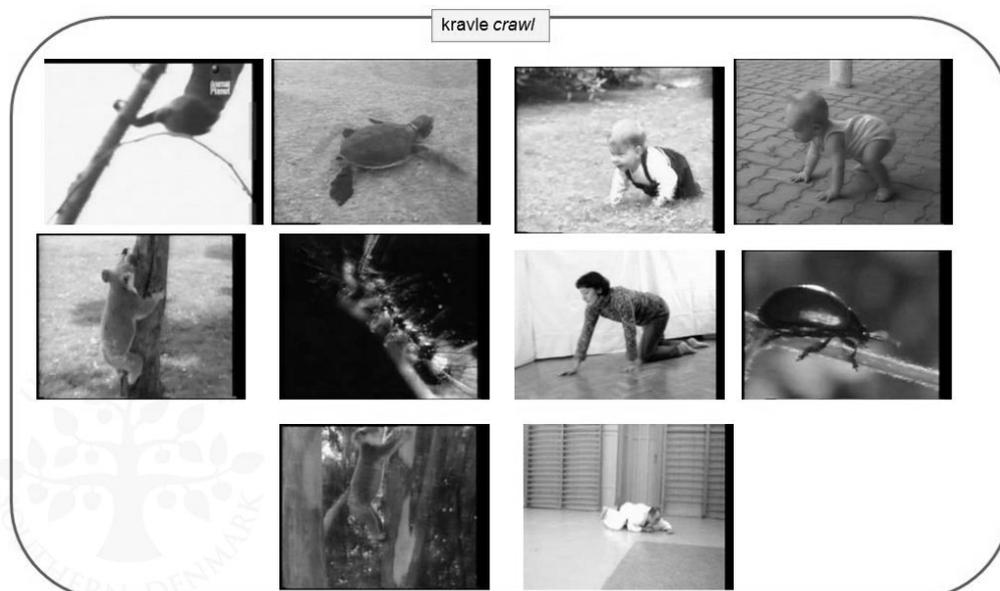
Figure 4: Extension pattern of Danish *kravle* 'crawl'

In contrast, Figure 5 shows how Turkish speakers segmented the same section of the semantic space. Movement along a vertical axis, as represented by the koala clips and the sloth clip, was separated into movement upward (*tırmanmak* 'climb up') and movement downward (*inmek* 'move down'). Thus, the distinction of categories into "upward" or "downward" movement seems obligatory. Furthermore, the bug moving forward on a twig belongs to the *yürümek* category, together with, for example, a woman walking. This points to a semantic conceptualization of a bug's movement, which is closer to a person walking than to a person crawling. The use of *emeklemek* 'crawl' was restricted to the three scenes showing babies moving on all fours and the woman moving on all fours. One speaker used it to describe the movement of the judoka. This might point to the fact that the use of *emeklemek* cannot easily be extended to non-human entities. The remaining three scenes showed movements that seem not to have been judged conceptually similar enough to fit a clearly defined category; hence, they were described by the very general motion verb *ilerliyor* 'move forward'.

As discussed above, Turkish speakers seem to be sensitive to vector orientation as a parameter for segmentation. Four of the categories that describe the motion domain were named by the use of a path verb, namely *inmek* 'move up', *dönmek* 'turn', *ilerlemek* 'move forward', or by *tırmanmak* 'climb up', which comprises manner as well as path information (cf. Özçalişkan/Slobin 1999). Typological membership might thus be considered a potential factor accounting for divergences in the motion domain.
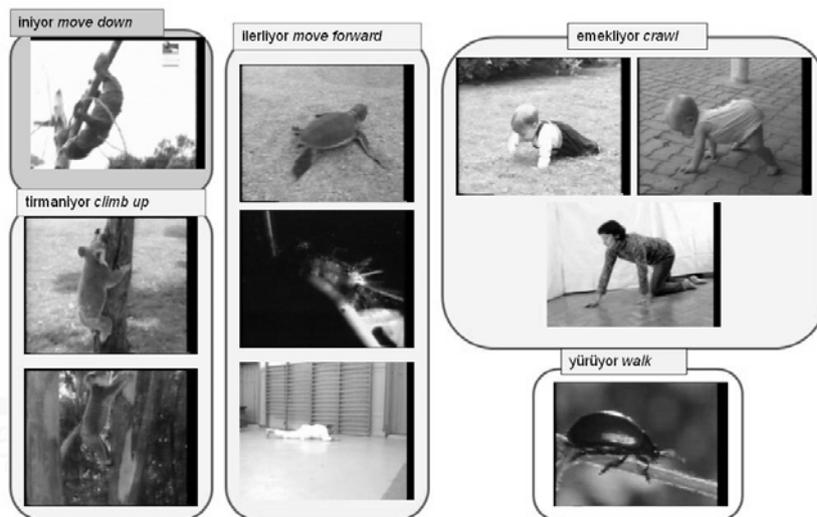
Figure 5: Segmentation of *kravle* scenes by Turkish speakers

Figure 6 shows the segmentation by the German informants. The divergence from the Danish motion verb *kravle* 'crawl' occurred according to seemingly different processes of semantic categorization. German speakers distinguished motion on a vertical axis from horizontal movement, as marked by the use of *klettern* 'climb' (for a movement up or down with close contact to the surface) and *krabbeln* 'crawl' (horizontal movement with close contact to the ground). However, unlike Turkish, German seemed to lack a distinction solely motivated by vertical vector (*inmek* 'move down' vs. *tırmanmak* 'climb up'). Thus, it can be hypothesized that the obligatory distinction is between horizontal and vertical movement. Another distinction, as compared to the Danish *kravle* category, was drawn between movement with close contact to the ground using legs/limbs, thereby permitting some space between the ground and the figure (*krabbeln* 'crawl'), and the lack of space between ground and figure (*kriechen* 'creep'). Additionally, the movement of the bug on a twig appears to be conceptually more similar to the babies and the woman moving on all fours, since the speakers describe it by the same verb, *krabbeln*. Lastly, the German speakers used a very specialized term for the movement of the man on the floor of the gym, *robben* 'move like a seal'.
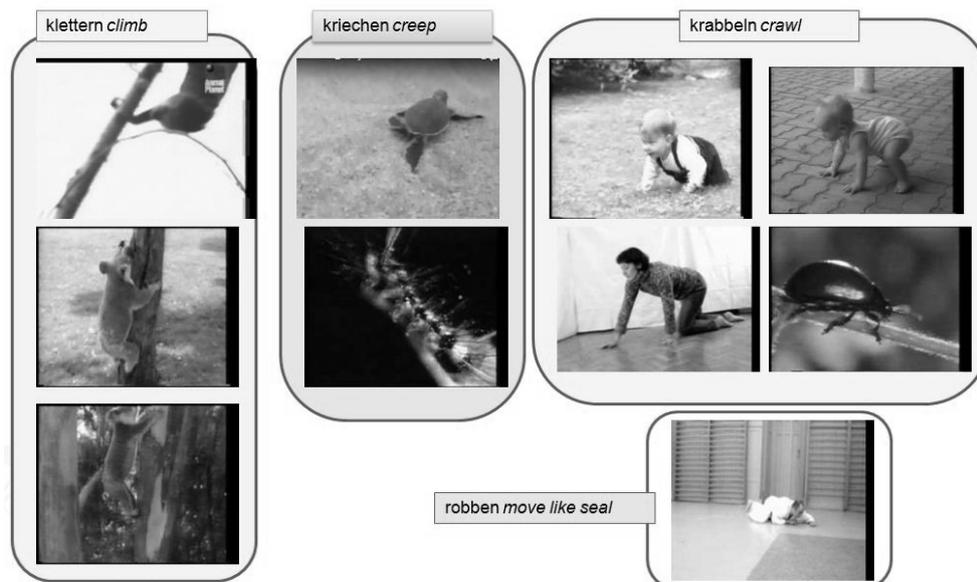
Figure 6: Segmentation of *kravle* scenes by German speakers

The second example to show how the meanings assigned to the verbs differ across languages involves the *gehen/laufen* cluster in German. Whereas there is a clear distinction between high and low-velocity gaits in Danish – as marked by the use of *løbe* 'run' for fast events – and Turkish, *koşmak* 'run', this distinction seems to be made abundant by the German speakers' use of *laufen* 'run/walk' for both slow and fast kinds of events. It can clearly be used to cover the semantic feature 'higher than normal speed', as in the pure *laufen* cluster. However, it co-occurs with *gehen* 'walk' in all slow, upright-gait events. For example, *laufen* and *rennen* 'run' are used in the description of a lizard moving very fast on his hind legs, whereas *laufen* and *gehen* 'walk' are used in the description of a scene depicting an alligator moving to the sea at a slow pace, its legs clearly visible. Thus, the common denominator appears to be the use of limbs rather than velocity.

6.   Discussion and conclusion

Overall, the present study shows that the extension patterns of semantic categories used to describe motion events across the three languages of the experiment vary considerably. Turkish displays a categorization pattern that is different from German and Danish in that it shows verbal categories that seem to be constructed around path information, thus hinting at the role of structural properties in categorization. These structural properties give rise to inter-typological differences. In addition, the differences between German and Danish appear to be relatively grave as well, concretely speaking with respect to "fine-grainedness" or taxonomic depth. These intra-typological differences can be accounted for in terms of how different features are selected for categorization.

The frequency analysis offered a first indication of where the differences might be located. The languages varied with respect to verb type frequency and the most frequently used verbs (Danish *kravle* 'crawl', German *laufen* 'run/walk', and Turkish *yürümek* 'walk'). The cluster analysis in turn revealed more specific differences in both the category boundaries of the verbs used and the hierarchical patterning. In other words, it made visible the extension patterns of the verbs used.

More specifically with respect to categorization, the clustering of the Turkish data suggested that patterns of variability in the category boundaries are both motivated by manner components as well as path components. Categories that are constructed around a path component/vector orientation are *tırmanmak* 'climb up', *inmek* 'move down', and *dönmek* 'turn'. In other words, all the motion events that display a vector different from a horizontal orientation are expressed by using a path verb. Scenes

78

displaying a horizontal vector orientation are described by a manner verb or a path verb (*ilerlemek, hareket etmek*), especially if the manner displayed seems marginal in relation to other exemplars of a possible category. This seems to point to the fact that the inherent typological structure of Turkish can at least partially be taken into consideration when accounting for the semantic boundaries in the motion domain. Additionally, Turkish showed the least taxonomic depth. The highest variation of more fine-grained distinctions was found in the use of *dolanmak, dolaşmak, gezmek,* and *gezinmek* 'wander', which occurred along with the use of *yürümek* 'walk'. As observed before (e.g., Slobin 2006), V-languages display a less elaborated lexicon for motion verbs. This is reflected in our data by a lack of hyponyms. As a matter of fact, it seems hard to imagine an infinite number of "kinds of path" as opposed to "kinds of manner". Here again it seems that there exists a relation between typology and the mapping of conceptual content to words.

The German and Danish data suggested that mainly manner of motion components provide a base for categorical boundaries. However, the cluster analysis of the German data showed that German speakers draw more distinctions than Danish speakers, e.g., by means of two categories that seemed to be motivated by the moving figure: *sich schlängeln* 'slither' for the scenes that show two different kinds of snakes moving, and *stolzieren* 'strut, move on long legs' for the scene depicting a long-legged bird walking. This means that German speakers tend to express more fine-grained distinctions, whereas in Danish only the distinction between *løbe, kravle,* and *gå* is dominant. In addition, looking at the overall number of motion verbs used, Danish speakers used 41 different verbs, whereas German used 69, which puts Danish closer together with Turkish speakers who used 36 different motion verbs. One would have expected a difference between German and Danish on the one hand, representing expectedly lexically rich S-languages, and Turkish on the other hand. However, in this respect, Danish is closer to Turkish. It can only be speculated why this is the case. Here the influence of typological membership seems to be minor. The assumed correlation between inventories and typological membership might not be straightforward, especially when taking into account the observations made by Naigles et al. (1998) and Kopecka (2010).

The cluster analysis was also used to locate the boundaries of the extensions of similar or corresponding verbs in different languages. The extensional approach showed that conceptual equivalence is cross-linguistically rather limited. For example, while for Danish and Turkish a clear distinction between fast and slow movement was found, this distinction was blurred in German, in that *laufen* 'run/walk' was used by speakers to describe both high and low-velocity events. A similar observation for German was reported in a study that replicated the Malt et al. (2008) study (Phelps/Duman 2012). This is especially interesting because the distinction between slow and fast events has been argued to be motivated by perceptually very salient distinctions in nature, and hence has been assumed to apply cross-linguistically. Vulchanova et al. (2012) showed this distinction for Bulgarian, English, Italian, Norwegian, and Russian, and Malt et al. (2008) for English, Japanese, Spanish, and Dutch. However, this study showed that this salient distinction in nature should be seen as rendering a strong tendency, rather than a universally linguistically applicable distinction.

Another observation in this study is in line with findings in Vulchanova et al. (2012); the conceptual scope of corresponding words for *crawl* is rather language-specific. For Danish, the category *kravle* seems to be centered around a notion of "figure in close contact with substrate" with no distinction between vertical and horizontal movement, thus displaying a rather large extension. In the case of German, the limitation of this category is to be found with respect to vector orientation, where a distinction is made between vertical vs. horizontal orientation. The corresponding category in Turkish, *emeklemek*, is limited to "humans in close contact to ground" and vertical vector orientation. Thus, the distinctions across languages can be captured in terms of features; however, how the features are applied seems to be language-specific.

With respect to the conceptual scope of less frequently used verbs, two things can be noted. First, the more fine-grained manner distinctions are not only more specific in terms of physical differences, as

claimed by Vulchanova et al. (2012), but they also reflect intentions or mental states, e.g., the difference between German *gehen* 'walk' and *schlendern* 'walk for fun'. Slobin (2006) refers to this as attitude:

> "Manner" is a cover term for a number of dimensions, including motor pattern (e.g., *hop, jump, skip*), often combined with rate of motion (e.g., *walk, run, sprint*) or force dynamics (e.g., *step, tread, tramp*) or attitude (e.g., *amble, saunter, stroll*), and sometimes encoding instrument (e.g., *sled, ski, skateboard*), and so forth (Slobin 2006: 3).

Second, the patterns of more fine-grained distinctions seem to be highly language-specific and instances of convention with respect to (in the sense of Malt et al. 1999) the choice of features for categorization. In other words, speakers might not be aware of any particular motivation of features they use as a basis for grouping, and features may vary across languages. To illustrate, the bug moving along a twig is categorized as *krabbeln* 'crawl' by German speakers, but as *yürümek* 'walk' by Turkish speakers. The physical features of the bug are attended to differently in the two languages. It cannot be said for sure why German speakers see a higher similarity of a bug's movement to a baby's movement; it could be the round shape or the fact that the figure is moving close to the ground. The fact that the figure's legs are visible seems to sanction the use of *yürümek* over *emeklemek* in Turkish, along with the fact that *emeklemek* seems to be restricted to human motion. To further illustrate the role of convention or the language-dependent choice of features in a meaning assigning process, let us look at Danish low-frequency manner verbs. Some of the verbs follow a pattern that can tentatively be described as "moving like object x", e.g., *orme sig* 'move like a worm' or *pile* 'move like an arrow'. The same pattern was not found in the German data. However, the German data showed a pattern that could be described as "moving as if using x", e.g., *sich schaufeln* 'move as if using a shovel' and *stelzen* 'move as if using stilts'. Turkish data did not show similarly motivated manner of motion verbs at all. A deeper exploration of this finding is beyond the scope of the current study and is the subject of ongoing research.

In conclusion, it can be said that German and Turkish display a higher number of semantic categories than Danish, albeit at different levels. The habitual verb use by German speakers can be considered more precise since they use many different hyponyms to describe more fine-grained manner distinctions. In contrast, Turkish speakers display the inclusion of a vector parameter in the verbal categories. However, the use of path verbs seems to be subject to constraints, for chiefly those scenes that displayed a vector orientation different from horizontal movement (i.e., for around-, up-, and down-movement) were described by path verbs, whereas manner of motion verbs were also used by Turkish speakers for many cases of horizontal movement. Nevertheless, such a vector-based distinction is absent in the verb use of German and Danish speakers and leads to segmentation of the semantic space along different boundaries. With respect to where Path is realized, then, the languages are influenced by typological structural constraints. However, the non-use of more specific manner verbs makes Danish the most consistent language compared to German and Turkish. This degree of consistency is not in line with the expected elaborated manner lexicon of S-languages. The number of overall observed motion verbs in Danish is much lower than in German. This adds to the observation that elaboration of the motion verb inventory as related to typological membership seems to be a tendency rather than a rule.

Overall, conventionalized feature-based categorization processes as well as, to some degree, typological membership have been shown to be a cause for the formation of the semantic categories in the motion domain across languages.

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Appendix

Verbs used by the informants

Turkish				German				Danish			
verb	approximate translation	freq.	%	verb	approximate translation	freq.	%	verb	approximate translation	freq.	%
yürümek	walk	219	26.45%	laufen	run, walk	206	23.09%	Kravle	crawl	166	25.70%
koşmak	run	147	17.75%	krabbeln	crawl	112	12.56%	Løbe	run	161	24.92%
ilerlemek	move forward	140	16.91%	gehen	walk, go	108	12.11%	Gå	walk	151	23.37%
emeklemek	crawl on all fours	58	7.00%	klettern	climb	67	7.51%	Bevægge	move	27	4.18%
tırmanmak	climb	50	6.04%	rennen	run	66	7.40%	sno sig	slither, glide	24	3.72%
sürünmek	crawl	41	4.95%	bewegen	move	60	6.73%	komme	come	22	3.41%
dönmek	turn	22	2.66%	schlängeln	move like a snake	35	3.92%	glide	glide	10	1.55%
hareket etmek	move	20	2.42%	kriechen	crawl, creep	33	3.70%	klatre	climb	7	1.08%
gitmek	go	19	2.29%	robben	move like a seal	21	2.35%	mave	move on tummy	7	1.08%
inmek	move down	19	2.29%	rutschen	slide	14	1.57%	lunte	sneak, creep, walk silently	6	0.93%
kaymak	slide	11	1.33%	schwimmen	swim	14	1.57%	krybe	creep	5	0.77%

dolaşmak	go around	7	0.85%	stolzieren	strut, swagger, stalk	11	1.23%	møve	glide, move along	5	0.77%
kaçmak	escape, run away	7	0.85%	schleichen	sneak, creep, walk very silently	10	1.12%	svømme	swim	5	0.77%
gezinmek	go around aimlessly	6	0.72%	schreiten	stride, pace	9	1.01%	skubbe	push	4	0.62%
yüzmek	swim	6	0.72%	hüpfen	hop	8	0.90%	pile	dash, move like arrow	3	0.46%
koşturmak	run slowly	5	0.60%	gleiten	glide, slide	7	0.78%	smyge	glide, move along	3	0.46%
oynamak	play, move	5	0.60%	stolpern	stumble, trip	7	0.78%	snige	glide, move along	3	0.46%
daire cizmek	draw a circle	4	0.48%	sprinten	sprint, spurt	6	0.67%	balancere	move forward balancing	2	0.31%
cıkmak	go out	3	0.36%	tapsen	toddle, lumber	5	0.56%	begive	move to	2	0.31%
düşmek	fall	3	0.36%	watscheln	walk like a duck, waddle	5	0.56%	hoppe	hop	2	0.31%
geçmek	pass	3	0.36%	erklimmen	reach, conquer by climbing	4	0.45%	jogge	jog	2	0.31%
gezmek	go around, visit	3	0.36%	hoppeln	hop like a rabbit, lollop	4	0.45%	slange	move like snake	2	0.31%
sürüklenmek	be dragged	3	0.36%	trotten	trot	4	0.45%	slentre	stroll	2	0.31%
takip etmek	follow	3	0.36%	besteigen	ascend, mount, climb	3	0.34%	snegle	move like snail	2	0.31%
yarışmak	race	3	0.36%	fliehen	flee	3	0.34%	spadsere	stroll on foot	2	0.31%
adim atmak	step	2	0.24%	joggen	jog, run	3	0.34%	spæne	dash	2	0.31%
koşturulmak	be made to run	2	0.24%	Schritte machen	take steps	3	0.34%	spankulere	stroll on foot	2	0.31%
süzülmek	glide	2	0.24%	umrunden	go, walk, drive around sth.	3	0.34%	spurte	spurt	2	0.31%
akmak	flow	1	0.12%	verfolgen	follow, chase	3	0.34%	tumle	toddle	2	0.31%
apalamak	crawl for a baby	1	0.12%	walken	like "Nordic Walking"	3	0.34%	vandre	hike, walk	2	0.31%
dolanmak	go around aimlessly	1	0.12%	wandern	wander, roam	3	0.34%	bugte	move in bows	1	0.15%
gelmek	come	1	0.12%	balancieren	move balancing	2	0.22%	falde	fall	1	0.15%
gerilemek	move backwards	1	0.12%	flitzen	move as fast as an arrow, dart	2	0.22%	fare	travel	1	0.15%
kaybolmak	become lost	1	0.12%	flüchten	flee, escape	2	0.22%	fise	dash	1	0.15%
kovalmak	chase after	1	0.12%	hopsen	hop, jump for joy	2	0.22%	flygte	escape	1	0.15%
yalpalmak	zigzag	1	0.12%	jagen	chase	2	0.22%	møffe		1	0.15%
				pirschen	stalk, approach carefully	2	0.22%	orme	move like worm	1	0.15%
				rasen	race, dash, speed	2	0.22%	piske	dash	1	0.15%
				schaufeln	shovel	2	0.22%	skøjte	skate	1	0.15%
				schieben	push, shove	2	0.22%	svæve	hover	1	0.15%
				spazieren gehen	go for a walk, stroll	2	0.22%	tage skridt	take steps	1	0.15%
				streifen	prawl, roam	2	0.22%				
				taumeln	sway, stagger	2	0.22%				
				umkreisen	move a circle	2	0.22%				
				einbiegen	make a turn	1	0.11%				
				erstolpern	stumble and discover	1	0.11%				
				hangeln	move hand over hand	1	0.11%				
				kommen	come	1	0.11%				
				kreisen	circle	1	0.11%				
				marschieren	march	1	0.11%				
				paddeln	paddle	1	0.11%				

					rotieren	rotate	1	0.11%				
					sausen	dash, dart	1	0.11%				
					schlendern	stroll, amble	1	0.11%				
					schlittern	slide, skit	1	0.11%				
					springen	jump	1	0.11%				
					spurten	spurt, sprint	1	0.11%				
					staksen	stalk, teeter	1	0.11%				
					stelzen	stalk, teeter	1	0.11%				
					stromern	roam or wander about	1	0.11%				
					surfen	surf	1	0.11%				
					tapern	totter	1	0.11%				
					traben	trot, lope	1	0.11%				
					turnen	climb, romp	1	0.11%				
					vorankommen	make headway	1	0.11%				
					wackeln	wobble, shake	1	0.11%				
					Weg bahnen	make way	1	0.11%				
					winden	wind	1	0.11%				
					ziehen	pull	1	0.11%				

Study 2: Jessen, M. & Cadierno, T. (2013). Variation in the categorization of motion in L2 Danish by German and Turkish native speakers. In J. Goschler & A. Stefanowitsch (Eds.), Variation and change in the encoding of motion events (pp. 133–159). Amsterdam: John Benjamins

Variation in the categorization of motion events by Danish, German, Turkish, and L2 Danish speakers

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This study examines the semantic categories in the motion domain by adult learners of Danish with typologically different L1s – Turkish and German, and compares their categorization patterns to that of Danish NSs. The participants described 37 video clips depicting a large variety of motion events. The results of the study showed that the meanings assigned by the two learner groups to the Danish motion verbs *gå* 'walk', *løbe* 'run' and *kravle* 'crawl' are influenced by the semantic categorization of their respective L1s. In addition, typological membership is found to play a role with respect to the processes involved in the restructuring of meaning/conceptual categories. These processes involve both conceptual transfer from the learners' L1 to the L2 and the creation of a new semantic category on the part of the Turkish learners.

Keywords: conceptual transfer, Danish L2, German, second language acquisition, semantic categories, Turkish

1. Introduction

The experience of motion seems to be universal among human beings due to the biologically determined perceptual mechanisms that we all share. Although the basic experience of motion is universal, languages differ with respect to the structures used to encode motion, and how motion events are categorized.

Differences in the expression of motion with respect to structure can be found in the way languages package the semantic elements of motion events. Talmy (1991, 2000) differentiates between two main types of languages depending on whether the semantic component of Path is encoded in the main verb (verb-framed languages or V-languages) or outside the main verb (satellite-framed

languages or S-languages). A potential difficulty for a learner of a typological dif-
ferent L2 is to detect these differences in packaging.

In addition to different packaging patterns, languages also vary with respect
to the number and nature of the semantic categories they distinguish in a given
domain. Across languages these semantic categories rarely overlap. For example, in
the motion domain, the German verb *laufen* can be used to describe fast and slow
motion events that in English are generally expressed by two verbs, namely *run*
and *walk*. Similar differences have been found in the domain of caused motion.
Whereas German has three different verbs to express placement depending on the
posture of the thing placed, i.e. *stellen, setzen, legen,* English generally expresses
placement by means of one verb, namely *put*. Such cross-linguistic differences in
meaning are a potential difficulty for L2 learners because they have to detect these
differences between their first (L1) and second language (L2).

The present study examines how learners of two typologically different lan-
guages, German (an S-language) and Turkish (a V-language), learn to express
motion events in L2 Danish and how they tackle the two challenges of detecting
L1–L2 meaning differences and possible L1–L2 variations in lexical packaging.

2.   Review of literature

2.1   L1 lexicalization and categorization

2.1.1   *L1 lexicalization*
A large body of research has focused on the lexicalization patterns of motion
events and the internal structure of these events. In his seminal work Talmy (1985,
2000) suggests that languages code the semantic space in the motion domain by
lexicalizing six semantic elements, i.e. Manner, Path, Motion, Figure, Ground,
and Cause. Depending on their lexicalization patterns, languages can be divided
into Satellite framed languages (S-languages), which tend to encode Path in
satellites, and Motion and Manner in the main verb, or Verb framed languages
(V-languages) that typically code Motion and Path in the main verb, and Manner
of motion in a separate constituent (e.g. an adverbial or gerund). To illustrate
examples are given in the languages of the experiment (1)–(3):

(1)   German
       Die Affen   gehen um   den Baum herum.
       The monkeys walk   around   the tree   around.
       'The monkeys walk around the tree.'

(2)   Danish
      To   aber   går   rundt   om   et træ.
      Two monkeys walk around around a tree.
      'Two monkeys walk around a tree.'

(3)   Turkish
      Maymunlar ağacın etrafında dönüyor.
      Monkeys   tree's side   circle.
      'Monkeys circle a tree.'

Examples (1) and (2) show the satellite framing pattern, with Motion and Manner being encoded in the main verb, and Path being expressed in a satellite (i.e. verb particle). Example (3), on the other hand, shows the verb framing pattern, with Motion and Path being encoded in the main verb.

Previous studies have shown that native speakers (NSs) of typologically different languages (S- vs.- V-framed languages) tend to focus on different aspects of motion events in narrative discourse (see Slobin 2004 for an overview). For example, speakers of S-languages tend to encode more detail explicitly about the movement along paths, leaving the settings to be inferred, whereas speakers of V-languages tend to encode more detail explicitly about the scene setting, leaving the paths to be inferred. Examples in (4) and (5) illustrate these tendencies in English and Spanish respectively:

(4)   The deer threw him off over a cliff into the water.

(5)   Lo tiró. Por suerte, abajo, estaba el río. El niño cayó en el agua

(Slobin 1996: 204)

      '(The deer) threw him. Luckily, below, was the river. The boy fell into the water.'

In (4), the detailed trajectories described allow the listener to infer that there is a cliff above the water, whereas in (5), the static description *below was the river* allows the listener to infer that the trajectory went from some elevated place down to the water. These tendencies can be attributed to the grammatical resources that are available for the expression of motion in the two types of languages, as English, but not Spanish, allows for compact expressions such as (4) where complex trajectories are described by way of accumulating several path satellites within a single clause. Important differences have also been found with respect to the expression of manner of motion. The lexicons of S-languages contain a wider variety of manner of motion verbs (e.g. *dash, swoop, scramble*), and the speakers of these languages tend to provide more frequent and varied manner information than speakers of V-languages when describing motion events. Speakers of S-languages thus seem to pay more online attention to this aspect of experience while talking about motion than speakers of V-languages.

136   Moiken Jessen and Teresa Cadierno

2.1.2   *L1 categorization*

> Categorization – the treatment of discriminably different aspects of experience as 'the same' – is a central property of human cognition. In language, for example, a finite vocabulary must stretch to cover any conceivable referent object or event.
>
> (Bowerman: 2011)

Languages differ in what meanings they select for expression and how they package them. The meanings are reflected in the different semantic categories a language has to offer, and the way in which the meanings are packaged is reflected in their lexicalization patterns. The categorization of events in cognitive science has received growing attention in the last years. Whereas research on categorization has traditionally focused on objects, the past decade has witnessed a growing body of research examining the question of event categorization, as for example events involving material destruction, or "cutting and breaking" events. Majid et al. (2007) find that even closely related Germanic languages differ significantly in the number and nature of categories that partition the semantic space of 'cutting and breaking events'. For example, the cognate verbs German *brechen* and Dutch *breken* describe the breaking of long thin things by hand, whereas the Swedish cognate *bräcka* is used for the separation of brittle objects.

Other events that have received attention with respect to semantic categorization are the "carry" and "put" events (Bowerman 2005). Bowerman stresses the existence of language specific covert object categories, i.e. "ways of classifying objects that are woven subtly into the semantics of the verbs..." (238). Whereas speakers of English do not distinguish between "what" is carried and "where" it is carried on a person's body, speakers of Tzeltal Mayan use different terms to describe a 'carry' event, depending on where something is carried, (e.g. in the arms, on the back, on the shoulders, or on the head), and speakers of Navajo encode a distinction about the nature of the item carried, i.e. whether it is living, long, bulky, or a container with contents. Another domain that displays cross-linguistic differences with respect to the partition of the semantic space is the domain of motion. Dimitrova-Vulchanova et al. (2012) showed how speakers of three different S-languages, Bulgarian, English and Norwegian and one V-language, Italian, named events of biological motion. Their analysis leads them to propose a finer grained feature analysis than the one suggested by Talmy (1991). In their study they found a clear distinction between non-supported high velocity, high energy gaits (running) and supported slow-to-normal velocity motion (walking) in all their languages. There were, however, differences in the categorization of 'walking' events, where the speakers of the languages under investigation varied on how fine-grained they sub-divided this type of motion events.

In a study using the same videos as those developed by Dimitrova-Vulchanova et al. (2012), Jessen (in press) found that NSs of Turkish, German and Danish varied in the number and the nature of the categories in which the semantic space of biological motion was divided into. German speakers used the largest number of categories to describe the semantic space, whereas Danish speakers used the fewest. Furthermore, cross-typological differences were observed in that Path played a bigger role in categorization for the Turkish speakers than for the speakers of German and Danish.

2.2 L2 lexicalization and categorization

2.2.1 *Lexicalization of motion in an L2*

In L2 research on motion, the differences in packaging the motion-related information have been regarded as a possible difficulty for learners of a language that is typologically different from their L1. The learners' task is considered to be learning the characteristic lexicalization patterns of the L2 (Cadierno 2004; Cadierno and Lund 2004). In the last decade, research has addressed two main research questions, namely, whether and to what extent adult language learners are able to learn the appropriate L2 lexicalization patterns, and whether and to what this extent this learning is influenced by the lexicalization patterns of their L1 (for recent reviews see Cadierno 2004; Cadierno 2008). The results of this research provide a complex picture, which can be summarized in three interrelated points. First, adult language learners can develop appropriate L2 lexicalization patterns over time, but this development does not necessarily affect all aspects of a motion event equally (e.g. expression of Manner vs. Path). Secondly, the influence of the L1 lexicalization patterns can also be seen on the learners' gesture patterns. And thirdly, the development of appropriate L2 lexicalization patterns seems to be particularly difficult when it involves expressing new grammatical distinctions, i.e., distinctions that are not coded in the learners' L1.

The main focus of this research has thus been the patterning of the motion event features of Manner and Path. Relatively little attention has been paid to whether the meanings assigned to the motion verbs by the L2 learners indeed reflect the meaning of the target language adequately. Harley (1989) and Harley and King (1989) found that English learners of French used certain manner of motion verbs (e.g. *courir* 'run', *sauter* 'jump', and *marcher* 'march') more frequently than French native speakers who tended to use verbs conflating motion and path (e.g. *monter* 'go up', *descendre* 'descend', *sortir* 'go out'). English is an S-language with a wide variety of manner verbs. The learners seem to be overusing the manner

138   Moiken Jessen and Teresa Cadierno

verbs in French as an effect of their L1. These effects can be attributed to transfer, i.e. traces of properties of the L1 in the L2 production.

For Turkish (a V-language) learners of Danish (an S-language) one possible difficulty is to learn the appropriate way of packaging Manner and Path information when describing a motion event and to become aware that manner descriptions are more detailed in Danish.

2.2.2   *Categorization of motion in L2*

For the L2 learner an additional source of difficulty, besides identifying the appropriate lexicalization patterns, is to be able to identify cross-linguistic differences in the semantic categorization of events (e.g. "carry" events display different boundaries in English, Tzeltal Mayan and Navajo, as shown by Bowerman 2005, see above). These differences in event conceptualization are considered to be problematic for the learner as soon as there is no congruence between the L1 and the L2 categories (cf. Ellis 1994: 307).

In the case of such differences, conceptual transfer from the L1 to the L2 may arise. For example, L2 users may fail to make conceptual distinctions that are obligatory/common in a particular language, or may adopt distinctions made in their L1 when using their L2s. This transfer may be visible in L2 lexical preferences as shown by Jarvis (2000). Participants in this study differed systematically in the use of collision verbs. Retelling a five minute segment of the silent film "Modern Times" Swedish learners used two different L2 English verbs when describing a collision with a vehicle (*crash/hit*) or human (*run on*), a distinction which is found in Swedish, (*krocka* for vehicles and *springa på* for humans) while speakers of Finnish did not show a systematic variation along this distinction. With respect to conceptual transfer, this means that the Swedish learners used their L1 concept of "collision" in their L2 English.

As pointed out by Gullberg (2009), the interest in L2 lexical acquisition looks at a diverse range of phenomena, such as productive and receptive vocabulary knowledge and contexts of acquisition. It seems remarkable that relatively little research has been performed on finding out what the learners actually mean by the words that they use. Related to the acquisition of L2 meaning is the process of semantic restructuring/reorganization along the lines described above: How does the restructuring of semantic categories take place? Do the L2 forms that look appropriate also have the same meaning as ascribed to them by NSs?

Cross-linguistic influence may be expected in the mapping of an L2 form onto an L1 meaning, and different types of acquisitional difficulties have been identified on the basis of L1–L2 comparisons (e.g. Stockwell et al. 1965). Where the splitting of one L1 category into two or more L2 categories is considered to be the most

difficult, equivalence between two categories is considered to represent the smallest difficulty. Gullberg (2009) found that English learners of L2 Dutch experienced difficulty in moving from one category of placement (i.e. *put*) to two L2 categories (i.e. *leggen* and *zetten*), even though English has low frequency equivalents of the Dutch target verbs, namely *lay* and *set*. On the other hand, moving from multiple categories to one category has been shown to be an easier task for L2 learners, e.g. German and Dutch classroom learners of French move from sets of specific caused posture verbs, *stellen, legen* 'stand/lay' in German and *zetten/leggen* 'set/ lay' in Dutch, to only one verb in French *metre* 'put' without noticeable difficulties (Gullberg 2009).

The present investigation follows this line of research in the motion domain by examining the semantic categories in the Danish L2 by German and Turkish speakers. The results of the study show that the learners have to restructure their L1 conceptual categories in the domain of motion in order to match the L2 target Danish conceptual categories. The path of restructuring for the L2 learners is exemplified by means of the three most frequently used motion verbs in Danish as an L1. It is shown that the transition from many to one and from specific to general categories in the L2 constitutes a difficult acquisitional task for the L1 German learners, and that the difference in L1–L2 lexicalization patterns leads to an overgeneralization of the verb *gå* by the Turkish learners.

The study addressed the following research questions:

a. What verbs do L2 learners use to describe motion events? How do they compare to L1 Danish NSs' verb use?
b. What are the boundaries of the semantic categories in the learner language?
c. What is the learners' task in restructuring the Danish L2 semantic categories?
d. How do L2 learners reconstruct meaning? What role does typological difference play?

3.   Method

3.1   Participants

A total of 50 informants participated in the study: 14 German learners of Danish, 14 Turkish learners of Danish, and 22 native speakers of Danish.

All the Turkish participants were professional workers in Denmark (age range: 26–58, M: 34.7). Length of residence in Denmark ranged from 1.5 years to 33 years (M: 11.5 years, SD: 9.5 years). 11 of the participants took a placement test (based on DIALANG[1]) and filled out a background questionnaire (a modified version of the questionnaire suggested by Gullberg and Indefrey 2003). The participants used Danish at their work place and interacted with Danes on a daily basis.

The German participants were also professional workers in Denmark (age range: 22–55, M: 33). Length of residence ranged from 1 year to 19 years (M: 5.7 years, SD 5 years). 13 German learners also took a placement test and filled out the same background questionnaire. The participants used Danish at their work place and interacted with Danes on a daily basis.

The percentages of the correct answers of the placement test were computed for each group. On average the German learners scored 83%, the Turkish learners scored an average of 75%. A Wilcoxian test for non-parametric distribution of small datasets confirms that the means of the populations are comparable. Table 1 summarizes the biographic information for the learners.

Table 1. Biographical information summary

Speaker information	mean	range	SD
Prof test % Germans	83.07	58.7–94.7	10.43
Prof test % Turks	75	58.7–92	10
Age Germans	33	22–55	
Length of residency Germans	5.7	1–19	5
Age Turks	34.7	26–58	
Length of residency Turks	11.5	1.5–33	9.5

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1. Due to the lack of a placement test for Danish as a foreign language we adopted the DIALANG Vocabulary Size Placement test for Danish. The test is a lexicon based test. 75 test items have to be classified as nonsense words or real Danish words. This test is considered to be a very good predictor of other areas of performance as well (Alderson 2006: 79–94).

The one German learner and the three Turkish learners that did not complete the placement test were included on the basis of their self-assessment (intermediate or better), their self-reported use of the target language and the researchers' assessment based on an oral interview.

3.2   Materials and procedures

Data were collected through a video-based event description task. The task required the participants to watch 37 short video-clips displaying a great variety of motion performed by humans, primates and a range of different animals. These videos have also been used in several studies on the naming of motion events (Dimitrova-Vulchanova 2012) and serve in our experiment as an extensional grid, i.e. a representation of the semantic space, onto which the meaning of the verbs used can be matched. The events depicted in the clips showed motion up and down a vertical axis, around an entity, forward, backward, slow, fast, using 4 limbs, 2 limbs, etc. The participants were asked to watch the videos and after each video briefly describe what they had seen in written form in a box provided underneath the given video. The instructions were given in Danish and participants were asked to answer in Danish. The clips were shown in a fixed randomized order.

The main verbs were then extracted from the participants' answers. In the few cases where the participants provided incomplete sentences, the verbal element of the clause was counted (e.g. *'en løbende abe'* – a running monkey).

4. Results

4.1   Motion verbs used by the informant groups

A frequency analysis was conducted on the data in order to examine the motion verbs used by L1 German and L1 Turkish learners in L2 Danish, as well those employed by Danish NSs.

As shown in Table 2, L1 Turkish learners used 28 different types of motion verbs in the scene descriptions. 95% of all the scene descriptions contained a motion verb. There was a rather high degree of agreement between the Turkish learners of Danish (Simpson's Diversity Index, D = 0.6)[2].

German learners used 48 different types in their descriptions of the scenes. 93% of their descriptions contained a motion verb. The German learners agreed to a lesser degree on how the scenes should be described (D = 0.4).

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2.   Simpson's Diversity Index can be explained in the following manner: We are interested in how diverse the speakers' use of verbs for a given scene is. In order to measure this diversity, we first count all the different verbs used for describing a given scene. Let V = {v1, v2,...,vM} be the set of unique verbs used by the speakers to describe the scene in question. Suppose, there is a total M such verbs. Furthermore, suppose verb v_i is observed n_i times. Let N denote the total number of responses collected for a scene, consequently:

$$N = \sum_{i=1}^{M} n_i$$

One can then easily compute the share of each verb within all the responses as the ratio of the number of times a given verb is used and the total number of responses. That is,

$$share\ of\ v_1 \equiv s_i = \frac{number\ of\ times\ v_i\ is\ used}{N} = \frac{n_i}{N}$$

When speakers use a large variety of verbs, naturally the share of each verb would be very small provided we have a sufficiently high number of total responses and we would have a rather diverse set of responses. On the other hand, when speakers use only a few verbs to describe the scene, each verb will have relatively high shares and we would have a quite concentrated set of responses. Simpson's Diversity Index is a commonly used measure of diversity (alternatively, concentration) that summarizes the above intuition for a given set of responses and is calculated based on the following formula:

$$D = \sum_{i=1}^{M} \frac{n_i(n_i - 1)}{N(N - 1)}$$

When one verb is used in most of the responses, that verb would have a very high share while all the others will have small shares, implying a large value of D. In the limit if one verb is used by all the respondents, then D will take a value of one. On the other hand, when all N responses contain a unique verb in the description, the contribution of each verb in the above sum would be exactly zero and D would take the value of zero indicating a very diverse set of responses.

Danish NSs used a total of 41 types of motion verbs in their scene descriptions. 79% of all the scene descriptions contained a motion verb. There was a rather high degree of agreement between the NSs of Danish, (D = 0.6).

Table 2. Summary of frequency analysis

	# of speakers	total # of scene descriptions	total # of motion verbs used	% of answers containing motion verb	mean SimpD	# of types of motion verbs
Danish NSs	21	777	646	79.36	0.6	41
Turkish learners of Danish	14	518	479	95	0.6	28
German learners of Danish	14	518	482	93	0.4	48

Figure 1 shows that the three most common verbs used by the L1 Turkish learners were *gå* 'walk', *løbe* 'run' and *kravle* 'crawl'. More specifically, 45% of descriptions containing a motion verb contained *gå*, 24% of the descriptions contained *løbe* and 17% of the description contained *kravle*. That means that 86% of all the scene descriptions are described by one of the three most frequent verbs.
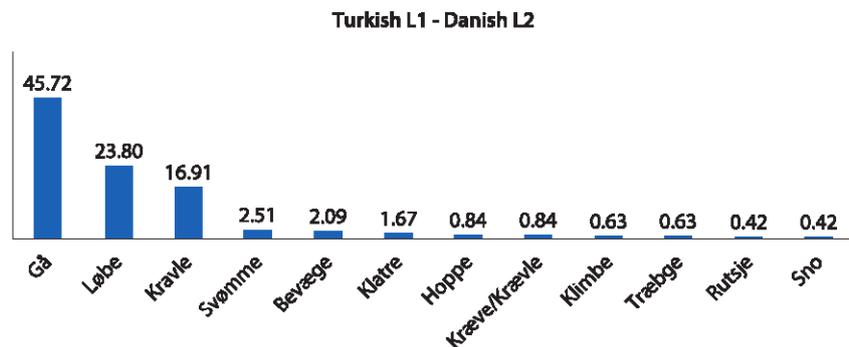

Figure 1. Danish motion verbs used by L1 Turkish learners

As illustrated in Figure 2, the L1 German learners used the same three motion verbs most frequently, albeit with a different distribution. In the case of the German learners *løbe* was used in 26% of all the scene descriptions containing motion verb, *kravle* was used in 18% of the cases and *gå* in 17%. In more general terms, 61% of the scene descriptions contained a motion verb that was either *gå*, *løbe* or *kravle*. These results constitute a first indication that L1 Turkish and German learners of L2 Danish partition the same semantic space differently.

German L1 - Danish L2
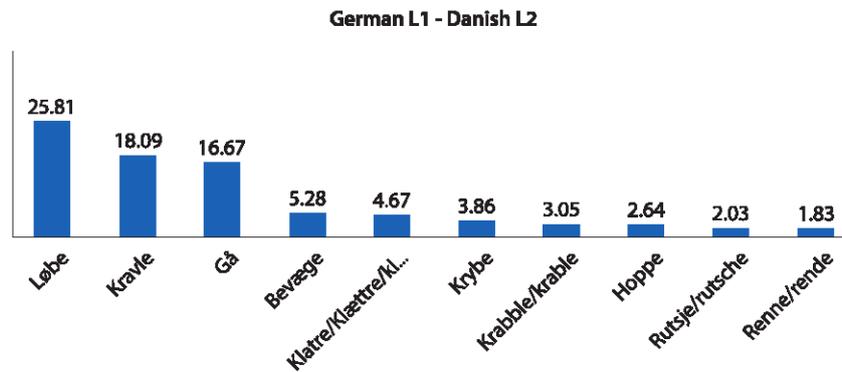
Figure 2. Danish motion verbs used by L1 German learners

Finally, Figure 3 below shows that the Danish NSs used the same three motion verbs most frequently, with the following distribution: *kravle* was used in 26% of the scene descriptions containing a motion verb, *løbe* was used in 25% of the cases, and finally *gå* was employed in 24% of the cases. In more general terms, in the Danish NSs descriptions 75% of all the scene descriptions containing a motion verb were described by either *løbe, kravle,* or *gå*.
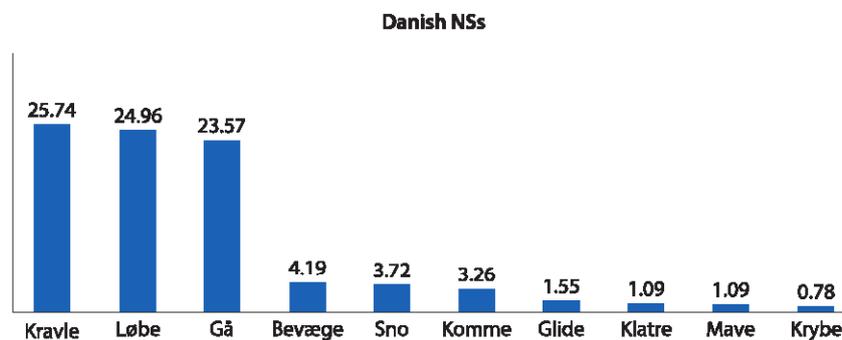
Danish NSs

Figure 3. Danish motion verbs used by Danish NSs

This overview of naming patterns thus already suggests, on the one hand, an over-generalization of *gå* on the part of the Turkish learners, and on the other hand, an under-use of the three most frequent verbs on the part of the German learners. With respect to the process of semantic categorization of motion events, both learner groups did not perform target-like.

98

4.2   Category boundaries in the learner languages compared to Danish

To gain a deeper understanding of the categories underlying the learners' and the NSs' descriptions, a cluster analysis was conducted on the data.

Cluster analysis (Majid et al. 2007) makes visible the number of categories used for a given semantic domain, and provides information about category boundaries across languages as well as the relationship among categories. As Majid et al. (2007) point out, the advantage of cluster analysis over other multivariate statistical procedures is that it makes hierarchical structures visible. Verbs that describe motion might have a hierarchical relationship, e.g. *spadsere* 'stroll' is a hyponym of *gå* 'walk'. Cluster analysis can also give us an insight into how learners structure their inventory of motion verbs, whether they build the same semantic relations as the NSs or not, and if not, where potential differences might be located.

A video clip-by-verb-matrix (with the scenes in rows and the verbs in columns) was created for each of the three informant groups (Danish NSs, German learners of Danish and Turkish learners of Danish) showing the frequency of occurrence for each verb per scene. The resulting matrixes were analyzed using a cluster analysis. We used Euclidean distance and Ward linkage in a hierarchical agglomerative clustering which differs slightly from Majid et al. (2007)'s procedure. Videos that are described by the same verb are grouped together, videos that are described by the same two verbs are grouped together etc. The use of a different distance measure allows us to capture differences in frequency of usage of a verb (rather than just noting if a certain verb appeared or not).

For Danish as an L1, the cluster analysis confirmed the semantic categories obtained in the frequency analysis. Native speakers of Danish partitioned the semantic space provided by the video clips in four main categories. As illustrated in Figure 4, three categories reflect the use of the three most frequent verbs *løbe*, *gå* and *kravle*, describing fast vs. slow movement forward, and slow movement with close contact to the ground. The fourth category is defined by a highly frequent use of the general motion verb *bevæge sig* 'move', and a high variation of rather specific motion verbs (e.g. *møve* 'move on tummy', *sno sig* 'slither').
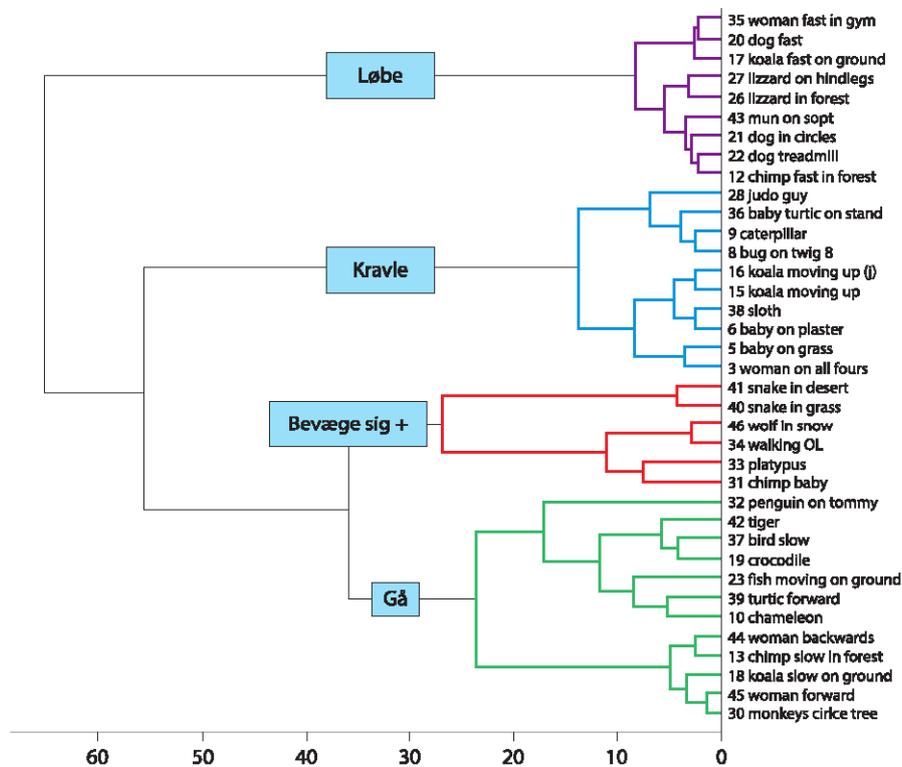
Figure 4. Cluster tree for Danish L1

4.2.1   *German L1–Danish L2 cluster tree*

As illustrated in Figure 5, the cluster tree for the German learners of Danish looks less clear-cut when compared to the L1 Danish tree. It contains 8 clusters, representing 8 different categories (*gå* 'walk', *gå/løbe* 'walk/run', *rutsje/svømme* 'slide/swim', *bevæge/kravle/krybe* 'move/crawl/creep', *klatre/kravle* 'climb/cawl', *kravle* 'crawl', *hoppe/løbe* 'jump/run' and *løbe* 'run'). There is, thus, a larger number of categories as compared to the NSs, and for many of the categories a higher degree of variation is visible. The three most frequently used motion verbs can be found here again in the best "defined" categories where most of the learners use the same verb. The *løbe*-cluster combines all the fast events, the *kravle*-cluster combines movements with slow velocity and close contact to the surface on a horizontal orientation and the *gå*-cluster includes normal pace motion events. A cluster that does not exist in Danish L1 is the *klatre/kravle*-cluster describing scenes that depict slow motion with a vertical orientation, and close contact to surface. The *gå/løbe*-cluster includes scenes of normal pace motions that German learners have

described with *gå* 'walk' as well as *løbe* 'run'. The *hoppe/løbe*-cluster contains only one scene depicting a koala moving fast across the ground. The German learners used *hoppe* 'jump' and *løbe* 'løbe' for the description of this scene. The *rutsje/svømme*-cluster, which contains two scenes, a platypus sliding down a river and a penguin sliding over the ice on its stomach, is also specific for the German learners. The *bevæge sig/kravle/krybe*-cluster subsumes scenes that are described with a variety of different motion verbs.
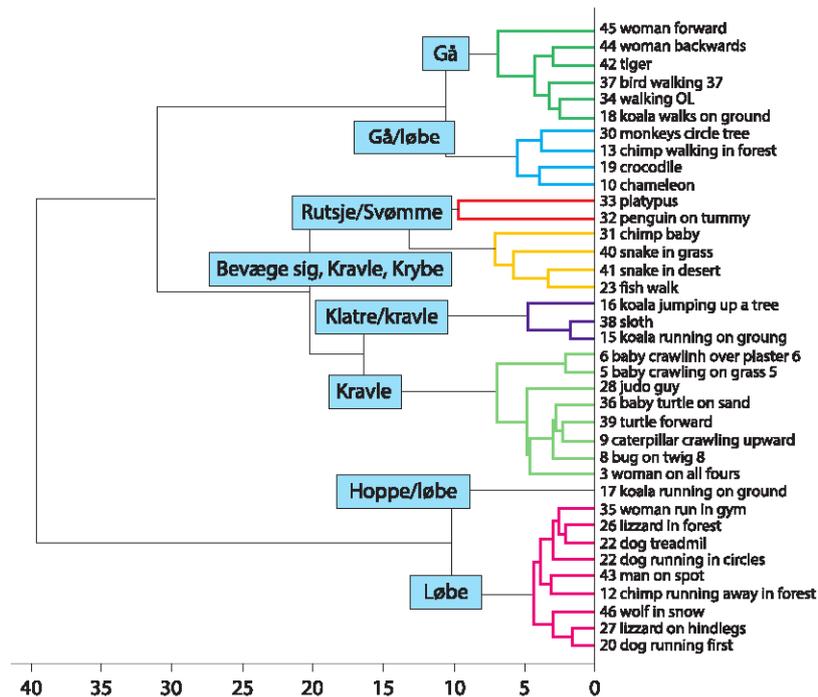
Figure 5. Cluster tree for German L1–Danish L2

4.2.2   *Turkish L1–Danish L2 cluster tree*

Figure 6 shows the cluster tree for the Turkish learners of L2 Danish. It contains 7 clusters, *løbe* 'run', *løbe/gå* 'run/walk', *svømme* 'swim', *gå*/mix 'walk' and a variety of other verbs, *kravle* 'crawl', *gå/kravle* 'walk/crawl', and *gå* 'walk'. The three most frequently used motion verbs can be found here again in the best defined categories. The *løbe*-cluster combines the fast events; the *gå*- cluster is the largest cluster and combines the events that depict slow forward movement. What is noticeable here is that the *gå*-cluster also contains scenes showing a bug and a chameleon moving on a twig/branch, which Danish NSs and L1 German

learners categorize as *kravle* 'crawl'. The *kravle*-cluster includes scenes that show slow movement with close contact to the ground. The *løbe/gå*-cluster includes three scenes, a man running on the spot, a wolf trudging in the snow and participants of a competitive walking event. They have been described with *løbe* 'run' as well as *gå* 'walk'. The *gå/kravle*-cluster contains scenes showing a bug on a twig, a chameleon on a branch and a caterpillar crawling up a twig. In the descriptions of these scenes *kravle* 'crawl' and *gå* 'walk' are used. The *gå*/mix-cluster contains scenes that show snakes moving, a baby turtle paddling through sand and other scenes that are rather special. The descriptions of these include *gå*, but also a variety of other motion verbs, such as *sno sig* 'slither', *krybe* 'creep', *bevæge sig* 'move', to name just a few.
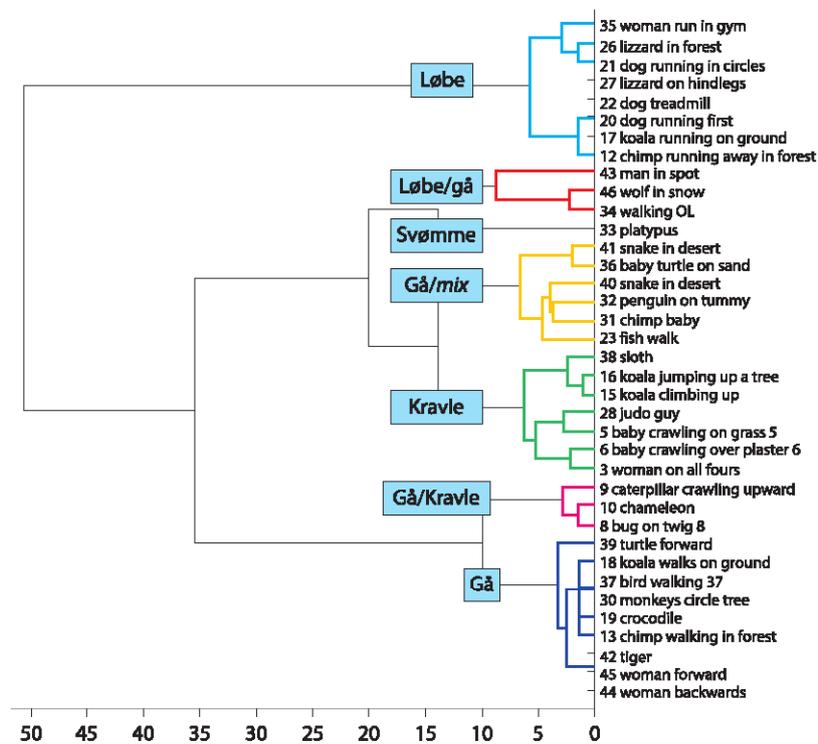

Figure 6. Cluster tree for Turkish L1–Danish L2

Table 3 sums up the cluster tree descriptions from the three informant groups:

Table 3. Summary of cluster analyses

Danish L1	German learners	Turkish learners
4 clusters	*8 clusters*	*7 clusters*
gå 'walk' 12	løbe 9	gå 9
kravle 'crawl' 10	kravle 8	løbe 8
løbe 'run' 9	gå 6	kravle 7
bevæge sig 'move' 6	gå/løbe 4	gå/*mix* 6
	bevæge sig/krybe/kravle 4	gå/løbe 3
	klatre/kravle 3	gå/kravle 3
	rutsje/svømme 2	svømme 1
	hoppe/løbe 1	

In sum, the results of the motion verb frequency analysis and the cluster analysis reveal that the way in which motion verbs are used by Danish NSs is not congruent with the learners' use of the same motion verbs in L2 Danish. This finding indicates that the learners under investigation have not mastered the target-like use of Danish motion verbs. Even though the L2 learners use Danish verbs to describe the videos, they use these verbs for different scenes than the Danish native speakers.

4.3   The learners' task in restructuring the Danish L2 semantic categories

The three most frequently used verbs will serve as a starting point to define the task learners have to tackle. We have to know which verbs the learners use to describe the scenes in question in their native languages to capture precisely where differences in meaning might occur. A previous experiment by Jessen (in press) looked at how NSs of Danish, German and Turkish describe motion events.

In the L1 Danish descriptions, the motion verb *kravle* 'crawl' was used to describe 10 different scenes, including a sloth climbing down a tree, a baby crawling over grass, and a baby turtle paddling through sand. German NSs used four different motion verbs to describe the same ten scenes, *krabbeln* 'crawl', *klettern* 'climb', *kriechen* 'creep' and *robben* 'move like a seal'. The German cognate *krabbeln* 'crawl' was used for four out of the ten scenes. German NSs made a general distinction as to whether a movement's vector orientation is horizontal or vertical. If it was vertical, *klettern* 'climb' was the preferred term. If the vector orientation was horizontal, a finer partition was applied that seemed to pay relative attention to how close the moving entity is to the ground, and whether or not its legs/limbs are noticeable. For movement with the body in very close contact to the ground and for entities without legs/limbs, *kriechen* 'creep' was used. An exception is the

use of *robben*, 'move like a seal', for the scene showing a man moving on the floor like a soldier. The term *robben* is used in German for the exact motion the man was performing in the video. For relatively close contact to the ground, *krabbeln* 'crawl' was used.

The Turkish NSs use five different verbs to describe the ten scenes Danish NS describe with *kravle* 'crawl': *inmek* 'move down', *tırmanmak* 'climb up', *yürümek* 'walk', *emeklemek* 'crawl' and *ilerlemek* 'move forward'. Like the German NSs, Turkish NSs distinguish between horizontal and vertical vector orientation. However, they subdivide the vertical vector orientation into moving upwards and downwards, using *inmek* 'move down' and *tırmanmak* 'climb up' in their descriptions. The motion verb used to describe the motion of a baby crawling, *emeklemek* 'crawl', was also used to refer to a woman moving forward on all fours, but it seems it cannot be extended to bugs or other insects. Rather, the bug's movement was described by *yürümek* 'walk'. Movement with close contact to the ground and no visible use of limbs was described by the more general motion verb *ilerlemek* 'move forward'.

For the scenes that Danish NSs described with *løbe* 'run', Jessen (in press) finds that German NSs used two verbs, *rennen* 'run fast' and *laufen* 'run/walk'. *Rennen* is used for scenes showing very fast movement forward, whereas *laufen* is used for scenes that are moderately fast.

Turkish NSs used only one verb, *koşmak* 'run', for the scenes Danish NSs describe with *løbe* 'run'.

For the scenes that Danish NSs described using *gå* 'walk', German NSs used *gehen* 'walk' or *laufen* 'run/walk'. The distribution of *laufen* and *gehen* seems random, there was a slight preference for *gehen* if the moving entity is human, but both verbs were used to describe forward movement at a normal pace.

Table 4 summarizes which verbs Turkish and German NSs used for the scenes that Danish speakers described with *kravle*, *løbe*, or *gå*.

Table 4. Verbs used for the same scenes in learners' source languages

Danish L1-target	German L1	Turkish L1
kravle (M) 'crawl'	krabbeln (M) 'crawl'	inmek (P) 'move down'
	klettern (M) 'climb'	tırmanmak (MP) 'climb up'
	kriechen (M) 'creep'	yürümek (M) 'walk'
	robben (M) 'move like seal'	emeklemek (M) 'crawl'
		ilerlemek (P) 'move'
løbe (M) 'run'	rennen (M) 'run'	koşmak (M) 'run'
	laufen (M) 'run/walk'	
gå (M) 'walk'	gehen (M) 'walk'	yürümek (M) 'walk'
	laufen (M) 'run/walk'	dönmek (P) 'turn'

For *kravle* the task for German learners is to move from four more specific manner verbs to one more general manner verb describing slow motion with close contact to the ground. The German learners have to understand that *kravle* 'crawl' is used for horizontal and vertical movement and that *kravle* also comprises motion with very close contact to the ground.

Turkish learners have to move from five more specific motion verbs to one more general one. However, unlike the German learners, they have to tackle the problem of learning a different lexicalization pattern. Scenes described in Turkish with two different path verbs, *inmek* 'move down' and *tırmanmak* 'climb up' are expressed in Danish with one and the same manner verb. In addition, Turkish learners have to understand when the Turkish equivalent to *yürümek* 'walk' is expressed as *kravle* 'crawl', e.g. the movement of the bug on the twig is expressed as *yürümek* 'walk' in Turkish, but as *kravle* 'crawl' in Danish.

In the case of *løbe*, German learners have to move from two categories to one. Danish NSs did not make a distinction between fast and very fast motion events. Turkish NSs use only *koşmak* 'run' for the scenes that Danish NSs described using *løbe*.

For *gå* German learners have to move from two different verbs to one. The problem for the German learner is to understand, that Danish *løbe* cannot be used for motion events with a normal speed, unlike the German cognate form *laufen*.

The Turkish learners also have to move from two verbs that are used in the descriptions to one. They have to drop the path element to replace the path verb *dönmek* by the manner verb *gå*.

4.4   Reconstruction of meaning

The aim of this analysis was to see how the learners reconstruct meaning in their L2. A closer look at how *løbe*, *gå*, and *kravle* are used across the three groups revealed which meaning the learners and the Danish NSs actually assigned to these forms.

Figure 7 shows the ten scenes for which the Danish NSs predominantly used *kravle*. The dark grey bars represent the frequency of use of *kravle* by Danish NSs, whereas the light and the medium grey bars reflect the use of *kravle* for the German and Turkish learners of Danish respectively. For scenes 6, 7 and 8, that show a koala climbing up a tree in two different ways and a sloth climbing down a tree, German learners diverge from the target language description pattern. A closer look at the description of the German learners' data for these three scenes reveals that some German learners opt for the use *klatre* in their descriptions. The NSs' data analyzed by Jessen (in press) can be of help in explaining the divergence

152   Moiken Jessen and Teresa Cadierno
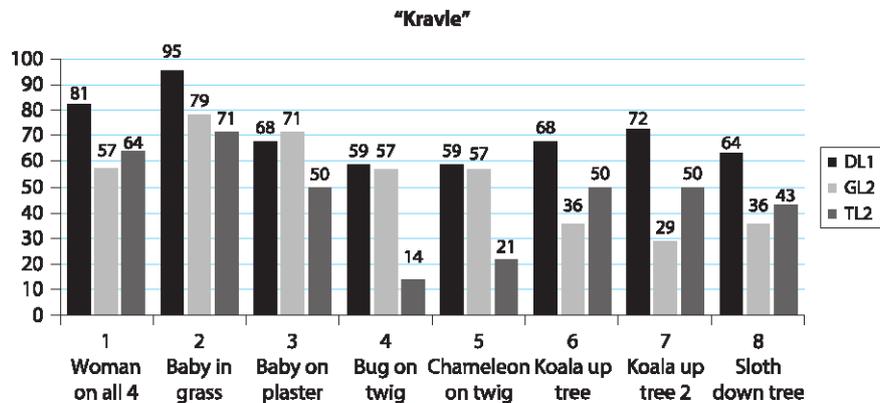
Figure 7. Scenes described with *kravle* by Danish NSs and % of descriptions by learners containing *kravle*

from the target use for this case, as well as subsequent cases analyzed below in this section. In those descriptions we find that German NSs describe the scenes in question with *klettern* 'climb'. The term *klettern* is the cognate term to Danish *klatre*. However, the meaning of these two terms diverges in that *klatre* in Danish is not used to distinguish between horizontal or vertical slow movement; it is an infrequently used verb in the descriptions by the Danish NSs. It seems that the German learners are not aware that a partition of motion events displaying slow movement with close contact to the ground is not segmented further in Danish. The German learners seem to try to maintain this segmentation in their L2.

Turkish learners on the other hand differ markedly from Danish NSs in their use of *kravle* for scenes 4 and 5 that show a bug and a chameleon moving on a twig or a tree trunk. A less pronounced difference can be observed for scenes 6–8. An investigation of the descriptions provided by the Turkish learners for these scenes indicates that they use *gå* instead. This divergence from the target like use can be explained by referring to Turkish NSs' use of *yürümek* 'walk' for scenes 4 and 5, and *inmek* 'move down' and *tırmanmak* 'climb up' for scenes 6–8. *Yürümek* is usually translated as *walk*. In many scenes the use of *gå* in Danish L1 and *yürümek* in Turkish L1 overlaps. However, in the case of the bug and the chameleon *gå* is not the target-like form. For the Danish NSs the movement of the bug and the chameleon resemble a crawling event more than a walking event. As there is not a complete overlap in the categories even rather advanced learners do not describe these videos appropriately.

Figure 8 shows the scenes that Danish NSs predominantly have described using *løbe*.

106
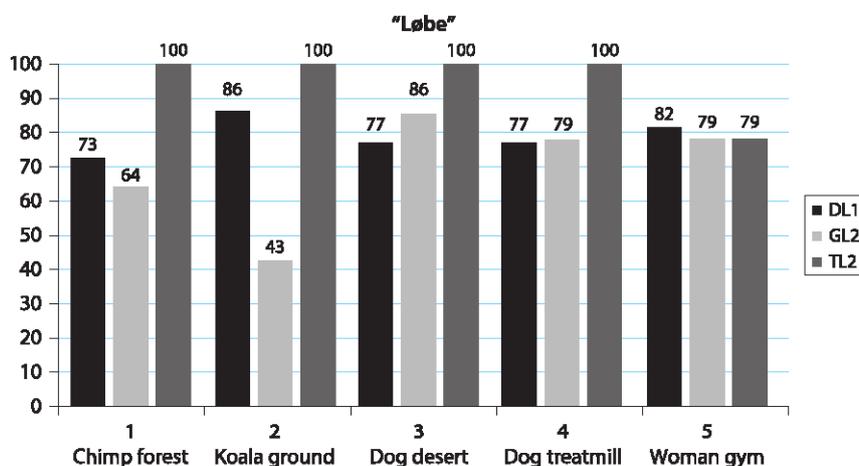
Figure 8. Scenes described with *løbe* by Danish NSs and % of descriptions
by learners containing *løbe*

The largest divergence from target language use can be seen among the German
learners who do not use *løbe* 'run' to the same extend as the Danish NSs in scene 2,
showing a koala moving fast forward on the ground. The German learners use
hoppe 'jump' rather than *løbe* 'run'. If we take a look at the L1 German data we
can see that the preferred term produced by the German NSs is *hoppeln* 'move
like rabbit'. In fact, the koala is moving forward in a rabbit-like fashion. However,
Danish *hoppe* is also commonly used to described movement by rabbits but does
not seem to be an option for the Danish NSs.

The Turkish learners used *løbe* for the scenes that Danish NSs predominantly
described with *løbe*; in the first four scenes in Figure 8 *løbe* is in fact the only verb
used. For the scenes in question the categories overlap in Danish and Turkish NSs'
descriptions.

Figure 9 shows scenes that Danish NSs predominantly described using *gå*.

In Figure 9 a divergence from the target use can be observed within the
German learner group. In scenes 1–3, showing a chimp walking in a forest, a koala
walking on the ground and monkeys walking around a tree, the German speak-
ers do not use *gå* to the same extend as the Danish speakers. The most frequent
motion verb used in their descriptions is *løbe*. In the German L1 descriptions of
the same scenes the German cognate to *løbe*, *laufen* 'run/walk', is used. *Laufen* can
include slow events as well as fast events. Our observations seem to point to the
fact that the German learners have not discovered that the meaning of Danish *løbe*
'run' is restricted to fast movement.
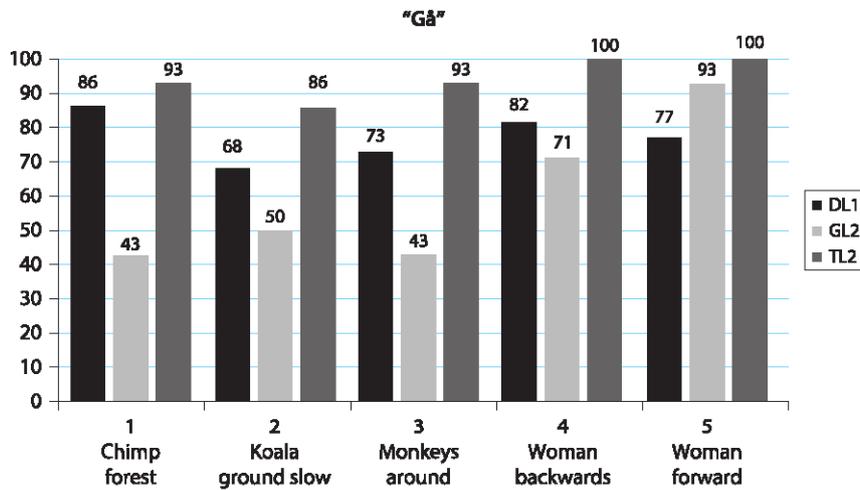
Figure 9. Scenes described with *gå* by Danish NSs and % of descriptions by learners containing *gå*

Strikingly, all Turkish learners used the verb *gå* for scenes 4 and 5, showing a woman walking forward and backwards. For the scene depicting two monkeys walking around a tree the preferred verb by the L1 Turkish group was *dönmek* 'circle'. Almost all the learners used *gå* to describe this scene in Danish L2.

Table 5 summarizes the observations with regards to what might influence the learners' reconstruction of Danish motion verbs *kravle, løbe,* and *gå*.

Table 5. Potential L1 influence on German and Turkish learners' use of *kravle, løbe, gå*

Danish L1-target	German learners	German L1	Turkish learners	Turkish L1
kravle (M)	kravle klatre	krabbeln (M) klettern (M) kriechen (M)	kravle gå	inmek (P) tırmanmak (MP) yürümek (M) emeklemek (M)
løbe	løbe hoppe (rende)	laufen hoppeln rennen	løbe	koşmak (M)
gå	Løbe gå	gehen laufen	gå	yürümek dönmek

Our analysis shows that neither Turkish nor German learners of Danish use the motion verbs they know in a target-like fashion. German learners use "false-friends", cognates that are semantically more restricted in the target language (TL) (e.g. *løbe* cannot be used to describe fast events) or that mean something else (e.g. *hoppe* cannot be used to describe the movement for a koala on the ground). Turkish learners seem to use *gå* rather disproportionally and it seems that *gå* is used for cases where a path verb exists in Turkish and where Danish does not offer an equivalent alternative.

5.   Discussion and conclusion

This study investigated the categorization patterns in the motion domain by adult L1 German and Turkish learners of Danish as well as by Danish NSs. The research questions posed at the beginning of the study were: (a) what verbs do the three informant groups use to describe motion events?; (b) what are the boundaries of the semantic categories in the learner language?; (c) what is the learners task in restructuring the Danish L2 semantic categories?; and (d) how do learners reconstruct meaning?

The results of the study showed that the German learner group employed the highest variety of motion verb types (48) to describe the motion scenes, and also exhibited the highest degree of variability in the scene descriptions. The Turkish learner group used 28 different types, and Danish native speakers used 41 types. Both the Turkish learners of Danish and the Danish NSs displayed a higher degree of agreement in the descriptions of the scene descriptions. Across the three groups three motion verbs were used the most frequently: *løbe, kravle,* and *gå*. However, the frequency distribution of these verbs differed across the groups: in the Turkish learner production data 86% of all scenes contained either *løbe, kravle,* or *gå*, in the German learner production data 61% of all scene descriptions contained either *løbe, kravle,* or *gå* and in the NSs this is the case for 75% of all scene descriptions. The number and the structure of the semantic categories in the learners' use of Danish as an L2 differed from the categorization patterns of Danish NSs. An explanation for the diverging categorization patterns in the use of *gå, løbe* and *kravle* was found in the categorization patterns of the learners' native languages.

As seen in Table 5, the main task for the German learners in acquiring a target-like use of *løbe, kravle, and gå* is to move from a multi-term system to a single-term system. In addition, German learners have to divide the more general term *laufen* into Danish *løbe* (for fast events) and *gå* (for normal pace).

The difficulty with the transition from a multi-term system to a single-term system is reflected in the observation that German learners retained their L1 patterns with respect to the amount and type of information coded in the main motion verbs of choice. This is evidenced in the fact that the German learners kept a distinction between horizontal and vertical slow movement with close contact to the ground, a distinction that is not present in the Danish NSs data. Danish NSs used *kravle* 'crawl' for both horizontal and vertical movement, whereas the German learners used *kravle* for horizontal movement and *klatre* 'climb' for vertical movement. In addition, the German learners opted to use the verb *hoppe* 'jump' in the description of a scene showing a koala moving on the ground in a rabbit-like fashion. In contrast, Danish NSs employed *løbe* 'run' for the description of this scene. The divergence in the learners' and Danish NSs' scene descriptions can be explained by the distinction found in the German NSs' data between *hoppeln* 'move like a rabbit' for movement in a rabbit-like fashion and *laufen* 'run' for other types of fast movements.

With respect to the task of moving from a specific multi-term system to a general single-term system, or in other words, the merging of conceptual representations, the German learners also experienced learning difficulties. They kept their more specific L1 concepts in the L2. This finding contrasts with predictions made in the literature (e.g. Stockwell et al. 1965; Cadierno 2008) regarding the relative acquisitional difficulty of splits over coalesced forms, as well as recent findings reported in Gullberg (2009), where L1 German and Dutch learners of L2 French quickly mastered the reconstruction of "put" events from multi-term systems to a single-term system.[3] In addition, the transition from one more general term to two more specific terms was also difficult for the German learners. This is reflected in their use of *løbe* 'run' for fast and slow motion events, which contrasts with the Danish NSs' restricted use of this verb for fast movements alone. The more extended use of *løbe* 'run' in the German learners' data can be accounted for by the fact that the German cognate verb *laufen* 'run/walk' can be used to describe both slow and fast movement.

These three examples illustrate that the German learners have difficulties with both the transition from a more specific multi-term system to a more general

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3.   In Stockwell et al. (1965) the term Coalescence is defined as two items in the native language becoming coalesced into essentially one item in the target language e.g. English 3rd person possessives require gender distinction (*his/her*) whereas in Spanish they do not (*su*). The term Split is defined as a process in which one item in the native language becomes two or more in the target language requiring the learner to make a new distinction. English speakers must learn the distinction between *ser* and *estar* 'be'. Whereas Coalescence is considered relatively less difficult for the L2 learner, Split is considered to be relatively more difficult.

single-term system, and the opposite transition of moving from a single-term system to a multi-term system. This can be interpreted as an indication of reliance on L1 German conceptual categories. There thus seems to be evidence of cross-linguistic influence of the L1 on the L2 in the form of conceptual transfer, i.e. the L1 has an influence of language-mediated conceptual categories on performance in the L2 (Jarvis and Pavlenko 2008).

For the Turkish learners of Danish the task of acquiring the target-like use of *løbe, kravle, and gå* is twofold. On the one hand, they have to learn the Danish appropriate lexicalization patterns, and on the other, they have to move from the use of several motion verbs (e.g. *tırmanmak* 'climb up', *inmek* 'move down', or *irlerlemek* 'move forward') to fewer motion verbs.

The difficulty in adjusting to the appropriate L2 lexicalization pattern is reflected in the Turkish learners' overuse of *gå*. They showed a tendency to use *gå* for scenes that the Turkish NSs described with a path verb. For example, the preferred verb used by the Turkish learners to describe the scenes showing a koala climbing up or down a tree was *gå*, whereas the Danish NSs employed the verb *kravle*. Even though the Turkish learners used the verb *kravle* to describe other scenes, they opted to use *gå* in the descriptions of movement along a vertical axis. This replacement of path verbs in Turkish L1 with the verb *gå* in L2 Danish suggests a route for restructuring that seems to start with the creation of a new semantic category that is different from both the L1 and L2 categories. The categories generated by the cluster analysis that contained a mixed distribution of the target-like motion verbs and *gå* point to the same phenomenon, namely that conceptual change is brought about by the creation of a new category. Another indication for this route for reconstruction can be seen in that the scenes described by the Turkish NSs with the verb *tırmanmak* 'climb up', which includes manner and path information, were expressed more frequently by the Turkish learners with the target manner verb *kravle* 'crawl' than the scenes described by the Turkish NSs with the pure path verb *inmek* 'move down'. It thus seems that the manner information contained in the Turkish verb *tırmanmak* facilitates the transition to the target-like manner verb *kravle* 'crawl'.

With respect to the transition from many options in the learners' native language to a single one, the Turkish learners experienced learning difficulties as well. This was apparent in their inappropriate use of *gå* for the description of some scenes that were predominantly described by Danish NSs with the verb *kravle* 'crawl'. The Turkish NSs in turn used five different verbs to describe these same scenes. The problem that the Turkish learners face is thus to identify those cases when the five verbs existing in their L1 are to be expressed by means of the Danish verb *kravle*. A case where the learners failed to make this identification is when they described a scene showing a bug moving on a twig with the verb *gå*.

158   Moiken Jessen and Teresa Cadierno

This choice coincides with that of Turkish NSs who used *yürümek* 'walk' in their descriptions of the same scene. In other words, a bug 'walks' in Turkish, whereas it 'crawls' in Danish. This observation thus suggests that Turkish learners relied on the conceptual categories of their L1 in their choice of the L2 verb, and this in turn provides evidence for the existence of cross-linguistic influence of the L1 on the L2 in the form of conceptual transfer for the Turkish learners as well.

To conclude, semantic categorization in an L2 is influenced by the structure of the learners' L1 conceptual space. The nature of this conceptual transfer is dependent on the type of the L1. The same lexicalization pattern in their L1 and L2 makes German learners transfer some motion category concepts directly into their L2, which results in a non target-like, too fine-grained partition of the semantic space of motion. In contrast, the difference in lexicalization patterns between Danish and Turkish leads Turkish learners to construct a new category, which is reflected in the preferential use of *gå* over other motion verbs. Hence, for the Turkish learners the path of learning the target-like use of motion verbs seems to involve the creation of a new semantic category that is different from the learners' source and target languages before the appropriate use of the target verbs is acquired.

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The expression of Path in L2 Danish by German and Turkish learners ----------------------------

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Abstract

Do language learners think in their first language (L1) when using their second language (L2)? This study explores the nature of crosslinguistic influence by investigating how German and Turkish learners of Danish express motion, paying special attention to the semantics of Path. We examined three aspects: overall Path frequency, Path complexity, and the subcomponents of Path. The presence of L1 influence in each aspect reflects how the interplay between form and meaning is carried over as a whole to the L2. In particular, we show how the selection of a specific Path meaning for expression in the L2 has its root in the structural and semantic properties of the L1. This raises important questions regarding how form and meaning are organized in the learner's mind.

Keywords: L2 acquisition, motion events, crosslinguistic influence, thinking for speaking

Zusammenfassung

Denken Sprachlerner in ihrer Muttersprache, wenn sie eine Fremdsprache benutzten? Diese Studie untersucht die Beschaffenheit des Einflusses der Erst- auf die Fremdsprache. Es wird untersucht, wie deutsche und türkische Lerner des Dänischen Bewegungsereignisse in der Zweitsprache ausdrücken, unter besonderer Berücksichtigung der Pfadsemantik. Wir untersuchten die folgenden drei Aspekte: die Gesamthäufigkeit und die Komplexität der Pfadbeschreibungen und die Bedeutung, die ihnen zugeordnet wird. Die Präsenz eines Einflusses der Erstsprache in allen Aspekten macht deutlich, wie das Zusammenspiel zwischen Form und Bedeutung als Ganzes in die Fremdsprache transferiert wird. Insbesondere können wir zeigen, dass die Bedeutungszuweisung einer Pfadbeschreibung in der Zweitsprache ihre Wurzeln in der Struktur und in semantischen Präferenzen der Erstsprache hat.

Dieses wirft die wichtige Frage auf, wie Form und Bedeutung in der sprachlichen Konzeptualisierung des Lerners organisiert sind.

Stichwörter: L2-Erwerb, Bewegungsereignisse, Einfluss der Erstsprache, Thinking for speaking

1. Introduction

The question of whether second-language speech is influenced by the learner's first language (L1) is at the heart of Second Language Acquisition (SLA) research. With the advent of cognitive linguistics, interest has expanded past structural influence towards investigations targeting conceptually motivated phenomena in the learner's second language (L2). This increased interest in language and bilingual cognition is reflected in the growing volume of published research on the topic (e.g., Han & Cadierno, 2010; Pavlenko, 2011; Cook & Basetti, 2011; Benazzo et al., 2012). Influenced by Talmy's motion event typology (1985, 2000) and Slobin's application of it in his "thinking for speaking" (TfS) hypothesis (1996), research has focused on the expression of motion in a second language. Many different aspects of motion events have been studied in various combinations, including the language type constellation between L1 and L2, the proficiency level of the learners, and the nature of the crosslinguistic influence. Furthermore, to investigate the concepts underlying linguistic expression, other modalities have been researched, e.g., the use of gestures and gaze patterns. To give but a few examples from the many relevant studies, the constellation L1 S-language and L2 V-language has been researched by Cadierno (2004), Navarro and Nicoladis (2005), and Hendriks and Hickmann (2011) among others. The constellation L1 V-language, L2 S-language has been examined e.g. by Carroll et al. (2012) and Reshöft (2011). Studies that looked at bilingual speakers' expression of motion events with typological different languages include Daller et al. (2011), Schroeder (2009), and Goschler (2009). Hohenstein et al. (2009) examined the nature of bidirectional transfer and the L2 acquisition of motion events. Gestures as a window into bilingual

cognition have been reviewed by, e.g., Brown (2007), Brown and Gullberg (2010), and Stam (2010). Eye tracking is another method to study conceptual representation underlying learners' expressions of motion, which was used, e.g., in a study by Schmiedtova (2011). For a more detailed overview of studies on the L2 acquisition and expression of motion events, see Cadierno (2013). The main question underlying these studies is whether learners think in their L1 when using the L2. Different TfS patterns in the L1 and the L2 require a development of new ways of TfS (Cadierno, 2004). In other words, are learners able to rethink for speaking (Robinson & Ellis, 2008) and reconstruct meanings in an L2 context (Gullberg, 2009)?

Despite the vast volume of literature, there is still no consensus regarding whether or not L1 thinking patterns are reflected in L2 production. The present study follows this line of investigation, asking whether learners acquire L2-appropriate ways of TfS. We examine three aspects: overall Path frequency, Path complexity, and the meaning of the Path expressions. We pay special attention to the subcomponents of Path Vector, Conformation, and Deixis, as defined in Talmy (2000). Few studies have focused on the acquisition of the subcomponents of Path or, correspondingly, provided a more fine-grained semantic analysis of Path. Two exceptions are Daller et al. (2011) and Carroll et al. (2012). Both find that L2 learners resemble L1 speakers on formal grounds but that the meaning underlying the forms differed from the language to be acquired. To that end, we investigate German and Turkish learners of Danish. This constellation allows us to look at possible inter- and intraypological crosslinguistic influences of the L1 on the L2. Particularly, we address the question of how L2 learners tackle the transition from simple to more complex Path expressions, and how the meaning of the L1 Path expression influences the choice of Path expression in the L2. To identify transfer effects and exclude other sources for divergence from the target language, such as acquisitional universals, we follow Jarvis's suggestions (2000) in our procedure. We establish intra-group homogeneity (similarities in the L2 production of learners with the same L1 background), inter-

119

group heterogeneity (differences between the two learner groups in L2 production), and similarities between the learners' L1 and their L2 production. We find an influence of the L1 on the L2, and we discuss its nature in terms of the intricate interplay between structure and conceptualization.

We first introduce Talmy's motion verb typology and Slobin's application of it in his thinking for speaking (TfS) hypothesis. We then review SLA literature that has investigated L2 acquisition from the theoretical perspective of Talmy's typological framework and Slobin's TfS hypothesis. We consider how the semantic component of Path, subject to the current analysis, is expressed in Danish, German, and Turkish before stating our research questions. A description of the experiment and the coding we apply precedes the presentation of the results. Finally, we discuss our findings in the light of the literature reviewed.

2. Talmy's motion event typology and Slobin's thinking for speaking hypothesis

In recent years, many studies focusing on L2 acquisition have related in one way or another to two very prominent theories in cognitive linguistics, namely Talmy's (1985, 2000) motion event typology and Slobin's thinking for speaking hypothesis (TfS).

In Talmy's motion event typology, the basic assumption is that motion can be considered a universal conceptual domain that is lexicalized across languages (Talmy, 1991, 2000). Various combinations of lexical items and grammatical morphemes can encode events. Elements of the basic motion event are the Figure, which is the object that is moving (or located) with respect to another object, and the other object, the Ground. The Path is "the course followed or site occupied by the Figure object with respect to the Ground object" (Talmy, 1985). Path consists of three parts, a) the vector, including basic types of arrival, traversal and departure, e.g. *to*, or *along*, b) the conformation, including the main geometric schema of a Path, e.g. *into* or *out off*, and c) deixis, defining motion as either toward or not toward the speaker (Talmy 2000: 53-57). Talmy (1985, 2000) suggests that languages code

Motion according to two main lexicalization patterns. Verb-framed languages (V-languages) typically code motion and Path in the main verb and Manner of motion in a separate constituent (an adverbial, converb, or gerund). In contrast, satellite-framed languages (S-languages) tend to encode Path outside the main verb as in satellites and conflate motion and Manner in the main verb. Examples for the two patterns are given in (1) and (2):

(1) German (S-language)	(2) Turkish (V-language)
Die Affe-n geh-en um den Baum herum.	*Maymun-lar ağac-ın etraf-ın-da dön-üyor.*
ART:DEF monkey-pl walk-3plPres around ART:DEF:ACC tree around.	monkey- pl tree-POSS side-POSS-loc turn-PRE:PROG
'The monkeys walk around the tree.'	'Monkeys circle a tree.'

In Talmy's original definition, satellites were directional verb particles that had to be distinguished from prepositions on syntactical and formal grounds (1985: 102). However, Talmy also mentions that both satellites and prepositions can semantically describe Path (1985: 105), e.g., *past* is referred to as a satellite-preposition. In current research, prepositions and particles are commonly included in the analysis of Path (e.g., Daller et al., 2011; Berthele, 2006; Treffers-Daller, 2012), since (e.g., in German) prepositions are frequently the only lexical items conveying directional meaning. In this study, too, prepositions are considered possible loci for Path expression.

Slobin (1996), building on Talmy's typology, finds that "each one [language] is a subjective orientation to the world of human experience, and this orientation affects the ways in which we think while we are speaking" (p. 91). For Slobin, the different lexicalization patterns in a language lead speakers to attend to different dimensions of experience, a process that Gullberg (2011) calls "the activity of information selection of linguistic conceptualization for speech" (p. 166). Slobin observes that speakers of V-languages tend to describe the scene setting, whereas speakers of S-languages tend to add more detailed Path descriptions to motion verbs. In S-languages, several satellites can be

connected to a single verb (Path concatenation). As a result, several Ground elements can be expressed in one clause associated to one verb, as in English *fall down into the river*. V-languages tend to express the scene setting and use several verbs together with several Path devices in a narrative. Slobin (1997) gives the following example for Turkish: "[...] *Cocuğu aşağıya atıyor, köpek de düşüyor aşağıya. Uçurumun dibinde bir göl varmış. Göle düşüyorlar* [...] 'He throws the boy down, and the dog falls down, too. At the bottom of the cliff, there was a lake. (They) fell into the lake'" (p. 451). However, there are intratypological differences regarding the degree of detailed path description (path salience cline) (Ibarretxe-Antuñano, 2009).

3. Typology and TfS in L2 acquisition

Talmy's typology addresses differences in how conceptual elements are mapped onto linguistic forms. Adult learners of a second language not only have to learn the morpho-syntactic patterns of their L2, they also have to understand how to relate meaning to these forms. Thus, in the case of the acquisition of an L2 exhibiting lexicalization patterns that differ from the learner's L1, the learner not only has to locate these differences in the morpho-syntactical structure, s/he also must understand which meaning the structure typically expresses. Thus, the task for an L2 learner is to learn a different way of thinking for speaking (Cadierno, 2004; Cadierno & Lund, 2004) or learn to rethink for speaking (Robinson & Ellis, 2008).

Similarly, the conceptual transfer hypothesis (Jarvis & Pavlenko, 2008) describes how form-meaning mappings learned in the L1 might affect L2 acquisition, stating that "a person's patterns of language use in one language can reflect the concepts and patterns of conceptualization that a person has acquired as a speaker of another language" (p: 115). The many interesting studies that have looked at an influence of the L1 on the L2 in this framework mainly examined lexical categories in a great variety of domains, such as objects or emotions (Jarvis & Pavlenko, 2008). A detailed account on

similarities and differences between rethinking for speaking and conceptual transfer can be found in Jarvis (2011), Odlin (2005), and Treffers-Daller (2012). Differences notwithstanding, in both approaches, the encoding of "outer world" experience is subject to language-specific constraints. These constraints result from the size of the lexicon and from the availability of certain grammatical categories. In a similar vein, von Stutterheim and Nüse (2003) argue that "differences in the organization of information in texts are rooted in structural contrasts between languages" (p. 851). In the framework of Levelt's model of speech processing (1989), this means that processes in the conceptualizer at least are partly language specific. Thus, language specificity already starts when speakers select what to talk about and how. Studies applying Talmy's typology, Slobin's Thinking-for-Speaking, and the conceptual transfer hypothesis as a basis to account for phenomena in L2 acquisition have shown varying outcomes as to whether or not the patterns of information selection, as acquired in the L1, play a role in the acquisition of motion events in an L2. As mentioned in Cadierno and Ruiz (2006), other factors, e.g. the level of proficiency, might crosscut the influence of typological membership. Furthermore, as described in great detail in Jarvis and Pavlenko (2008), transfer rooted in the selection of information is only one possible type of transfer. Other types include morpho-syntactic transfers or phonological transfers.

Vulchanova et al. (2012b) and Goschler (2009) did not find crosslinguistic influence of the L1 on the L2 in the context of motion events that could be based on typological differences. Other studies, however, argue for a crosslinguistic influence rooted in linguistic conceptualization: Daller et al. (2011) and Schroeder (2009) for German-Turkish bilinguals, Reshöft (2011) for Romance learners of English, Carroll et al. (2012) for French learners of English and German, Hijazo-Gascon (2011) for German, Italian and French learners of Spanish, and Cadierno (2010) for Russian, German and Spanish learners of Danish.

There is thus a divide between studies that find an influence of the L1 on the L2 that is conceptual in nature, and those that do not. The studies that do not find an influence include the constellation L1 V-language – L2 S-language and learners (Vulchanova et al. 2012) vs early bilingual speakers (Goschler 2009). This constellation is found as well in those studies that do find an influence (e.g. Schroeder 2009 for bilinguals and Cadierno 2010 for L1 V-language – L2 S-language). A focus on the L2 expression of semantic components might help to cross this divide.

4. Path of motion in Danish, Turkish, and German

Before presenting the method and findings, we will briefly discuss the structure of the languages used in this study.

4.1 Turkish

Linguistic means to express Path of motion in Turkish are verbs, local nominals, local adpositions (prepositions or postpositions), and case marking. Most typically, Path is expressed in the root of the main verb, e.g., *inmek* 'move down' and *dönmek* 'turn', making Turkish a V-language. Case marking can be used to distinguish between static location, -DE (3), and directional interpretation relative to the goal, –E (5), or source, -DEn (4) (Kornfilt, 1987, Becker, 1994; Moser-Weithmann, 2001). According to Becker (1994), the "relatum," or the Ground, can often be implicit.

(3) *kitap raf -ta*	(4) *ev-den çık-tık*	(5) *kitap raf-tan yer-e düş -tü*
book shelf-LOC	house-SOURCE leave-PAST	book shelf-SOURCE floor-GOAL fall-PAST
'the book is on the shelf'	'we left from the house'	'(the) book fell from the shelf to the floor'

Furthermore, to express the relation of the moving Figure and the Ground more specifically, locative adverbials can be used, such as *iceri* 'into', *disari* 'out', *yukari* 'up', *asagi* 'down', *ileri* 'forward', and *geri* 'backward'. These forms can also take nominal inflections. It is thus possible to express several Path segments in a complex fashion (6):

(6) *geyik (...)çocu-ğu baş:ın-**dan asağı** at-ıyor*

 deer (...) boy-ACC its :head -**ABL downwards** throw-pres.PROG.3

'(The) deer throws the boy **down from** his head'. (Aksu-Koç, 1994: 354)

The expression of several Path elements is atypical for a V-language, but it has been shown to occur in other V-languages, too, e.g., in Basque (Ibarretxe-Antuñano, 2004, 2009) and Italian (Hijazo-Gascón & Ibarretxe-Antuñano, forthcoming). Akşu-Koç observed that in the narration of the frog story, speakers of Turkish showed a tendency to express a static Ground, as marked by –DE. The availability of locative inflections might predispose Turkish speakers to mention source and goal explicitly. Slobin (2004) speculates that this use of productive verbal morphology seems to compensate for lack of lexical richness.

4.2 German

Linguistic means for the expression of Path of motion in German are prepositions, separable and inseparable verb particles, case marking, adverbs, and some few Path verbs. Typically, Path is marked outside the verb, in the Ground prepositional phrase (PP) (7). German also allows for a more complex motion construction, with a PP as well as an adverb (8) (Berthele, 2006). Thus, German belongs to the S-languages.

(7) *Der Frosch hüpft in das Glas.*	(8) *Der Frosch hüpft ins Glas rein.*
ART:DEF frog jump-PRES into ART:DEF glass	ART:DEF frog jump-pres1sg into-ART:DEF glass into
'The frog jumps into the glass'.	'The frog jumps into the glass into'.

4.3 Danish

Linguistic means to express Path in Danish are prepositions, adverbs, and, to some degree, nominal constructions. The typical expression of Path in Danish is achieved by a combination of a particle and a preposition, rendering a complex path description:

(9) *Hun kravler op på stolen.*

   She crawl-pres up onto chair-ART:DEF.

   'She crawls up onto the chair'.

As Sinha et al. (1994) point out, "Distributionally, Danish [...] encourages a higher degree of specification or semantic profiling of the semantic relations that are encoded" (p. 265). This idea is also expressed in Sinha and Kuteva (1995) in that distributed spatial semantics "permit[s] the Danish speaker to profile path, goal, and configuration to a greater extent than [...] the English speaker" (p. 261). According to Hovmark (2009), it is necessary to relate the space the moving Figure is moving in to: a) the starting point of the Figure as well as b) to an estimated endpoint or continuation of the movement. Harder et al. (1996) have pointed out that transitional adverbs cannot be omitted when they occur in a certain context. They argue that speakers of Danish have to specify the "subjectively conceived spatial location" and a "specific directionality within the subjectively conceived space." The analysis of our data confirms this. Since Danish marks Path outside the main verb, it belongs to the S-languages (Cadierno, 2010).

5. The study

Previous studies investigating the L2 expression of motion events have mainly focused on whether or not L1 preferences for a mapping between form and meaning had an influence on the L2. Few studies have addressed how the L1 patterns for the selection of more-specific meanings (such as the selection of subcomponents of Path) influence the expression of a motion event in an L2. In the process of verbalizing a motion event, speakers have to "plan" if a trajectory is to be expressed, whether this trajectory is simple or complex, and which meanings of Path are to be expressed. Hence, we ask how learners in their L2 tackle these steps and whether or not the L1 has an influence on these selection processes. In Danish, Path is expressed frequently and in a complex fashion, by the use of two lexicalized Path devices. In German, Path is expressed frequently, but in a simple fashion, by the

use of one lexicalized Path device. Finally, in Turkish Path is expressed less frequently and in a simple fashion. Thus, the constellation between L1 German, L1 Turkish, and L2 Danish allows us to test how L2 learners tackle the transition from a simple to a complex system for form and meaning alike. We addressed the following research questions:

RQ 1: Do the participant groups (i.e., the Danish native speakers (NS), the German NS, the Turkish NS, the German learners of Danish, and the Turkish learners of Danish) differ with respect to the overall frequency of expression of Path? What is the proportion of Path in all the descriptions?

RQ 2: How complex are the descriptions of Path used across the five groups? How many different Path devices are expressed?

RQ 3: What meanings/subcomponents of Path are expressed?

RQ 4: How can we account for differences between Danish native speakers and the learner groups' production of Danish as an L2?

6. Method

6.1 Participants

A total of 99 informants participated in the study, including native speakers of Danish (n 21), German (n 25), and Turkish (n 25); German learners of Danish (n 14); and Turkish learners of Danish (n 14). The participants were asked to fill out a linguistic background questionnaire, based on The Language Background Questionnaire (Gullberg & Indefrey, 2003). They generally reported a good to very good knowledge of English.

Participants belonging to the L2 informant groups used Danish at their work place and interacted with Danes on a daily basis. Most Turkish participants (n=11) and most German participants (=n13) took a placement test based on DIALANG (Alderson, 2006). A nonparametric Wilcoxon test suggests that the means of the two populations are comparable. Table 1 summarizes the biographic information for

the learners. One German learner and three Turkish learners did not complete the placement test. They were included in the sample based on their self-assessment, researcher assessment by means of an oral interview, and high reported use of the target language.

	German learners			Turkish learners		
	Mean	Range	SD	Mean	Range	SD
Prof test %	83.07	58.7–94.7	10.43	75	58.7–92	10
Age	33	22–55		34.7	26–58	
Length of residency	5.7	1–19	5	11.5	1.5–33	9.5

Table 1. Biographical information summary.

6.2 Stimuli

The stimuli in this study were 37 video clips, each 3- to 4-seconds long, showing a great variety of motion events performed by humans, primates, and a range of different animals (Vulchanova et al., 2012a). Originally designed to map out the Manner verb inventory across different languages, the videos also lend themselves to the examination of the expression of Path because a) the descriptions of the informants included more than just Manner information and b) the descriptions of German and Danish NSs included a high degree of Path description, as opposed to a lower number in Turkish L1 descriptions. This fact provides a good testing ground to see how Turkish learners of Danish handle the expression of Path in Danish as an L2. The video clips were embedded in a Web page with instructions in the native language of the L1 informants and in Danish for the learner groups. Participants viewed each clip as often as they liked and typed their answers into a response box. The L1 informants answered in their native language; the learners answered in Danish. The response box was preceded by the appropriate translation of "please, describe what you see".

6.3 Coding across the five groups

The focus of this study is on the expression of Path. As described by Sinha and Kuteva (1995), Path information can be distributed across different word classes. Accordingly, we base our Path count on

all lexical form classes that can express Path. In detail, they include adverbs, prepositions, and a few verbs in Danish; verbs, adverbs, and prepositions in German; and verbs, adverbs, and morphological inflection in Turkish. Taking Danish as a point of departure, we derived five complexity categories (Table 2): simple *(s)* if the Path description contained only one Path device, complex redundant *(cr)* if the Path description contained two Path devices describing the same meaning, and complex complementary *(cc)* if the Path description included two Path devices with different meanings. If the Path description contained three or more Path devices, it belonged to the multi-complex category *(ccc)*. The category "other" *(o)* contains Path descriptions that are very infrequent and not part of the dominant coding strategies of the languages, e.g., *den ganzen Weg hüpfen* 'jump all the way'. Examples as to how we applied the complexity categories for the five languages are described in the coding section below.

Category	Number of Path devices	Examples
simple *(s)*	1	der koala klettert **auf** den Baum ART koala climb-PRES up ART.DEF.ACC tree 'the koala climbs **up** the tree'
other collapsed (nominal devices etc.)	1–3	Der Frosch ist **den ganzen Weg** gehüpft. ART frog is ART.DEF.ACC whole way jumped ' The frog jumped **the whole way**'
complex complementary *(cc)*	2	koalaen kravler **op ad** træet koala-ART crawl-PRES up along tree-ART 'The coala crawls **up along** the tree'
complex redundant *(cr)*	2	der Koala klettert **auf** den Baum **rauf** ART koala climb-PRES up ART.DEF.ACC tree up 'The koala climbs **up** the tree **up'**
3 or more Path devices (ccc)	3	koalen kravler **ned ad fra** toppen koala-ART crawl-PRES down along from top-ART 'The koala crawls **down along from** the top'

Table 2. Complexity categories across languages; Path devices in bold.

6.3.1 Coding Danish: We have considered two Path devices in the most frequently appearing construction Vmanner+particle+P: *løbe ind i skoven* 'run into into the forest', the particle and the preposition. We furthermore made a distinction whether particle and preposition referred to the same "direction" (complex redundant, *cr*) or different ones, as in *ud i havet* 'out into the sea' (complex complementary, *cc*). In the case of constructions with only a preposition (typically either *gennem* 'through' or *over* 'across/through'), we counted one Path device, (simple, *s*). In this, we follow Berthele (2006), who applied a similar distinction for a Swiss-German variant.

6.3.2 Coding German: Most of the German speakers' descriptions followed a simple pattern *(s)*: *das Krokodil geht ins Wasser* 'The crocodile walks into the water'. For these instances, we counted the preposition as one Path element. Some instances showed a construction like *auf den Baum rauf* 'up the tree up'. Following Berthele (2006), we assume that there is no semantic spatial distinction between *auf den Baum* 'up the tree' and *auf den Baum rauf* 'up the tree up' and counted the preposition and the adverb as referring to the same "direction", complex redundant (*cr*).

6.3.3 Coding Turkish: As a V-language, Turkish can express the Path in verbs. Additionally, there are three case suffixes that can be interpreted locally (-dE) or directionally (-E goal and –dEn source) (Kornfilt,1987; Becker, 1994). We counted each of these element as one Path device. In order to specify space in more detail, directional nominal adverbials can be used, e.g. *iceri*: insideness (see section 4). These can be combined with the directional case suffixes. Similar to this class is *doğru:* straightness. Thus, example (6) contains two Path devices: *baş:ın-dan asağı at-ıyor* 'from his head down'. As outlined in Aksu-Koç (1994), Path verbs can be used in combination with directional locative inflections and directional adverbs, thus making it possible "to present several Path segments in a compact fashion," as summed up by Slobin (2004). This is represented in coding categories as "*cc*", complex complementary, and "*cr*", complex redundant.

7. Results

We first focused on the overall expression of Path and examined how many scene descriptions included one or more Path devices, independent of the locus of Path expression. Second, we looked at how structurally complex the descriptions were with respect to Path. Third, we looked at which meanings the Path devices encoded. For all aspects, we first report on the NSs' descriptions, followed by the descriptions of the two learner groups and the across-group comparisons.

7.1 Overall frequency of Path

Our first analysis focuses on whether or not one or more Path devices have been expressed across the five groups. Table 3 gives an overview of the results:

	Danish NS (n=21)	German NS (n=25)	Turkish NS (n=25)	German L1/Danish L2 (n=14)	Turkish L1/Danish L2 (n=14)
Path %	52.77	64.22	30.6	49.81	21.43
# Scene descriptions	777	925	925	518	518
# Path mention absolute	410	594	283	258	111

Table 3. Overall Path frequency, i.e., Path mentions in relation to all descriptions.

Regarding the NSs, the highest proportion of Path mentions can be observed for the German NSs, mentioning Path in 64.22% of all their descriptions, followed by the Danish NSs with 52.77%, and the Turkish NSs with 30.6%. In cases when Path is not expressed, descriptions across all groups include motion verbs and either static or no ground descriptions or descriptions that did not contain motion. With respect to the learner groups, German learners of Danish expressed Path in 49.81% of their scene descriptions. The Turkish learner group displayed the lowest proportion of Path mentions with 21.43%. Chi-square tests and comparisons across groups showed significant differences regarding the overall expression of path, except for the comparison between Danish NS and German learners (Appendix A).

The low values for overall Path expression for Turkish NSs and Turkish learners of Danish can be accounted for in terms of a preference for the description of a static Ground, as encoded by *–DE* in

L1 Turkish and the frequent use of *på* 'on' in the descriptions of the Turkish learners. Note that Turkish NSs frequently use Manner verbs in their descriptions, probably because of the nature of the videos. The high number of Manner verb tokens can be considered as an artifact of the stimuli.

Overall, we can summarize that Danish NSs, German NSs, and German learners of Danish express Path very frequently, i.e., they display a high frequency of Path expression. Conversely, Turkish NS and Turkish learners of Danish do not express Path very frequently, and thus display a low frequency of Path expression.

7.2 Degree of Path complexity across groups

In this section, we first provide a description of the behavior of speakers in each group regarding how structurally complex their descriptions are by using the coding categories outlined in section 3. In order to show the distribution of complexity categories within each group, absolute numbers are presented in Figure 1 for the NS groups and Figure 2 for the learner groups.

7.2.1 Native speakers: Danish NSs preferred to express Path in a complex construction with two complementary Path devices, noted as *cc* (Figure 1). Typically, the *cc* construction consisted of Vmanner+adverb+PP. The second-most-frequent type of Path expression used by Danish NSs was the simple Path category *s*, represented as Vmanner+PP. In most cases, the simple pattern was realized by the use of *gennem* 'through'. To illustrate the use of *cc* and *s,* the five most-frequent Path devices used by Danish NSs were *hen over cc,* 'horizontal transition across'*,* 64 mentions; *gennem s,* 'through/across', 38 mentions; *rundt om cr* 'around around', 28 mentions; and *ned ad cc* 'down via', 22 mentions. German NSs clearly preferred the expression of Path in a single element (Figure 1). The structure reflecting this preference was Vmanner+PP, as in (7). There were very few occurrences of more complex constructions. Turkish NSs most frequently expressed one Path element (Figure 1). Typically, this element was represented in the use of a Path verb plus a stationary Ground description:

+N-DE+Vpath, as in (2). The second-most frequent construction used was complex, containing two complementary Path devices, Vpath+(y)E or –DEn.
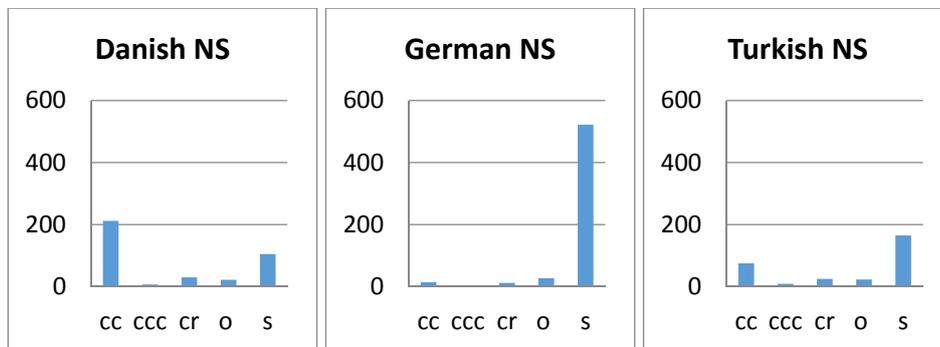

Figure 1: Path complexity in NS groups, absolute numbers
Note:cc-two complementary path devices, ccc-three path devices, cr-two redundant path devices, o-nominal path devices, etc., s-single path device).

7.2.2. Learner groups: Figure 2 shows the preferred degree of Path complexity for the learner groups. The German learners preferred a simple construction *(s)* in their L2 Danish descriptions, encoded by a Vmanner+PP construction. The single path device is realized in the preposition. The forms most frequently filling the P slot were *gennem* 'through' and *over* 'across'. The use of *gennem* 'through' in the German learners' production is not the same as in the Danish NSs' production, since the two groups used it in the description of different scenes. Furthermore, the use of *over* 'across' (29 times) without an additional Path device, as frequently applied by the German learners (10), is absent in the Danish baseline data. The Turkish learners preferred a simple expression of Path, V+PP, as in (11). The second-most-frequent construction used by the Turkish learners of Danish was a complex construction consisting of an adverb and a preposition providing complex complementary Path information (*cc*).

(10) *en kamelion klættrer rolig over græne*	(11) *en abe kravler ned et træ*
a chameleon climb-PRES quiet along/across twig	a monkey crawl-PRES down ART:INDEF tree
'a chameleon climbs slowly along a twig'	'a monkey crawls down a tree'

Figure 2 shows Path complexity across learner groups in absolute numbers.
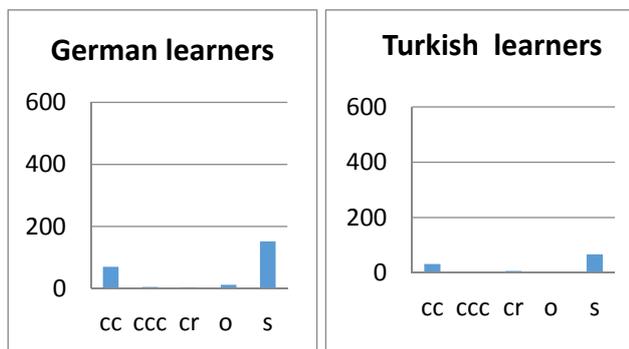
Figure 2. Path complexity in learner groups, absolute numbers

Note: *cc*-two complementary path devices, *ccc*-three path devices, *cr*-two redundant path devices, *o*-nominal path devices etc., *s*-single path device.

To sum up, our results regarding degree of Path complexity, indicated that German NSs, German learners of Danish, Turkish NSs, and Turkish learners of Danish tend to encode Path in a single device *(s)*, i.e., they show a low Path complexity. Conversely, Danish NSs prefer a complex expression of Path, using two Path devices, i.e., they display a high complexity of Path expression. Typically, the two Path devices have different meanings.

7.3 The meaning of Path devices

In this section, we examine the meaning of the Path devices employed for the descriptions of two selected scenes. In the "koala scene," a koala is climbing up a tree; in the "crocodile scene," a crocodile is walking on a beach towards the sea. The two example scenes (Figure 3) were selected because they display different vectors and different options with respect to a possible goal/endpoint encoding. They thus give us the possibility to compare all these aspects in the descriptions of the five groups. Appendix B includes screenshots of all 37 scenes. Unfortunately, due to space restrictions, only two scenes can be analyzed here. They nevertheless are representative of overall tendencies. First, the Danish baseline description is presented, followed by the baseline data for German and Turkish, and lastly the learner data.

Figure 3. Screenshot of koala and crocodile scenes.

Danish NSs used a complex construction with a particle and a preposition, providing complementary information to describe both scenes, illustrating the high degree of Path specificity in Danish, as represented by examples (12–13):

(13) *En koala bjørn der kravler op ad et træ.* ART:DEF coala bear PRON:REL crawl-PRES up along ART:INDEF tree 'A koala bear that crawls up along a tree'.	(14) *En aligator går ud i vand-et.* ART:INDEF aligator walk-PRES out into water-DEF 'An alligator walks out in the water'.

In (12), a movement on an upward axis is expressed, *op* 'up', together with a Path scheme assigning a via, *ad* 'along' (11 occurrences) or *i* 'into' (10 occurrences). In (13), a movement away from a container, *ud* 'out', into another container, *i* 'into' (7 occurrences) or towards a goal *mod/til* 'towards' (5 occurrences) as in *ud mod/til vandet* 'out towards the water' are expressed.

The German NSs preferred simple constructions for the same scenes; representative examples are (14) and (15):

(14) *Ein Koala kletter-t ein-en Baum hinauf/hoch.* ART:INDEF coala climb-PRES ART:INDEF-ACC tree up 'A koala climbs up a tree'.	(15) Ein Krokodil läuft in-s Meer. ART:INDEF crocodile walk/run into-ART:DEF:ACC sea 'A crocodile walks/runs into the sea'.

In (14), Path is expressed by means of an adverbial accusative and an adverb indicating an upwards vector, *hinauf/hoch* 'up' (18 occurrences). In (15), the conformation component *in* 'into' is expressed in a PP (10 occurrences). Alternative descriptions included *zu* 'to' (7 occurrences).

135

The Turkish NSs preferred a complex expression of Path for the two examples scenes, as shown in examples (16) and (17). This is the second most frequent complexity pattern.

(16) *Koala ağac-a tırman-ıyor.*	(17) *Timsah suy-a doğru yürüyor.*
koala tree-GOAL climb.up-PRES.PROG	aligator water-GOAL straight walk-
'The koala is climbing up the tree'.	PRES.PROG
	'The alligator is walking straight to the water'.

In (16), complexity resulted from a specification of a goal, *-a*, and an upwards vector expressed in the verb, *tırman-* 'climb up' (25 occurrences). For the crocodile scene, most of the Turkish speakers described a goal, *-a*, and a vector, *doğru* 'straight' as in (17) (24 occurrences).

The German learners' data showed a relatively high variability. Nevertheless, the preferred pattern was a simple Path expression *(s)* for both scenes.

(18) *En koala klatrer op en træ.*	(19) *Krokodilen går i vandet.*
ART:INDEF koala climb-s up ART:INDEF tree	crocodile-art:def walk-pres in water-art:def
'A koala climbs up a tree'.	'The crocodile goes in the water'.

Seven descriptions included a vector *op* 'up' (18) as the only Path device. In typical descriptions of the crocodile scene (19), the German learners expressed a conformation, *i* 'into' alone (4 occurrences), or a more complex pattern, *krokodillen går ind i vandet* (4 occurences) 'The crocodile goes into in the water'. Both kinds do not appear in the Danish baseline data. Another striking difference is that German learners only used *hen* "horizontal:translocation" in 9 cases, whereas in the Danish baseline data *hen* is used 85 times. In these cases, German learners used a simple *over* 'over' or *gennem* 'through'.

The data for the Turkish learners of Danish showed a relatively high variability, too. The preferred pattern was a simple Path expression *(s)* for both scenes.

(20) *En lille bjørn kravle-r op på træ* ART:INDEF little bear crawl-PRES up on tree 'A little bear crawls up on tree'.	(21) *En varan gå-r imod hav-et.* ART:INDEF varan walk-PRES towards sea- ART:DEF 'A varan goes towards the sea'.

For the koala scene, most descriptions of the Turkish learners included the upwards vector *op* 'up', (4 occurrences) often in combination with *på* 'on' as in (20) (4 occurrences). For the crocodile scene, two Path devices were prominent in the Turkish learners' descriptions: *til/mod* 'towards', expressing a goal (6 occurrences) (21), and *ind/i* (4 occurrences) 'in', expressing a conformation. Other descriptions by the Turkish learners included *på* 'on' with a static meaning: *går på træ* 'walks on tree' or *går på stranden* 'walks on the beach'. Table 4 gives a summary of the preferred Path semantics expressed by the five groups.

Group	koala scene	crocodile scene
German NS	*rauf/hoch* (vector up)	*rein* (conformation into)
German Learners	*op* (vector up)	*i* (conformation into)
Danish NS	*op ad* (vector up + medium/via)	*ud i* (conformation out of + conformation into)
Turkish learners	*op på* (vector up + location)	*til/mod* (goal)
Turkish NS	*-a tirman-* (goal+vector up)	*-a doğru* (goal + vector horizontally)

Table 4. The meaning expressed in the Path devices.

7.4 Across-groups comparison for the three aspects

The relevant across-group comparisons can be derived from the suggestions made by Jarvis (2000) regarding methodological rigor. We compare the learners' descriptions to the Danish baseline data to see if they differ for the relevant aspects. In order to establish if possible differences are due to crosslinguistic influence, we compare the L1 and L2 production of the learners to see if there are similarities. Similarities between L1 and L2 descriptions can be interpreted as one indicator of crosslinguistic influence. Additionally, we compare the two learner groups to each other to see if we

can establish inter-group heterogeneity (differences between the two learner groups in L2 production). Inter-group heterogeneity is another indicator of crosslinguistic influence. We have already established intra-group homogeneity (similarities in the L2 production of learners with the same L1 background). Table 5 summarizes the results for overall Path expression and Path complexity.

	L1 German	German learners L2 Danish	L1 Danish	Turkish learners in L2 Danish	L1 Turkish
Freq. of Path expression	high	high	high	low	low
Path complexity	low (s)	low (s)	high (cc, cr, ccc)	low (s)	low (s)

Table 5: Summary of results for overall Path expression and Path complexity.

Comparisons between both learner groups and the Danish baseline data revealed the following results. Regarding the frequency of Path expression, a comparison between the German learners' production data and the Danish baseline data shows that both groups exhibit a high frequency of Path expression. Regarding the degree of Path complexity, a difference can be observed in that the descriptions of the German learners show a low Path complexity, contrasting with a high Path complexity in the Danish baseline. A comparison between the Turkish learners' production data and Danish baseline data revealed differences in both aspects. Regarding Path frequency, Turkish learners display a low overall frequency of Path expression in contrast to a high frequency of Path expression in the Danish baseline data. Regarding Path complexity, Turkish learners preferred a low degree of complexity, whereas Danish NSs preferred a high degree of complexity. Comparisons between L1 and L2 data revealed the following results: The comparison between German learners and German NS data shows similarities, both regarding the Path frequency and Path complexity. Likewise, a comparison between Turkish learners and Turkish NSs revealed similarities in that both groups show a low frequency of Path expression as well as a low degree of Path complexity. However, complex Path descriptions are the second-most frequent pattern in both groups. Finally, a comparison between German learners and

Turkish learners showed that German learners describe Path more frequently. Both groups prefer simple Path encoding.

Regarding the semantic content of the Path expression, we shall apply the same comparisons across groups. Table 4 summarizes results for the meaning expressed in the Path devices to facilitate these comparisons. Both learner groups diverged from the Danish baseline regarding the complex meaning of the Path expressions. Compared to the descriptions of the Danish NSs, the descriptions provided by the German learners were syntactically less complex. Consequently, the German learners only expressed part of the complex Danish Path description (the upwards vector). However, the one Path device employed by the German learners overlapped part of the meaning expressed in Danish. The Turkish learners provided descriptions that in general were less complex syntactically, too. In the koala scene, they assigned partly the same meaning as the Danish NSs (vector up). The upwards vector was also expressed in the Turkish L1 data. Furthermore, for the crocodile scene, Turkish learners expressed a goal component. Such a component was not present in the Danish baseline data, but frequently expressed in Turkish L1 data. Thus, the learner groups differed from the baseline data and for the crocodile scene from each other regarding the meanings chosen for Path expression. A comparison of the learner groups to the learners' L1 baseline data revealed the possible sources for variation regarding the meaning of the Path expression: the components that were expressed in the L1 data were expressed in the learners' L2 Danish production.

8. Discussion

We examined if German and Turkish learners are influenced by their L1 in the expression of motion events in Danish as an L2. We considered three aspects: overall Path frequency, Path complexity, and meaning of the Path expression. We identified similarities and differences between learner patterns and Danish baseline patterns. Overall, crosslinguistic influence can be seen as the driving force behind the expression of motion in the L2 on all three aspects.

Regarding the overall frequency of Path expression, the results show that German learners differ from Turkish learners. Overall, the German learners expressed Path as frequently as the Danish NSs. Thus, it may seem that they have mastered the expression of Path to some degree. However, as will be described below, the German learners have not yet mastered the degree of complexity and the correct content of the Path construction in their L2 Danish description.

Overall, the Turkish learners express Path to a much lesser degree when compared to Danish NSs, but in concordance with the Turkish L1 baseline descriptions. Both Turkish groups prefer the expression of a location. It appears that the choice of whether or not to express a Path or location in the description of a scene in L2 Danish is guided by the learners' L1 filter. The frequent expression of a static Ground by both Turkish groups is in line with previous findings in the literature (e.g., Slobin, 1996; Aksu-Koç, 1994; Carroll et al., 2012). For example, *ilerlemek* 'move forward' was the most frequently used verb in the Turkish baseline data and appeared in the construction type Vpath+– DE (locational suffix), e.g. *ağaç-ta ilerlemek* 'on tree move forward'. In Danish, a corresponding Path verb does not exist, but learners used the construction *gå* + *på* 'on' in corresponding scenes. Elsewhere we have therefore argued that *gå* acts as a placeholder for Turkish Path verbs in Danish L2 production (Jessen & Cadierno, forthcoming; also Cadierno, 2010). In Turkish, other Vpath constructions involve morphological case marking, typically adding Path information, e.g., *ağac-a tirmanmak* 'climb up to the tree' or *ağac-tan inmek* 'move down from the tree', creating complex path descriptions. These constructions cannot be used with the locational suffix –DE. Descriptions of scenes containing a complex Path description, that is Vpath + nominal path marking, in the Turkish baseline data were more likely to yield an explicit Path element in the L2 Danish descriptions than L1 descriptions of scenes containing only a single Vpath + locative –DE. This suggests that a higher degree of complexity in the expression of Path in the L1 increases the likelihood for explicit expression of one or more Path devices in Danish L2. This observation points to the intricate interplay

between structural properties and semantic conceptual properties. Overall, the overt expression of Path seems subject to transfer for the Turkish learners of Danish. However, it is difficult to assess whether this transfer is only morpho-syntactic in nature or reflects L1 TfS patterns.

Regarding the degree of Path complexity, results show that both learner groups prefer to express one Path device in their L2 production. This preference is also evidenced in the German and Turkish L1 data. However, the Danish baseline data shows a complex Path-encoding pattern. The two learner groups did not show difficulties regarding the locus of expression. We can thus assume that learning the appropriate L2 lexicalization patterns with Path outside the main verb is not difficult (Vulchanova et al., 2012b). The difficulty for the learners seems to lie in the information selection process, i.e., how many meanings of Path should be selected and expressed. In the TfS framework, this process of information selection is represented as an intricate interplay between linguistic structure and online linguistic conceptualization. As demonstrated in Stutterheim and Nüse (2003) and Bylund and Jarvis (2011), structures are not autonomous, but rather are reflections of linguistic conceptualization. In our case, the morpho-syntactical influence of the L1, i.e., the preference for encoding a simple Path device, has a negative effect on the encoding in the L2, leading to a lack of Path information.

Comparisons across groups regarding the meaning of the Path expressions reveal different preferences for the two scenes investigated. Since the German learners only expressed one Path device, they did not express all the Path semantics provided by Danish NS. They preferred the expression of a simple Path device. The meaning selected for expression is the same in the German learner and the German L1 data. Turkish learners expressed a goal component of Path, which was rare in the Danish baseline data but occurred frequently in the Turkish NS data. Thus, regarding the meaning of Path, both learner groups displayed a reliance on the meanings expressed in the L1s when expressing Path in L2 Danish. In Vulchanova et al. (2012b) the focus was on the locus of Path expression, rather than on Path semantics. However, a closer look at the prepositions used by the

Bulgarian learners to express Path in L2 Norwegian reveals that the learners chose items that differed from the lexical items chosen by Norwegian NSs. Equally, in the study by Carroll et al (2012), the non-target like selection of meaning components in the encoding of motion is identified as a reason why very advanced French learners of German or English still do not sound native-like. This non-targetlike selection has its roots in the meaning selection patterns of the learners' L1s.

As described above, this reliance on an L1 pattern of meaning selection is sometimes considered evidence for a reflection of L1 TfS patterns in the L2. Critical claims have been made as to whether differences between an L1 and L2 "regarding linguistic repertoires result in mere surface differences in speech and rhetorical styles, and to what extent, if any, such differences reflect a deeper difference in what information speakers attend to and consider in their construals of events" (Gullberg, 2011). Similarily, Schmiedtova (2011) raises the question whether linguistic results can be taken as evidence for a restructuring in non-linguistic domains. In order to resolve this question, Gullberg (2011) and Brown & Gullberg (2010), among others, use an analysis of speech accompanying gestures as a possible window to conceptualization. Similarly, Schmiedtova (2011) assumes that "eye movements during event conceptualization provide a window on underlying event representations" (p.141) and includes gaze patterns in her analysis.

Thus, we state that there is an influence of the L1 on the L2 that can be called L1 TfS in an L2 or Conceptual Transfer in the respective frameworks. We agree that the augmentation with multiple modalities would enrich studies that ask "Do learners think in their L1 when using the L2?"

9. Conclusion

We asked whether learners think in their L1 when using the L2 or whether learners rethink for speaking. By investigating German and Turkish learners of Danish, we examined three aspects that could help illuminate this question: overall Path frequency, Path complexity, and the meaning of Path. In order to describe a motion event, speakers plan the expression or "non-expression" of a trajectory,

whether this trajectory should be simple or complex, and which subpaths are to be selected for expression. We find that the driving force behind the expression of motion in Danish as an L2 is a reliance on preferred planning and selection patterns observed in the L1. These three steps are mutually dependent. Overall, the fact that L1 influence seems present in each step reflects how the interplay between form and meaning is carried over as a whole to the L2. Whereas it becomes obvious that all learners in the study master the locus of expression of Path, it is difficult for the Turkish learners of Danish to find out when to express a Path. Furthermore, it is difficult for Turkish and German learners to master the degree of complexity and the meaning selection for the typical Danish Path expressions. This is in part due to a lack of frequency and complexity of the Path expression in the L1s and in part due to preferences of Path meaning selection in the L1, when the Path meaning selection differs from Danish. In conclusion, this study shows that the expression of Path in an L2 is subject to L1 influence on different levels, which are mutually dependent. Specifically, the L1 influence not only presents itself as a different form-meaning mapping, rather it is present in the selection of specific meaning for expression. In order to determine whether learners rely on their L1 as a resource in L2 acquisition of motion and the exact nature of this reliance, it would be beneficial not to stop at the examination of lexicalization patterns but to go further and examine the meanings that underlie the lexicalization patterns. This raises the question regarding how exactly the three aspects we examine are interrelated: in the planning process, does the selection of the explicit encoding of a Path element precede the selection of degree of complexity? Can the degree of complexity be established before selecting meaning(s) for the Path expression? This opens the subject for further explorations of a speech production model for L2 learners. Finally, S-languages have been shown to express manner to a higher degree than V-languages (Özçalışkan & Slobin 2003). The question of how learners of Danish as an L2 express the Manner component in the L2 is interesting and subject to another study.

Acknowledgements

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Appendix A: Results for the Chi-square tests

Comparison	x-square results
Danish NS-German NS	x-squared = 45.9303, df = 1, p-value = 1.225e-11
Danish NS-Turkish NS	x-squared = 46.8347, df = 1, p-value = 7.723e-12
Danish NS-German learners	x-squared = 0.1541, df = 1, p-value = 0.6947
Danish NS-Turkish learners	x-squared = 96.2956, df = 1, p-value < 2.2e-16
German NS-German learners	x-squared = 41.4605, df = 1, p-value = 1.203e-10
Turkish NS-Turkish learners	x-squared = 18.6742, df = 1, p-value = 1.551e-05
German learners-Turkish learners	x-squared = 76.4862, df = 1, p-value < 2.2e-16

Appendix B: Snapshots of the 37 video clips used in the study

baby	woman	tortoise	caterpillar	race walk
beetle	man on floor	snake in grass	snake in desert	baby on tiles
sloth	koala	koala	penguin	platypus
baby turtle	mudhopper fish			
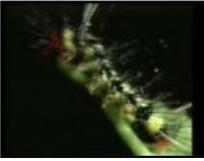
Study 4: Jessen, M. The expression of Manner in L2 Danish by German and Turkish learners (to be submitted)

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The expression of Manner in L2 Danish by German and Turkish learners

1. Introduction

In the seminal work of Talmy (1985, 2000a, b), in the expression of motion events, experience is categorized into six basic cognitive components: Path, Figure, Ground, Cause, and Manner. Path is considered the main component, or the core, of a motion event. Manner, on the other hand, is an optional component that does not necessarily need to be expressed. Because of the morpho-syntactic constraints of S-languages that allow the expression of Manner in the verb, Path is expressed outside the verb. Thus, the frequent expression of Manner has been described as a typical feature of S-languages. In contrast, the expression of Manner is said to be more difficult to process and express in V-languages since it might require the construction of subordination. Languages vary, therefore, with respect to the degree in which Manner is expressed. Slobin (1996) claims that if Manner is expressed frequently, this increases the degree of attention paid to Manner. This is also reflected in the fact that Manner verbs occur very frequently in S-languages, with a rough estimate of several hundred verbs in the lexicon, whereas the number of Manner verbs assumed for V-languages is about a hundred. This difference in inventory leads to verbs that are very specific and can be used to describe fine-grained Manner distinctions (second tier) (Slobin, 2006). V-languages are said to comprise mainly first-tier verbs in their lexicons, whereas S-languages employ both first- and second-tier verbs much more frequently. Keeping in mind these typological differences in monolingual expression of motion, this study focuses on the expression of Manner in the description of motion events. Special focus is set on whether or not the first language (L1) influences the expression of Manner in the second language (L2), exploiting the typological differences in the set-up of the study, with both inter- and intratypological L1s of the learners.

To that end, we examine the frequency with which Manner is expressed in relation to all the descriptions we elicited. From this broad view, we will zoom into the preferred morpho-syntactic means used to express Manner of motion. The goal is to understand the role of morpho-syntactic constraints on processability and ease of expression of Manner. Finally, we look at the actual Manner devices used with regard to the meaning expressed. We compare the production data of the native speaker groups to the production data of the L2 learners. The overall question we ask is if and how L2 learners from the same and L2

learners of a different typological background differ from the monolingual baseline data. In order to account for differences, we will scrutinize the role of morpho-syntactic features and codability in comparison to online attention.

2. Background

2.1 Lexicalization of Manner from a typological perspective

Talmy (1985, 2000b:25) defines a motion event as "containing movement or the maintenance of a stationary location" (Talmy, 1985:61) with Path as its basic element. Manner is the co-event, adding another cognitive dimension. In S-languages, Path is encoded outside the main verb in satellites. This leaves room for the expression of Manner in the verb, without much processing costs, i.e., "Manner for free" (Slobin, 2003). In V-languages, Path is encoded in the main verb, Manner has to be encoded in a subordinated verb or clause or adverbial. These different lexicalization patterns have consequences. Regarding Manner, one consequence is that Manner in V-languages is frequently implicit in the context or discourse or omitted because it is difficult to construct (Talmy, 1985:69). That means that despite the fact that all languages have the morpho-syntactic means to express Manner, they do not always do so (see also Slobin, 2003).

Slobin (2004b) this effect, comparing translations of the novel *The Little Hobbit*. Equivalents of the verb "climb" are translated to "verbs equivalent to descent in V-languages." Slobin further observes that in translation from V-language to S-languages, Manner verbs are added in the place of the original Path verb. Slobin agrees with Talmy in that the encoding of Manner depends on its codability. Two factors add to codability: the ease of processing and the relative weight of Manner info (syntax and discourse). Manner has a high codability if it can be encoded in the main verb. At the same time, what is encoded in the main verb is easily processed. Manner has a low codability if it has to be encoded in adverbials or subordinate verbs. The relative weight of Manner means that in S-languages, since Manner is expressed frequently in motion events, the absence of Manner is salient. So with the use of a Manner verb, Manner info is actually backgrounded. The absence of Manner is salient in an S-language. In V-languages, if Manner is expressed at all, it is often in "heavy" structures that arise as a result of a considerable amount of processing. These structures are marked and therefore salient. Based on these differences regarding codability, Slobin (2004b) proposes a Manner salience cline. In high Manner salient languages, Manner is easily codable; hence, there is no competition between

semantic components—both Manner and Path can be expressed. Some typical S-languages are not as Manner salient as predicted by Talmy's typology. As illustrated by Slobin (2004) with help of the famous owl scene, Manner is competing with deixis in German, where speakers have the option of using either *kommen* 'come' or a Manner verb plus the Path device. This option is not available for speakers of Slavic languages, since these do not have an independent *come* verb. For German speakers, the coding of Manner in the main verb might then depend on the conceptual properties of the event. In low Manner salient languages, Manner is not easily encodable in the verbs and therefore likely to be omitted.

The question that arises then has already been addressed prior to this study by Özçalışkan and Slobin (2003): namely, whether speakers of low Manner salient languages like Turkish encode Manner in devices other than the verb to a greater extent than speakers of S-language (as a kind of compensation). They found that Turkish speakers make use of the outside-verb coding option, but English speakers do so as well. This results in a higher Manner density in the utterances of English speakers. Turkish speakers use Manner devices together with neutral motion verbs or Path verbs. Thus, regarding adverbials, the same grammatical form serves different functions in the two languages: to augment Manner information in English and to introduce Manner information in Turkish, "compensating for what they cannot easily encode at the level of motion verb constructions" (p. 267). Another study that assessed the use of Manner devices is Naigles et al. (1998). They looked at the use of Manner modifiers (gerunds, adverbs, postpositional phrases) and found that these modifiers appear together with Manner verbs in English, but with Path verbs in Spanish.

Regarding the expressivity/types of Manner verbs, Slobin (1997) describes two different types of Manner verbs: first-tier verbs that are neutral for everyday activities, e.g., running, and second-tier verbs or Manner of motion verbs denoting more specific or "exceptional" motion, like dashing or scrambling. All languages are said to have first-tier Manner verbs, whereas, in general, V-languages do not have many if any second-tier Manner verbs. Consequently, the lexicon of V-languages is usually smaller with regard to Manner of motion verbs compared to S-languages (p. 172). An explanation offered by Slobin (1997) is that the expression of Manner is neutral in S-languages. That is, when Manner is salient, it needs to be marked explicitly by second-tier verbs that can express more fine-grained semantic features. Slobin (1997) underlines this by pointing out that one verb in a V-language can have many corresponding verbs in an S-language. Additionally, counting verb types in the translations and originals of novels, S-languages tend to use more Manner of

157

motion verb types than V-languages (Slobin, 2004a). Slobin (2006) estimates that in a V-language, about a hundred motion verbs exist, whereas there are up to several hundred in an S-language.

Furthermore, Aske (1989) and Slobin and Hoiting (1994) note that in V-languages, the use of Manner verbs in motion events is restricted to situations without boundary crossing. Thus it is possible to say "run in the park" (not leaving it) but not "run into the park". (Aske, 1989; Slobin & Hoiting, 1994).

Berman and Slobin (1994:640) discuss the impact of these typological patterns on (linguistic) cognition. They argue that:

> frequent use of forms directs attention to their functions perhaps even making these
> semantic and discursive especially salient on the conceptual level. That is, by
> accessing a form frequently one is also directed to the conceptual content expressed
> by that form. Since such content is organized, by language, into compact systems—
> devoted to some kinds of distinctions and excluding others—particular conceptual
> domains come to be organized in a speaker's mind, becoming the basis of thinking
> for speaking.

This idea is pursued further in Slobin (1997, 2004a). It is argued that typological differences in the grammars of languages predispose speakers towards certain types of construal or conceptualization of events. This means that the use of language affects the online conceptualization of events, or in other words, determines the thinking for speaking (TfS) patterns. Slobin argues that speakers might attend to aspects that are expressed in their language more than to aspects of the input that are not habitually expressed. This habitual attention leads, in turn, to a certain rhetorical style, i.e., the encoding or non-encoding of Manner. An area that might be fruitful to the pursuit of the question of how entrenched these habitual patterns of information selection are is second-language acquisition. If there really are patterns of information selection that are different crosslinguistically, can learners learn to reorganize these patterns? This question about thinking for speaking in a second language (TfS in SLA) was first raised by Cadierno (2004, 2008) and then taken up again by Robinson and Ellis (2008).

2.2 Acquisition of motion in an L2

Many studies have looked at the role typology or other crosslinguistic differences in encoding play in second language acquisition and their possible implications on linguistic cognition. This increased interest in language and bilingual cognition is reflected in the growing volume of published research on the topic (e.g., Han & Cadierno, 2010; Pavlenko, 2011; Cook & Basetti, 2011; Benazzo et al., 2012). A vast number of studies have looked at this question from a variety of angles, different language pairs, and different participant groups. To give but a few examples from the many relevant studies, the constellation L1 S-language and L2 V-language has been studied by Cadierno (2004), Navarro and Nicoladis (2005), and Hendriks and Hickmann (2011), among others. The constellation L1 V-language, L2 S-language has been examined, e.g., by Carroll et al. (2012) and Reshöft (2011). Studies that looked at bilingual speakers' expression of motion events with typological different languages include Daller et al. (2011), Schroeder (2009), and Goschler (2009). Hohenstein et al. (2006) examined the nature of bidirectional transfer and the L2 acquisition of motion events. Gestures as a window into bilingual cognition have been reviewed by, e.g., Brown (2007), Brown and Gullberg (2010), and Stam (2010). Eye tracking is another method to study conceptual representation underlying learners' expressions of motion, which was used, e.g., in a study by Schmiedtova (2011). For a more detailed overview of studies on the L2 acquisition and expression of motion events, see Cadierno (2013).

We will focus on the results some of these studies offer with regard to the expression of Manner in an L2. As outlined in Brown (2007), "although Manner is lexicalized in verbs in both verb- and satellite-framed languages, there is still much to be acquired for the learner of a second language." Beyond the lexicalization of Manner, learners have to understand the meaning of lexical equivalents across languages and, moreover, when learning an S-language with a V-language background, learners have to understand the degree of descriptivity in S-language Manner verbs, the "second-tier" Manner verbs in particular. As exemplified in Slobin (1997:458), a Spanish learner of English will find many different references for the term *deslizarse* in a dictionary, including *creep, glide, slide, slip,* or *slither*.

Cadierno and Ruiz (2006) looked at Danish and Italian learners of Spanish. They did not find differences in the number of Manner verbs or other morpho-syntactic devices for the

expression of Manner for Danish learners of Spanish compared to Italian learners. This is argued to be a limited effect of TfS in L2 acquisition. Additionally, one should think about if they actually can acquire second-tier verbs for two reasons: Spanish as a V-language does not offer a very diverse Manner verb lexicon, and, as shown in Jessen (2013), Danish NSs do not use second-tier Manner verbs in motion descriptions, either, but rather limit themselves to first-tier verbs. The effect of TfS might thus be a positive one.

Cadierno (2010), looking at Spanish, Russian, and German learners of Danish, finds that with regard to the use of Manner verbs in boundary-crossing situations, Russian and German learners of Danish use Manner verbs to a higher degree than Spanish learners but to a lesser degree compared to Danish NSs. Instead, they resort to the use of general motion verbs or describe the situation as non-boundary crossing. Cadierno (2010) finds inter-typological differences regarding construction types (Manner verb+Path, non-Manner verb+Path), proportion of Manner-of-motion verbs used, and the total amount of motion verbs produced and recognized. Regarding the construction type, the Spanish learners learned to encode Path outside the verb. It can be said that they acquired the target-like lexicalization pattern but not the co-expression of Manner in the verb. This is further underscored by the observation that Spanish learners used *gå* 'go/walk' in a non-Manner sense, but rather with a meaning that probably is more like a translational motion along a path.

Treffer-Daller and Tidball (2012) look at English learners of French at two different levels of proficiency and compared their results to monolingual NSs of French and English. Regarding the NSs, they find in a type-token analysis that French and English NSs used the same number of Manner verbs. However, French types often occurred only once, whereas English types occurred more frequently. Manner was expressed more frequently in the verb by English NSs. They find that learners used fewer Manner verbs on average, had type/token ratios that were between French and English NSs, and used many deictic verbs, which was shown to be a result of transfer for boundary crossing scenes. Overall, they show how learners have different struggles with different aspects of construing motion events.

Hickmann and Hendriks (2011) looked at English learners of French and find that the utterances of English learners in French are less dense compared to both NS groups, since the learners express Path only, and in the verb. In other words, Manner information is dropped in the L2.

Brown (2007) finds that the lexical inventory for the description of Manner in Japanese intermediate learners of English does not seem to differ from the monolingual English baseline. In an analysis of the morpho-syntactic means to express Manner, she found that Japanese learners express Manner in the verb to the same degree as English NS, and to a higher degree compared to Japanese NSs. With regard to the expression of Manner in comparisons and the overall density of Manner expression, no differences are reported. Brown concludes: "Overall, the learners seem remarkably target-like." There were, however, differences regarding the degree to which Manner was encoded.

In a study on Turkish learners of English, Özçalışkan (2002) finds learners at the advanced level are able to express both Manner and Path in one description. Already at the intermediate level, Manner was expressed in a Manner verb. Learners show a target-like pattern.

In a study on Romance learners of English, Reshöft (2011) finds that learners use fewer Manner verb types than NSs, but instead use simple motion verbs and Path verbs to describe motion events.

It seems, thus, that learners learning an S-language with a V-language background can learn to express the Path component outside the main verbs. Differences seem to be present rather at the semantic level with regard to how descriptive the Manner verbs are for the direction of L2 acquisition from a V-language to an S-language and the use of devices to express Manner outside the verb for learners of a V-language with an S-language background. We want to shed some light on this discussion by exclusively focusing on the expression of Manner. To that end, we conduct quantitative analyses as well as qualitative analyses addressing the following research questions:

Quantitative analyses

1. Across all five groups, is Manner explicitly mentioned?

2. Which morpho-syntactic resources are primarily used to express Manner?

    a) verb

    b) converb

    c) adverb

    d) other (categories converged across languages)

3. Are Manner expressions stacked across the descriptions? Do learners resort to the combination of lexical resources to gain a higher degree of descriptivity?

Qualitative analyses

4. What can we observe regarding the diversity of Manner expression in Danish, German, and Turkish in terms of

a) number of first- and second-tier verbs.

b) different types of Manner expressed in converbs, adverbs, and other Manner devices.

5. How do differences in the morpho-syntactic level and regarding the diversity influence L2 acquisition?

3. Coding categories

What constitutes Manner of motion? This simple question does not have a simple answer. In Talmy's description of the basic semantic components of motion events, Manner is defined as "the way in which motion is performed." Filipovic (2007:17), states that "in experience, Manner is an indispensible experiential component of a motion event, because every change of location from A to B must have been carried out in a certain manner." A more detailed but at the same time still vague description is offered by Slobin (2006:61): ""Manner" is a cover term for a number of dimensions, **including motor pattern** (e.g., *hop, jump, skip*), often combined with **rate of motion** (e.g., *walk, run, sprint*) or **force dynamics** (e.g., *step, tread, tramp*) or **attitude** (e.g., *amble, saunter, stroll*), and sometimes **encoding instrument** (e.g., *sled, ski, skateboard*), and so forth." Slobin (1997) furthermore makes a distinction between first- and second-tier verbs. First-tier verbs are neutral and everyday verbs, such as run, walk, or swim. In contrast, second-tier verbs are more detailed and describe very detailed and specific motion. For instance, Basque and Spanish, both V-languages, have mainly first-tier verbs, whereas S-languages such as German or English have many second-tier verbs (*plummet, splat*) in addition. Manner verbs have often been placed in opposition with Path verbs (e.g., *enter, exit, arrive, depart*)—verbs in which the element of Motion is conflated with Path (Ibarretxe-Antuñano, under review). As Vulchanova et al. (2012) point out, another issue is the fact that it is sometimes hard to clearly distinguish Manner from Path. This is especially true for cases were the Manner of movement at the same time refers to a direction, for example walking backwards, or to "zigzag." Another problem is that many so-called Manner verbs lexically encode both a

Manner and a Path component (*run* vs. *dance*). Another issue is how to treat the inner state of the protagonist. This kind of different Manner of motion need not be visible in the actual motor pattern. Ibarretxe-Antuñano (2010) makes the point that "it is a key factor in the characterization of this type of events, e.g., in the English verbs *wander* or *strut*, or the Spanish *deambular* 'saunter'." In our study, we count all verbs of motion that refer to the psychological state of the protagonist as well as verbs similar to *zigzag* and the like as instances of Manner.

In the following section, the morpho-syntactic means available to express Manner in Danish, German, and Turkish are described. We then derive a coding scheme that captures similarities across morpho-syntactic form classes that can encode Manner.

Danish: In Danish, Manner is typically encoded in the verb; other devices are applied as well, e.g., adverbs and gerunds or converbs (*han kommer kravlende* 'he comes crawling') (cf. Jessen, 2013; Cadierno, 2010). Even though Danish has some few Path verbs, no Path verbs were used in our data.

German: In German, Manner is typically encoded in the verb (Bamberg, 1994; Harr, 2012). It can furthermore be encoded in gerunds/converbs (*er kommt angehoppelt* 'he comes jumping' or *sie läuft hüpfend* 'she runs/walks hoppingly'). Adverbs such as *schnell* 'quickly' or *leise* 'quietly' can be used together with all kinds of motion verbs. Additionally, descriptions including comparison (*wie ein Baby* 'like a baby') or other devices can be combined with motion verbs.

Turkish: Turkish has Manner verbs in its lexicon, but not as many as S-languages can offer. Another option in Turkish to express Manner is the use of converbs. Converbs are derived from verbs and carry out functions of adverbial linking or conjoining between clauses. In Turkish, converbs indicate relative tense in relation to the main verb, which conveys absolute tense. Slobin (1995) discusses the meaning of the four most frequent converb types in Turkish: *-ince, -erken, -ip,- erek*. According to Slobin (1995), *–ince* and *-erken* indicate succession and simultaneity, *-ip* is considered a simple coordinator, and *–erek* can relate to the main verb by extending its meaning according to a consecutive event, a purpose, and a circumstance. A subcategory of circumstance is Manner. As we shall see, our participants frequently opt for *–erek* to describe the Manner of motion. This is in line with observations made by Aksu-Koc (1994) that the *–erek* converb is used frequently to express Manner and is therefore one of the frequently used devices when Manner is lexicalized (355). Slobin

(1995) describes the use of the *-erek*-converbs as follows: "*–Erek* is used to refer to two phases of a situation (sequential or simultaneous) in the construction of an event. Such an event notion is a complex category which is neither fully temporal nor causal in traditional terms" (p. 368). Aksu-Koç and von Stutterheim (1994) offer a similar semantic description of the meaning of the Turkish converbs *-ince* 'when', *-ip* 'and then', and *-erek* 'in/by', which are said "to serve to closely integrate two situations as immediately successive or as simultaneous, depending on the context" (pp. 404–405).

Thus, Turkish can encode Manner in a variety of different lexical devices: verbs, converbs, and adverbials as well as, e.g., comparisons and descriptions. Aksu-Koç (1994:356) observes that Turkish speakers prefer clausal or phrasal packaging of Manner info. This means that Turkish compensates for a lack of lexical richness of Manner verbs by the use of productive verbal morphology that allows for packaging of events in a variety of ways and leads to an elaboration of Manner if salient in the input.

We group gerunds, as they are called in the traditional grammar books in Danish and German, and the Turkish converbs together in the same category. The functions of gerunds and converbs overlap in that they add information of Manner to the main verb. In our coding, we thus have the following categories (in bold) following the questionnaire below.

1. Is there **motion** in the description?

2. If yes, is there **Manner in the description**?

3a. If yes, is **Manner in the verb**?

3b. Is **Manner in a converb**?

3c. Is **Manner in an adverb**?

3d. Is Manner in **other devices**?

4. How often is Manner expressed in one description/**stacking of Manner**?

Appendix 1 shows a list of all the devices used sorted into the three categories. The following section describes the quantified results to these questions.

4. Results

We first address research questions 1–3 for the quantitative analysis. Then, in section 4.2, turn to questions 4 and 5.

4.1. Quantitative analyses

First, we explored whether or not Manner was explicitly mentioned across the five groups. Then, four separate related analyses were conducted to explore differences in the use of different morpho-syntactic resources to expresss Manner. Additionally, we investigated if Manner expressions were stacked across the descriptions.

In the following section, we present the results for first the NS groups and then the learner groups. Then, we compare the results of the learner groups to the results of the Danish NSs to define areas of difference. Subsequently, we compare the two learner groups with each other. The final comparison between the German learners' production and the German NSs' production, as well as between the Turkish learners' and the Turkish NSs' production, might show us sources for possible crosslinguistic influences. The boxplots conveniently depict the distribution of the measure in question. The length of the box encompasses the observations, which fall within the 25th and 75th percentiles of the underlying distribution. The line in the box corresponds to the median of the distribution. The observations which can be considered to be outliers are marked with crosses.

Analysis 1: This analysis considered the mean proportion of descriptions encoding Manner per total event descriptions across groups. Figure 1 shows that the Danish NSs and the German NSs describe Manner in almost every scene. The Turkish NSs describe Manner significantly less in relation to the Danish NSs groups. There is no significant difference between the German NSs and the Danish NSs. Both the German and the Turkish learners express Manner in almost every description. Hence, there is no difference between both learner groups and Danish NSs. There is a significant difference between Turkish learners and Turkish NSs: The Turkish learners express significantly more Manner than the Turkish NSs. A caveat concerns the fact that we decided to code *gå* 'walk' in the Turkish learners' descriptions as a Manner verb. As we will describe in more detail in section 4.2.1, the meaning assigned to *gå* by the Turkish learners might be different from the meaning assigned by the Danish NSs (cf. Jessen, 2013).
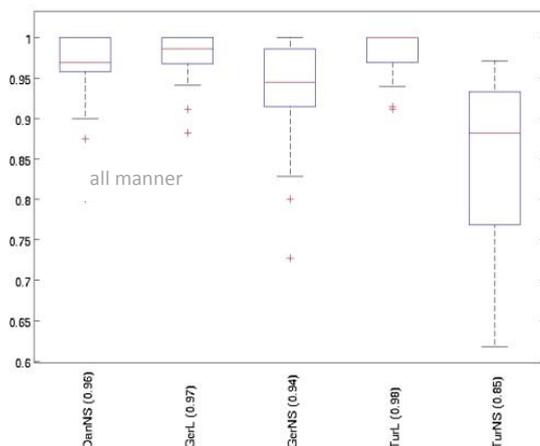
Figure 1: Mean proportion of Manner devices across all descriptions containing motion

Analysis 2 a: This analysis considered the mean number of Manner verbs per description in all descriptions containing Manner across five groups. Mann-Whitney U tests (Appendix 2) showed that Danish NSs, German NSs, and German and Turkish learners can be considered as belonging to the same population. A Mann-Whitney U test showed further that the Turkish learners differ significantly from the Turkish NSs. It might seem that the Turkish learners have learned that Manner is expressed frequently in the verb; we have to bear in mind that there are not many other options in Danish due to the scarcity of Path verbs. Learners could, however, have opted for more neutral verbs, as, e.g., *bevægge* 'move'. Another caveat is the coding of *gå* as a Manner of motion verb. Whereas there is no doubt that *gå* 'walk' is used as a Manner verb in the descriptions of Danish NSs and German learners, it is less clear if the Turkish learners really use it as a Manner verb. *Gå* is by far the most frequent verb used by the Turkish learners (see also Jessen, in press).
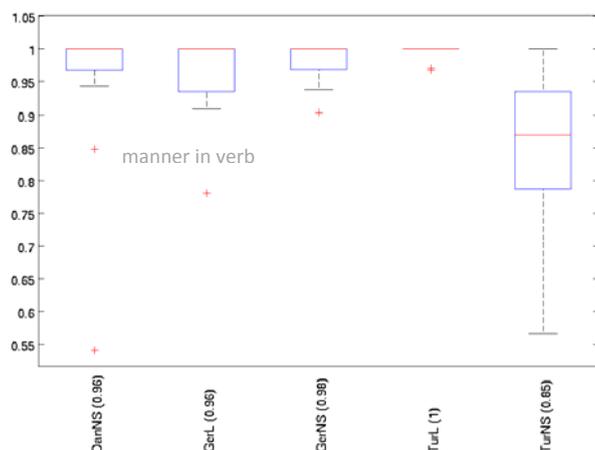
Figure 2. Mean number of Manner verbs used in description containing Manner.

Analysis 2b: This analysis explored the use of Manner converbs in all descriptions containing Manner across five groups, as shown in Figure 3.
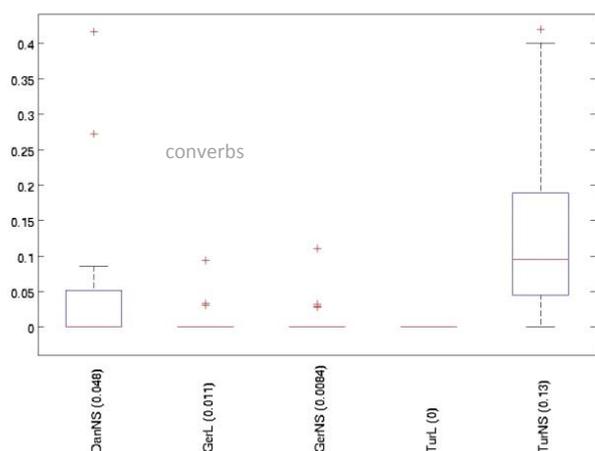
Figure 3: Mean number of converbs containing Manner in descriptions containing Manner.

The optional use of converbs to express Manner is only employed by Danish NSs and Turkish NSs. German NSs very rarely use converbs; some seem to use them as an idiosyncratic feature, as shown by the two crosses representing the outliers. It is important to note that the use of converbs is likewise not present in all Danish NSs; nevertheless, it is more common than in German NSs. The Turkish NSs use converbs, although with a high degree of variation; nevertheless, 50% of the descriptions contain a converb. The Mann-Whitney U test showed significant differences between Danish NSs and Turkish learners, with the Danish NSs using converbs more frequently. The Turkish NSs use a converb to

express Manner significantly more than Turkish learners and Danish NSs. (Converbs are combined with Path verbs and Manner verbs alike, and thus seem to serve the augment function and express function described by Özçaliskan and Slobin (2003) alike.)

Analysis 2c provides information about the relation between the expression of Manner and adverbs.
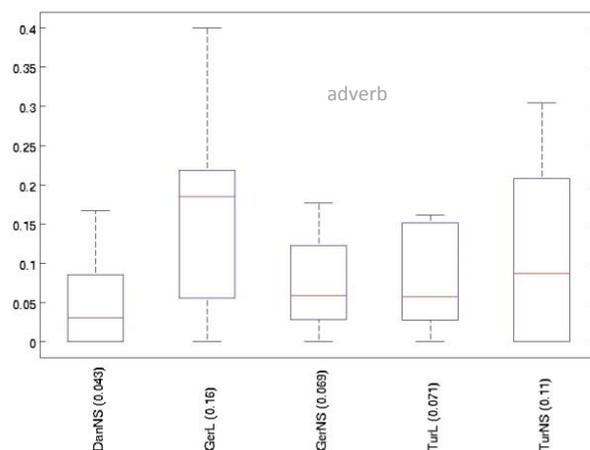
Figure 4: Mean number of Manner-adverbs in all descriptions containing Manner across five groups.

Overall, adverbs are not used very frequently across groups. A Mann-Whitney U test showed significant differences between Danish NSs and German learners but not for Turkish learners. German learners used more adverbs to express Manner. The difference between German learners and Turkish learners is significant as well, with the German learners using more adverbs. The German learners also use significantly more adverbs than the German NSs. There is no significant difference between Turkish NS, Turkish learners, and Danish NSs. We can maybe assume a positive CLI effect from Turkish regarding the expression of Manner in adverbs.

Analysis 2d shows the mean number of other-Manner devices in all descriptions containing Manner (Figure 5). Other Manner devices include, e.g., comparisons or descriptions like *on all fours*. A complete list can be found in Appendix 1. There are only small differences between the three NSs groups, none of which are significant. The German learners use other Manner devices slightly more frequently than the Turkish learners and the NSs groups.
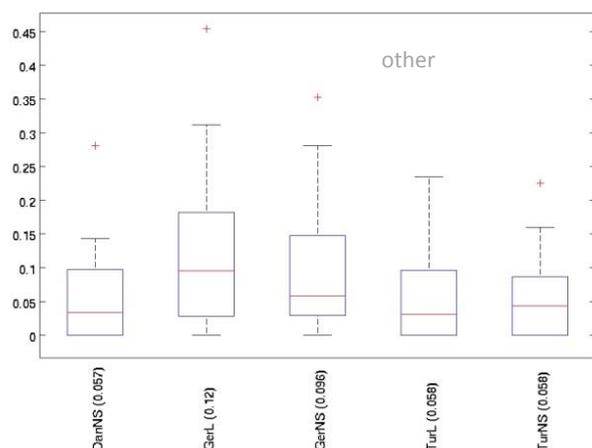
Figure 5: Other devices used to describe Manner across all descriptions including Manner.

Analysis 3 looks at how many Manner devices are used in the scene descriptions. We can thus determine whether speakers stack Manner information. Values above one reflect that more than one Manner device has been used in a scene description.
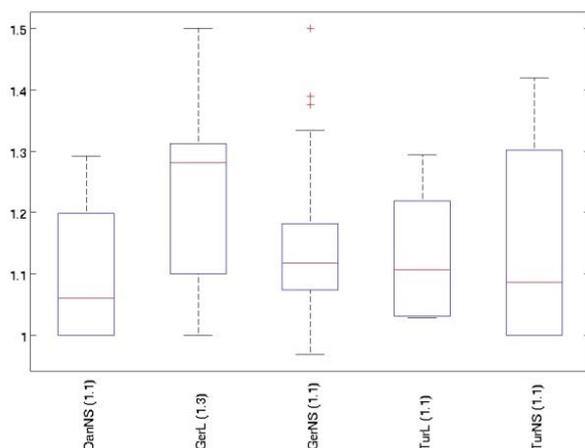
Figure 6: Mean number of Manner devices used per description.

German learners use the highest number of Manner devices, on average; Turkish learners are similar to German NSs and Turkish NSs. A Mann-Whitney U test showed a significant difference between Danish NSs and German learners and German learners and Turkish learners.

We now have an impression of whether or not the groups differ regarding a. the overall expression of Manner, b. which morpho-syntactic devices are preferred across groups in order to express Manner, and c. how dense the Manner descriptions are. Boxplots allowed

us to factor in individual variations. Table 1 sums up the results of the statistical analysis, leaving out the individual variation.

	overall	Verb	converb	adverb	other	density
DNS vs. GL	same	Same	different, GL use fewer	different, GL use more	same	different, GL use more
DNS vs. TL	same	Same	different, DNS use more	same	same	same
GL vs. TL	same	Same	same	different, GL use more	same	different, GL use more
GL vs. GNS	same	Same	same	different, GL use more	same	same
TL vs. TNS	different, TL use more	different, TL use more	different, TL use fewer (0)	same	same	same
DNS vs. GNS	same	Same	same	same	same	same
DNS vs. TNS	different, TNS use fewer Manner	different TNS use fewer Manner verbs	different TNS use more	same	same	same

Table 1: Summary as a function of group result for morpho-syntactic devices.

The main between-group-comparisons to establish evidence for a cross-linguistic influence, as suggested by Jarvis (2000), are intra-group homogeneity, intergroup heterogeneity, and similarities between the learners' L1 and L2. The degree of intra-group homogeneity can be derived from the size of the boxplots. We will now summarize intergroup homogeneity following the order of the analyses for the preferred morpho-syntactic devices. We always start with a comparison between the Danish NSs and the German and Turkish learners, respectively. We then compare the two learner groups to each other. Finally, the learner groups with the L1 groups for German and Turkish. According to Jarvis (2000), if the comparison between Danish NSs and the Danish production of the learners results in difference, we have evidence for crosslinguistic influence. The same is true if the comparison between both learner groups results in differences. On the other hand, if a comparison between German L1 production data results in similarities, this is also seen as evidence for CLI.

Comparison 1: German learners – Danish NSs, German learners – German NSs, and German learners – Turkish learners

German learners differ from Danish NSs with regard to the morpho-syntactic encoding of Manner in converbs and adverbs. Furthermore, German learners use more Manner devices per description compared to the Danish NSs. The difference from Danish NSs regarding converbs can be explained as resulting from CLI: German NSs do not express Manner in

converbs very frequently. Additionally, the use of converbs is rare in the production of Danish NSs. They are scarce in the input and it might be difficult for the German learners to notice them.

German learners use more adverbs compared to German NSs and Danish NSs and Turkish learners. This might be considered an attempt to compensate for a perceived lack of specificity in the Manner verb. This frequent use of adverbs is also reflected in the higher density compared to Danish NSs, as we shall see. This, rather than being CLI, can be considered a strategy employed by German learners to keep up the same degree of Manner detail. We will discuss the consequences of this for the argument of whether or not we have a transfer of conceptual content in this case.

Overall, we can say that German learners use significantly more adverbs in relation to Danish NSs, which leads to a significantly higher Manner density in their Danish L2 descriptions.

Comparison 2: Turkish learners – Danish NSs, Turkish learners – Turkish NSs, Turkish learners – German NSs

Turkish learners differ from Danish NSs with regard to the use of converbs. Turkish learners never use converbs in Danish L2. This is interesting since they quite frequently use converbs to express Manner in their L1 (the difference is significant).

Overall, we can say that with regard to the morpho-syntactic devices used in the expression of Manner, Turkish learners are able to code Manner in the verb and, additionally, do not differ from Danish NSs regarding the frequency of use of the other morpho-syntactic devices with an exception for the use of converbs. Additionally, regarding the overall expression of Manner, there are no significant differences between the two learners groups and the Danish NSs. However, Turkish learners differ from Turkish NSs. This might be because Danish does not offer many possibilities to express Path in a verb. It seems that for this reason, Turkish learners use *gå* 'walk' a lot. Again, here it is possibly a result of the coding that the Turkish learners resemble Danish NSs.

Based on the quantitative analysis, we can state that Turkish learners are very similar to Danish NSs in their use of morpho-syntactic devices to express Manner and in the overall frequency of expression of Manner. The German learners use more Manner devices than Danish NSs. In particular, they opt for the use of adverbs more frequently.

4.2. Qualitative analysis

4.2.1 Diversity regarding the different Manner devices: We asked whether there are differences regarding the number of first-tier and second-tier verbs across languages. Regarding the use of first- and second-tier Manner verbs, as described above and shown in Appendix 1, the native speaker groups differ with regard to the number of different verbs used to express Manner. As shown in Jessen (2013), the German NSs display the highest degree of diversity, i.e., they use many different verbs, and each verb often more than once. This diversity entails the use of many second-tier Manner verbs. In contrast, Turkish and Danish NSs use relatively fewer Manner verbs and display a tendency to use three particular first-tier Manner verbs: *gå* 'walk', *kravle* 'crawl', and *løbe* 'run'. This is similar to the Danish NSs group, albeit the distribution of the three Manner verbs differs across these groups. German learners use many more Manner verbs and more specific Manner verbs. The diversity can be measured with help of the Simpson diversity index: A value of 1 represents infinite diversity, 0 no diversity (see Majid et al., 2007, for a detailed description). Values for the five groups are Danish NSs 0.4, German NSs 0.6, Turkish NSs 0.6, German learners: 0.6, Turkish learners 0.4.

The low diversity of verb types used by Danish NSs can be considered an advantage for the Turkish learners overusing *gå* and a disadvantage for the German learners trying to maintain the L1 level of fine-grainedness.

4.3. Diversity in terms of converbs, adverbs, and converbs: We also asked how diverse the use of converbs, adverbs, and other Manner devices was across the five groups. Table 2 shows the type/token frequency regarding the use of converbs, adverbs, and other Manner devices.

	converbs type/token	adverbs type/token	other type/token
Danish NSs	15/29	12/23	29/38
German NSs	8/13	21/53	54/86
Turkish NSs	7/68	44/68	43/56
German learners	5/5	15/71	46/57
Turkish learners	0	6/33	32/34

Table 2. Type/token relations for Manner devices across five groups.

We would like to point to two observations in particular: The high number of adverbs that German learners use in combination with Manner verbs. As we will discuss, this might show how they are trying to maintain fine-grained distinction, i.e., particularly with regards

172

to the speed of movement. Furthermore, even though Turkish NSs use many different adverbs, Turkish learners do not use many adverbs in Danish L2.

Another interesting angle on the qualitative analysis would be to investigate the meaning of Manner that is expressed across all form classes. This is an issue that, due to time constraints, has to be performed in future research. The different tasks for data elicitation and the elicitation material are probably the causes for this. In our study, Turkish NSs use devices outside the verb both to augment (Manner verb + Manner device) and to introduce Manner (Path verb and Manner device).

5. Discussion

German learners differ from Danish NSs with regard to the density of Manner devices used per description, use fewer converbs than Danish NSs, and use more adverbs. The easiest of these differences to explain is the lack of the use of converbs. They are not very frequent in Danish and are rare in German. It could be that the learners just did not pick them up.

The descriptions of the German learners contain more Manner information than the descriptions of the Danish speakers, since German learners make frequent use of adverbs. This adds to the degree of descriptiveness in the learner descriptions. Thus, the question as to why German learners would feel the need to augment Manner arises. Especially since, as shown in Table 1, there is no need to adjust the degree of Manner density, since it is the same in Danish and German. One explanation might be that the German learners want to compensate for a perceived lack of expressivity. As described in Jessen (2013), German has the highest diversity of Manner verbs. This entails a relatively large number of specific second-tier verbs and results in a high degree of descriptivity. By using adverbs together with Danish, first-tier Manner verbs learners might try to achieve the same degree of specificity. This is also in line with findings in Özçalışkan and Slobin (2003). They describe how English native speakers use adverbials as a device to elaborate on Manner, rather than using them to introduce Manner. It seems that the German learners assign the same function to adverbials in L2 Danish in order to maintain the more fine-grained description of Manner.

The Turkish learners look remarkably target-like in the use the morpho-syntactic categories for the expression of Manner. Now this could be the story of a tremendous success. However, again, a closer look at the qualitative results calls for skepticism regarding the learning achievement. The most striking observation is the highly frequent use of the

Danish Manner of motion verb *gå* 'walk'. In this paper, *gå* has been coded as a Manner verb. There is no doubt that in the descriptions of the Danish NSs and the German learners it is used as such. However, it is less clear what meaning the Turkish learners assigned to it. In Jessen (2013), it is argued that *gå* is used often as a placeholder verb if the L1 verb was a Path verb designating a non-horizontal or non-forward Path. Thus, the overuse of *gå* 'walk' could be considered a transfer-to-nowhere phenomenon, when learners look for a certain category and then run into trouble when the target language lacks the respective category (Kellermann, 1995). Other studies also observed a highly frequent use of *gå* and its equivalents in other languages. They also offer similar explanations. In her study, Cadierno (2010) describes that Spanish learners of Danish use *gå* quite frequently. She proposes that *gå* seems to have the meaning of a general motion verb. She offers the following explanations: L3 influence of English, or a lack of online attention to the actual Manner of movement because of the habitual focus on Path as induced by the L1. Similarly, albeit in the acquisition of a V-language starting from an S-language, Treffers-Daller and Tidball (2012) show an overuse of the deictic motion verb *aller* in their data of English learners of French. (Unfortunately, this is not discussed in more detail). Similarly, in a corpus-based study of written narratives by Romance learners of English, Reshöft (2011) finds that the learners use Manner verbs that are "rather neutral" in describing Manner of motion, whereas English NSs use verbs that are more specific. She states that this might be the result of the typological influence of the L1, but it might also just be a linguistic difference or the fact that it is easier to learn these not-so-specific motion verbs. Similarly, Iakovleva (2012), in a study of Russian learners of French, reports an overuse of *walk*, arguing that the broader conceptual structure of the Russian equivalent is the reason for this overuse. Goschler (2009) observes a significantly higher use of *gehen* 'walk' in German-Turkish bilinguals but offers no explanation. In another interesting study on English learners of French, Hendriks and Hickman (2011) argue that in order to express a variety of Manners, only a very limited lexicon is necessary. A case in point would be the frequent use of *aller* in their English learners of French. Referring to their earlier work, they argue that one of the strategies applied by learners is that of a "minimal response to the task," which is to be understood as a "highly efficient way of dealing with the task of communicating complex information in an L2." The learner is constrained by the need of being explicit enough for successful communication on the one hand and the need to be target-like on the other hand. The learner optimizes regarding the encoding of information and therefore when need be might neglect correct grammar in favor of getting the message

across. *Gå* 'walk' might be the result of such an optimization strategy as well. It fits the target-pattern to the extent that it is a Manner verb, but is still not precise regarding the Manner.

The fact that the Turkish learners perform pretty much target-like in the use of all Manner devices, but overuse *gå,* seems to suggest that typological differences are most difficult to overcome on the level of fine-grainedness in the meaning. However, even though still a good member of the S-language type, Danish is similar to Turkish with respect to many features that are first visible when one zooms further in: the diversity of motion verbs used in this task is somewhat low in both, especially when compared to German (Jessen, 2013). The fact that three verbs make for more than 75% of all motion verbs makes the task for the Turkish learners easier. This fact, on the other hand, makes German learners feel that they did not add enough descriptive power to their utterance and compensate for that with the use of adverbials.

We furthermore observed that Turkish learners do not use adverbs to describe Manner as often as Turkish NSs. This brings us back to the question of codability. As we have seen, in V-languages, Manner can be difficult to code, since it often requires a more complex sentence structure with subordination. Nevertheless, whether or not it is coded also depends on its salience in the event itself. The videos used as stimuli in this study were originally designed to map out Manner inventory. The fact that the NS groups do not display a great variation with regard to overall Manner expression and, in turn, in overall density might be an effect of the Manner bias of the stimuli. This finding is somewhat different from Özçalışkan and Slobin's (2003) finding of a reported higher density in English due to the function the expression of Manner outside the verbs has, namely the augmentation in S-languages and the introduction in V-languages. The different tasks for data elicitation and the elicitation material are probably the causes for this. In our study, Turkish NSs use devices outside the verb both to augment (Manner verb + Manner device) and to introduce Manner (Path verb and Manner device). The question thus arises as to why the learners do not make use of this possibility. It seems that it cannot be explained by a lack of attention to Manner since Turkish NSs frequently expressed it. It would be interesting to pursue this issue further. At the moment, it remains an open question.

The big question that links many studies looking at the expression of motion both in L1 and L2 studies is whether or not language has an impact on the online thinking in the

preparation of speaking. In our case, we observed that on the surface the typological differences between Danish and Turkish with regard to lexicalization patterns did not cause learning difficulties for Turkish learners. But a closer look at the inventory of Danish motion verbs reveals that Turkish learners in fact do not have much of a choice. The virtual absence of Path verbs in Danish only permits them to use Manner verbs. We can thus not determine, on the structural level, how far-reaching the typological influence is. It seems still that the consequences of the typology are at work on the level of meaning selection. The Turkish learners overuse *gå* to compensate for a lack of Path verbs in L2 Danish. The German learners seem to make simple things more complicated than necessary. The higher density in their descriptions might point to the fact that they are trying to maintain a degree of descriptivity in their L2 that is similar to their L1. This points to an influence at the level of information selection.

Overall, we can summarize that the question of CLI or a transfer of TfS patterns cannot be answered in a simple fashion. Next to inter-typological factors, intratypological factors have to be carefully considered as well. Additionally, the morpho-syntactic means of the target language might make learners look successful. However, the use of target-like forms might mimic target-like expression on the surface but differ on the meaning dimension. Hence, the conceptual level deserves more careful attention, and an observation of the lexicalization of semantic components should include a deeper analysis of the meaning selection for these components to spot otherwise invisible crosslinguistic differences and the possible impact of these differences on learning to think-for-speaking in an L2.

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APPENDIX 1: Inventory of items used to describe Manner

<u>Danish Native Speakers</u>

Converbs: *gående* (4) 'walking', *galoperende* 'galloping', *glidende* (2) 'gliding', *grinende* 'laughing', *hoppende* 'hopping/jumping', *humpende* (2) 'limping', *kravlende* (4)

'crawling', *krybende* 'creeping', *legende* 'playing', *løbende* (7) 'running', *luntende* 'plodding', *slendrende* 'strolling', *snigende* 'stealthily', *søgende* 'searching', *springende* 'hopping/jumping'

Adverbs: *aggressivt* 'aggressively', *ekstremt* 'extremely', *forsigtigt* 'carefully', *glad* 'happily', *hurtig* 'fast', *hurtigt* (7) 'fast', *langsomt* (4) 'slowly', *meget* (2) 'very', *rigtig* 'really', *roligt* (2) 'quietly', *stærkt* (3) 'strongly/fast', *stille og roligt* 'calmly and quietly', *usikkert* 'insecurely', *vildt* 'wildly'

Other: *for sit liv* 'for its life', *i fuld fart* 'in full speed', i skarp trap 'in fast trot', *i vuggende gang* 'in a rocking gait', *lige som en skildpadde* 'just like a turtle', *med åben mund* (2) 'with open mouth', *med forbenene løftet* 'with the front legs lifted', *med hoppende bevægelser* 'with hopping/jumping movements', *med hoved ned ad* (3) 'with head down', *med hovedet først* 'with the head first', *med store skridt* 'with large steps', *med strakte ben* 'with stretched legs', *men falder* 'but falls', *næsten springer* 'almost jumps', *på alle fire* (14) 'on all fours', *på bagbenene* 'on the hindlegs', *på hænder og fødder* 'on hands and feet', *på hovedet* 'head first', *på maven* (4) 'on the tummy'

German Native Speakers:

converb: *drohend* 'threatening', *gelaufen* 'running', *hüpfend* 'jumping/lollop', *jagend* 'hunting', *schleichend* 'sneaking', *stolpernd* 'stumbling'

adverb: *aufmerksam* 'attentively', *aufrecht* 'upright', *aufrecht und schnell* 'upright and fast', *barfuss* (5) 'barefoot', *bäuchlings* 'on tummy', *fröhlich* 'happily', *gemächlich* (5) 'sedately', *gemütlich* (2) 'leisurely', *geschmeidig* 'sleekly', *kopfüber* (5) 'headfirst,' *langsam* (9) 'slowly', *majestätisch* (2) 'majestically', *munter* 'jollily', *relativ* (2) 'relatively', *ruhig* 'quietly', *schlangenlinien* 'windingly', *schnell* (9) 'quickly', *sehr* (3) 'very', *lustig* 'funnily', *seitwärts* 'sideward', *tapsig* 'clumsy like a baby animal', *unbeholfen* (4) 'clumsy', *unsicher* 'insecurely', *vierbeinig und energisch* 'four-leggedly and forcefully', *vorsichtig* (2) 'carefully', *wellenförmig* wave-shapedly'

other: *auf allen vieren* (17) 'on all fours', *auf dem Bauch* (9) 'on the tummy', *auf den Hinterbeinen* (2) 'on the hindlegs', *auf Flossen* 'on fins', *auf seinem Bauch* 'on its tummy', *auf seinen Flossen* 'on its fins', *auf seinen Hinterbeinen mit offenem Maul* 'on its hindlegs with open mouth', *auf zwei Beinen* (3) 'on two legs', *den Kopf zum Boden gewandt* 'head

turned towards the ground', *durch multifunktionale Flossen* 'through multifunctional fins', *durch Zuhilfenahme von Flossen und Füssen* 'taking fins and feet as help', *für seine Verhältnisse schnell* 'fast for its condition????', *im Bärengang* 'in bear gait', *im Schritttempo* 'in walking speed', *im Stehen* 'standing up', *im Vierfüsslerstand* 'in quadruped stand', *im Zickzack* 'in a zigzag', *in kleinen Sprüngen* 'in little jumps', *in kriechender Bewegung* 'in a creeping movement', *in lustig anzusehendem Gang* 'in a funny to watch gait', *in schnellem Tempo* 'in fast tempo', *in Wellenbewegungen* (2) 'in wavelike movements', *indem er springt* 'in that it jumps', *indem sie sich seitwärtsschlängelt* 'in that it sidewards slithers', *Kopf voraus* 'head first', *gemessenen Schrittes* 'in a paced fashion', *kriecht quasi* 'creeps so to speak', *mit abgestimmten Tempo* 'in a harmonized tempo', *mit angehobenen Knien* 'with knees lifted up', *mit dem Kopf nach unten* 'with the head down', *mit enormen Tempo* 'at an enormous tempo', *mit geöffnetem Mund* 'with opened mouth', *mit Hilfe seiner Flossen* 'with help of its fins', *mit Hilfe seiner Füsse* 'with help of its feet', mit *Hilfe seiner Hinterbeinchen* 'with help of its little hindlegs', *mit Hühnergang* 'with chickengait', *mit mittlerer Geschwindikeit* 'at medium speed', *mit normalem Schritt* 'with normal pace', *mit offenem Maul* 'with open snout', *mit schnellem Tempo* 'at a fast tempo', *mit schwebeartigem Gang* 'in a hovering-like gait', *mit seinem Bauch* 'with its tummy', *mit tapsigen Schritten* 'with clumsy steps', *strammen Schrittes* 'with loping steps', *und benutzt dafür schon seine Füße im Vierfüßlergang* 'and is already using its feet for that in a quadruped gait', *und bewegt seinen Kopf vor und zurück* 'and moves his head forth and back', *und macht hüpfende Bewegungen* 'and makes hopping movements', *und strauchelt dabei* 'and stumbles/trips at it', *wie aufgescheucht* 'as if startled', *wie ein kleines Baby* 'like a little baby', *wie ein Soldat* 'like a soldier', *wie ein Verrückter* 'like a crazy one', *wie von Sinnen* 'frantically', *wie wild* 'like mad'

Turkish:

adverb: *hızla* (21) 'with speed', *hızlı* (15) 'fast', *hızlı değil* (2) 'not fast', *usulca* 'silently slowly', *yavaşça* 'slowly', *yavaş yavaş* (15) 'slowly, slow slow', *yavaşça* (13) 'slowly'

converb: *aranarak* 'as if he is looking for something', *birbirlerini takip ederek* (3) 'as they are following one another', *daire çizerek* 'as they are circling, as they are drawing circles', *daireler cizerek* (2) 'as they are drawing circles', *dala tutunarak* 'while he was hanging on to the branch', *dilini çıkararak* 'while putting his tongue out', *dönerek* 'as he is turning

around', *düşe kalka* (2) 'while falling down and getting up again, stumbling', *elleri ve dizlerinin üzerinde emekleye emekleye* 'as he was crawling on his hands and knees', *ellerini kullanarak* 'with using his hands', ellerinin ve dizlerinin üzerinde emekleyerek 'as he is crawling on his hands and knees', *emekleyerek* (4) 'while crawling like a baby', *etrafı kolaçan ederek* 'as he controls/checks out his surroundings carefully', *etrafında dönerek* 'as he is turning around himself', *halka çizerek* 'as he is drawing a circle', *halkalar çizerek* 'as he is drawing circles', *hoplayarak* 'as he is hopping, jumping up and down', *kafasını öne arkaya oynatarak* 'as he is moving his head backwards and forward', *kafasını sallayarak* (2) 'as he is shaking head', *kayarak* (9) 'while he is sliding', *kıvrılarak* (4) 'as he is zigzagging', *kıvrılarak ve sürünerek* 'with a motion as if he is zigzagging and crawling', *koklayarak* 'by smelling', *kollarını kullanarak* 'by using his hands', *koşarak* (6) 'by running', *koserken* (koşarken) 'as he is running', *koşturarak* 'with a running-like motion', *olduğu yerde durarak* 'by standing still where he is', *sallana sallana* 'walking very slowly, with a dancing-like motion, shakingly', *sallayarak* 'by shaking', *sekerek* 'by jumping on a single foot', *sendeleyerek* 'by stumbling', *sendeleyip* 'by stumling, after stumbling', *sıçrayarak ve emekleyerek* 'by jumping and crawling', *sinsice* 'in a calculated, scheming fashion', *sürtünerek* 'by brushing against something', *sürüne sürüne* 'crawlingly crawlingly', *sürünerek* (27) 'by crawling', *taşların arasından geçerek* 'by passing through the stones', *yalpalayarak* (3) 'by zigzagging like a drunk person would with a car or so', *yatip* 'after laying down', *yüzerek* 'by swimming', *zıplaya zıplaya* 'jumping jumping', *zıplayarak* (4) 'by jumping'

Other: *hareket etmek için* 'in order to move', *yere yatmış* 'lying on the floor', *hizli adimlara* 'with speedy fast steps', *hızlıca* (7) 'speedily', *iki ayağının üzerinde* (2) 'on his two feet', *iki küçük kolunun yardımıyla* 'with the help of his two small arms', *ileri doğru* (2) 'in a forward direction', *kıvrıla* (2) 'zigzagging like a snake', *kıvrılara* 'zigzagging like a snake', *koşar adım* 'with steps fast as if he is running', *küçük ve hızlı adımlarla* 'with small but fast steps', *rahat bir şekilde* 'in a comfortable fashion', *ritmik hareketlerle* 'with rhythmic moves', *ritmik kafa hareketleriyle* 'with rhythmic head moves', *sakin bir şekilde* 'in a calm fashion', *sürünmeye benzer bir hareketle* 'with movement similar to crawling', *yavaş adımlarla* (2) 'with small steps', *emeklemeye benzer bir şekilde* 'in a fashion that resembles a baby crawling', *iki el ve ayağını kullanarak* 'by using his two hands and feet', *kendisi için hızlı sayılabilecek adımlarla* 'with steps which could be considered fast for him', *2 ayağının üzerinde* 'on his two feet', *2 ayak ve 2 eli kullanarak* 'by using his two hands and

feet', *adım adım* 'step by step', *ağacın etrafında elipsoid çizerek* 'by drawing an ellipse around the tree', *ağır adımlarla* 'with slow steps', *ağır ağır* 'slow slow, slowly', *ağzı açık* 'with an open mouth', *ağzını açarak* 'by opening his mouth', *amaçsızca* 'without a goal', *ayaklarıyla* 'with his feet', *aynı kavislerle* 'with the same curves', *baş aşağı şekilde* 'in a fashion with his head downwards', *bata çıka* 'by sinking and getting out, from mud for example', *bir şey arar gibi* 'as if he is looking for something', *baş aşağı* (2) 'head downwards, again the yoga stand like, sometimes downwards', *canlı kollarıyla* 'with his lively arms', *çok* (3) 'very', *deli gibi* 'like a crazy person', *dört ayağının üzerinde* 'on its four feet', *dört ayağının üzerinde* 'on its four feet', *durmadan* 'without stopping', *ellerinin ve ayaklarının üzerinde* 'on his hands and feet', *emekler şekilde* 'in a manner crawling like a baby', *garip bir şekilde* 'in a strange manner'

German learners:

converb: *gående* 'walking', *kravlende* 'crawling', *mavende* 'tummying' truende 'threateningly', springende 'jumpingly'

adverb: *hurtigt* (27) 'fast', *langsom/t* (19) 'slowly', *lydløst* 'without sound', *mærkligt* 'strangely', *majestetisk* (2) 'majestically', *krybeagtig* 'creep-like', *neurotisk* 'neurotically', *sidevent* 'turned-sideways', *smidigt* 'sleekily', *stærkt* (8) 'fast', *stolt* 'proudly', *straks* 'directly', forsigtig (3) 'carefully', hovedunder 'headfirst', rolig (3) 'quietly'

other: *springer/galopperer* 'jumps/gallops', *traver* 'trots', *eller springer* 'or jumps', *eller svømløber* 'or swimruns', *hopper* 'hops/jumps', *i langsomt vækselgang* 'in slow shifting gaits', *i opret position* 'in an upright position', *i regelmæssige skridt* 'with regular steps', *i sin typiske bevægælse* 'in its typical movements', *i store skridter* 'with big steps', *i store spring* 'with big hops', *med fast bevidste skridt* 'with firm conscious steps', *med fire ben* 'with four legs', *med hovedet op* 'with head up', *med halsen i luften* 'with the neck up in the air', *med hjælp af disse arme* 'with help of these arms', *med hjælp af sine finner* 'with help of its fin', *med hjælp af små hop* 'with help of small hops', *med hoved ned ad* 'with the head toward down', *med hovedet først* (2) 'with the head first', *med noget som ligner arme* 'with something that looks like arms', *med svingende skridt* 'with swinging steps', *og kigger* 'and looks', *og klatrer* 'and climbs', *og rutsjer* 'and slides', *og vipper med hovedet* 'and rocks its head \m/', *på alle ben* 'on all legs', *på alle fire* (14) 'on all fours', *på alle fire ben* 'on all four legs', *på bagbenene* 'on hindlegs', *på benene og armen* (2) 'on arms and legs', *på brystet og maven* 'on chest and tummy', *på en meget mærkligt måde* 'in

a very strange way', *på en stolt måde* (2) 'in a proud fashion', *på fire ben* (2) 'on four legs', *på hænde og føder* 'on hand and feet', *på hænden og fødder* 'on hands and feet', *på hænder og fødder* 'on hands and feet', *på hånd og knæ* 'on hands and knee', *på to ben* (2) 'on two legs', *på to ben hale op* 'on two legs tail up', *skridt efter skridt* (4) 'step by step', *som en indianer* 'like an indian', *som en soldat* 'like a soldier', *som ikke benytter knæene men føderne i stedet for* 'who doesn't use knees but feet instead'

Turkish learners:

adverb*: stærkt* 'strong/fast', *stille* 'quietly', *stille og roligt (2)* 'quietly and quietly', *stolt* 'proudly', *hurtigt (12)* 'fast', *langsomt (16)* 'slowly'

other: *åbner munden op* 'opens the mouth open', *har to arm til* 'has two arms to', *lige som et barn* 'just like a child', *med sine armer* 'with its arms', *med sine hånd og knæ* 'with hand and knee', *med stor trin* 'with big steps', *med to ben* 'with two legs', *mens han stå* 'as he is standing', *modsatte* 'opposite', *og falder* 'and falls', *og går* 'and walks', *og hopper (2)* 'and jumps', *og kigger i himmlen* 'and looks into the sky', *og løber (2)* 'and runs', *og skier* 'and skis', *over sine fødder og hænder* 'over it feet and hands', *på alle fire* 'on all fours', *på alle sine ben* 'on all its legs', *på almindeligt hastighed* 'at normal speed', *på de fire* 'on the fours', *på fire ben* 'on four legs', *på hånd* 'on hand', *på hendes ben* 'on her leg', *på maven* 'on the tummy', *på maven uden ben* 'on the tummy without legs', *på sin mave* 'on its tummy', *på sine knæ* 'on its knees', *sagte* 'softly', *som den plejer* 'as it usually does', *som en baby* 'like a baby', *som en soldat* 'like a soldier', *som stå* 'as if stand',

Verbs used by the learners:

German learners					Turkish learners				
verb	Approx. translation	freq	%	tier	Verb	Approx. translation	freq	%	tier
løbe	run	127	25.81	1	Gå	walk	219	45.44	1
kravle	crawl	89	18.09	1	Løbe	run	114	23.65	
gå	walk	82	16.67	1	Kravle	crawl	81	16.80	
bevæge	move	26	5.28	1	Svømme	swim	12	2.49	
klatre/klættre/kletre	climb	23	4.67	1	bevæge	move	10	2.07	
krybe	creep	19	3.86	2	klatre	climb	8	1.66	
krabble/krable	crawl	15	3.05	1	hoppe	jump	4	0.83	
hoppe	hop/jump	13	2.64	2	kræve/krævle	crawl	4	0.83	
rutsje/rutsche	slide	10	2.03	2	klimbe	climb	3	0.62	
renne/rende	run fast	9	1.83	1	trænge	*invented*	3	0.62	
glide	glide	8	1.63	2	rutsje	slide	2	0.41	

186

verb	translation	freq		group	verb	translation	freq	
svømme	swim	8	1.63	1	sno	slither	2	0.41
krabe	crawl	5	1.02	1	følge	follow	1	0.21
komme	come	4	0.81	1	glide	glide	1	0.21
maskiere	march	4	0.81	2	komme	come	1	0.21
rase/race	race	3	0.61	2	krybe	creep	1	0.21
skride	stride	3	0.61	2	lave motion	make movement	1	0.21
sno	slither	3	0.61	2	lave S	make s	1	0.21
balancere	move forward balancing	2	0.41	2	paddle	paddle	1	0.21
falde	fall	2	0.41	1	ræse	race	1	0.21
følge	follow	2	0.41	1	ski	ski	1	0.21
jogge	jog	2	0.41	2	skøjte	skate	1	0.21
slængre		2	0.41	2	skynde	hurry	1	0.21
slippe	slip	2	0.41	2	snige	tip-toe	1	0.21
sprinte	sprint	2	0.41	2	steppe	step	1	0.21
suse	move very fast	2	0.41	2	trippe	fall	1	0.21
være på vej	be on the way	2	0.41	1				
vandre	hike	2	0.41	2				
flygte	escape	1	0.20	1				
forfølge	pursue	1	0.20	1				
gallopere	gallop	1	0.20	2				
kable	crawl	1	0.20	1				
lave jogging	make a jog	1	0.20	2				
liste	sneak	1	0.20	2				
mave	move on tummy	1	0.20	2				
møve	push forward, elbow	1	0.20	2				
skubbe	push	1	0.20	2				
slængle	meander	1	0.20	2				
slynge	meander	1	0.20	2				
spæne	move super fast	1	0.20	2				
spankulere	stroll, stride	1	0.20	2				
springe	jump	1	0.20	2				
spurte	sprint	1	0.20	2				
tage skridt	take a step	1	0.20	1				
tulle	toddle, potter	1	0.20	2				
tumle	toddle	1	0.20	2				
walke	nordic walk	1	0.20	2				

Verbs used by the native speakers:

Turkish				German				Danish			
verb	approximate translation	freq	%	Verb	approximate translation	Freq		Verb	approximate translation	freq	
yürümek	walk	219	26.45%	laufen	run, walk	206	23.09%	Kravle	crawl	166	25.70%
koşmak	run	147	17.75%	krabbeln	crawl	112	12.56%	Løbe	run	161	24.92%
ilerlemek	move forward	140	16.91%	gehen	walk, go	108	12.11%	Gå	walk	151	23.37%
emeklemek	crawl on all fours	58	7.00%	klettern	climb	67	7.51%	Bevægge	move	27	4.18%
tırmanmak	climb	50	6.04%	rennen	run	66	7.40%	sno sig	slither, glide	24	3.72%
sürünmek	crawl	41	4.95%	bewegen	move	60	6.73%	Komme	come	22	3.41%
dönmek	turn	22	2.66%	schlängeln	move like a snake	35	3.92%	Glide	glide	10	1.55%
hareket etmek	move	20	2.42%	kriechen	crawl, creep	33	3.70%	Klatre	climb	7	1.08%
gitmek	go	19	2.29%	robben	move like a seal	21	2.35%	Mave	move on tummy	7	1.08%
inmek	move down	19	2.29%	rutschen	slide	14	1.57%	Lunte	sneak, creep, walk silently	6	0.93%
kaymak	slide	11	1.33%	schwimmen	swim	14	1.57%	krybe	creep	5	0.77%
dolaşmak	go around	7	0.85%	stolzieren	strut, swagger, stalk	11	1.23%	møve	glide, move along	5	0.77%
kaçmak	escape, run away	7	0.85%	schleichen	sneak, creep, walk very silently	10	1.12%	svømme	swim	5	0.77%
gezinmek	go around aimlessly	6	0.72%	schreiten	stride, pace	9	1.01%	skubbe	push	4	0.62%
yüzmek	swim	6	0.72%	hüpfen	hop	8	0.90%	pile	dash, move like arrow	3	0.46%
koşturmak	run slowly	5	0.60%	gleiten	glide, slide	7	0.78%	smyge	glide, move along	3	0.46%
oynamak	play, move	5	0.60%	stolpern	stumble, trip	7	0.78%	snige	glide, move along	3	0.46%
daire cizmek	draw a circle	4	0.48%	sprinten	sprint, spurt	6	0.67%	balancere	move forward balancing	2	0.31%
cıkmak	go out	3	0.36%	tapsen	toddle, lumber	5	0.56%	begive	move to	2	0.31%

düşmek	fall	3	0.36%	watscheln	walk like a duck, waddle	5	0.56%	hoppe	hop	2	0.31%
geçmek	pass	3	0.36%	erklimmen	reach, conquer by climbing	4	0.45%	jogge	jog	2	0.31%
gezmek	go around, visit	3	0.36%	hoppeln	hop like a rabbit, lollop	4	0.45%	slange	move like snake	2	0.31%
sürüklenmek	be dragged	3	0.36%	trotten	trot	4	0.45%	slentre	stroll	2	0.31%
takip etmek	follow	3	0.36%	besteigen	ascend, mount, climb	3	0.34%	snegle	move like snail	2	0.31%
yarışmak	race	3	0.36%	fliehen	flee	3	0.34%	spadsere	stroll on foot	2	0.31%
adım atmak	step	2	0.24%	joggen	jog, run	3	0.34%	spæne	dash	2	0.31%
koşturulmak	be made to run	2	0.24%	Schritte machen	take steps	3	0.34%	spankulere	stroll on foot	2	0.31%
süzülmek	glide	2	0.24%	umrunden	go, walk, drive around sth.	3	0.34%	spurte	spurt	2	0.31%
akmak	flow	1	0.12%	verfolgen	follow, chase	3	0.34%	tumle	toddle	2	0.31%
apalamak	crawl for a baby	1	0.12%	walken	like "Nordic Walking"	3	0.34%	vandre	hike, walk	2	0.31%
dolanmak	go around aimlessly	1	0.12%	wandern	wander, roam	3	0.34%	bugte	move in bows	1	0.15%
gelmek	come	1	0.12%	balancieren	move balancing	2	0.22%	falde	fall	1	0.15%
gerilemek	move backwards	1	0.12%	flitzen	move as fast as an arrow, dart	2	0.22%	fare	travel	1	0.15%
kaybolmak	become lost	1	0.12%	flüchten	flee, escape	2	0.22%	fise	dash	1	0.15%
kovalmak	chase after	1	0.12%	hopsen	hop, jump for joy	2	0.22%	flygte	escape	1	0.15%
yalpalmak	zigzag	1	0.12%	jagen	chase	2	0.22%	møffe	?	1	0.15%
				pirschen	stalk, approach carefully	2	0.22%	orme	move like worm	1	0.15%
				rasen	race, dash, speed	2	0.22%	piske	dash	1	0.15%
				schaufeln	shovel	2	0.22%	skøjte	skate	1	0.15%
				schieben	push, shove	2	0.22%	svæve	hover	1	0.15%
				spazieren gehen	go for a walk, stroll	2	0.22%	tage skridt	take steps	1	0.15%
				streifen	prawl, roam	2	0.22%				
				taumeln	sway, stagger	2	0.22%				
				umkreisen	move in a circle	2	0.22%				
				einbiegen	make a turn	1	0.11%				
				erstolpern	stumble and discover	1	0.11%				
				hangeln	move hand over hand	1	0.11%				
				kommen	come	1	0.11%				
				kreisen	circle	1	0.11%				
				marschieren	march	1	0.11%				
				paddeln	paddle	1	0.11%				
				rotieren	rotate	1	0.11%				
				sausen	dash, dart	1	0.11%				
				schlendern	stroll, amble	1	0.11%				
				schlittern	slide, skit	1	0.11%				
				springen	jump	1	0.11%				
				spurten	spurt, sprint	1	0.11%				
				Staksen	stalk, teeter	1	0.11%				
				Stelzen	stalk, teeter	1	0.11%				
				Stromern	roam or wander about	1	0.11%				
				Surfen	surf	1	0.11%				
				Tapern	totter	1	0.11%				
				Traben	trot, lope	1	0.11%				
				Turnen	climb, romp	1	0.11%				
				Vorankommen	make headway	1	0.11%				
				Wackeln	wobble, shake	1	0.11%				
				Weg bahnen	make way	1	0.11%				
				Winden	wind	1	0.11%				
				Ziehen	pull	1	0.11%				

APPENDIX 2: Results of the Mann-Whitney U tests

	p	h	z-val
DNS vs GL	0.273994	0	-1.09391
DNS vs TL	0.243139	0	1.167176
GL vs TL	0.053597	0	-1.93008
GL vs GNS	0.510937	0	-0.65738
TL vs TNS	6.58E-06	1	4.506731
DNS vs GNS	0.549748	0	0.598138
DNS vs TNS	2.71E-05	1	4.196171

a. Mann-Whitney U test: Is Manner in the verb?

	p	h	z-val
DNS vs GL	0.235616	0	-1.18601
DNS vs TL	0.011075	1	-2.54032
GL vs TL	0.079464	0	1.753805
GL vs GNS	0.670739	0	0.425134
TL vs TNS	6.28E-06	1	-4.51677
DNS vs GNS	0.065533	0	1.841607
DNS vs TNS	0.000746	1	-3.37201

b. Mann-Whitney U test: Is Manner in the converb?

	p	h	z-val
DNS vs GL	0.001543	1	3.166506
DNS vs TL	0.191343	0	1.306617
GL vs TL	0.026935	1	2.212463
GL vs GNS	0.009864	1	2.58056
TL vs TNS	0.592742	0	-0.53487
DNS vs GNS	0.148706	0	-1.44412
DNS vs TNS	0.072322	0	-1.79709

c. Mann-Whitney U test: Is Manner in the adverb?

	p	h	z-val
DNS vs GL	0.171153	0	1.368508
DNS vs TL	0.958866	0	0.051577
GL vs TL	0.266309	0	1.111602
GL vs GNS	0.80807	0	0.242916
TL vs TNS	0.789125	0	-0.26745
DNS vs GNS	0.190337	0	-1.30958
DNS vs TNS	0.636063	0	-0.47321

d. Mann-Whitney U test: Is Manner in other?

	p	h	z-val
DNS vs GL	0.531009	0	0.626466
DNS vs TL	0.270205	0	1.10259
GL vs TL	0.524226	0	-0.63684
GL vs GNS	0.083433	0	1.731106
TL vs TNS	6.96E-06	1	4.49487
DNS vs GNS	0.18051	0	1.339186
DNS vs TNS	1.46E-05	1	4.335301

e. Mann-Whitney U test: Does description contain Manner?

	p	h	z-val
DNS vs GL	0.006828	1	2.70513
DNS vs TL	0.554551	0	0.590955
GL vs TL	0.025789	1	2.229378
GL vs GNS	0.064754	0	1.846955
TL vs TNS	0.964863	0	-0.04405
DNS vs GNS	0.309952	0	-1.01532
DNS vs TNS	0.396603	0	-0.8477

f. Mann-Whitney U test: Concatenation of Manner.