Hierarchy of Social/Pragmatic Skills as Related to the Development of Executive Function
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Age	Pragmatic Skills	EF Development/Tasks requiring EF	Treatment Ideas/Strategies
0-3 months	Illocutionary—caregiver attributes intent to child actions - smiles/coos in response - attends to eyes and mouth - has preference for faces - exhibits turn-taking	**Development:** - behavior is designed to meet immediate needs - cognitive flexibility not emerged	- face to face interaction - vocal-turn-taking with care-providers
3-6 months	- laughs while socializing - maintains eye contact appropriately - takes turns by vocalizing - maintains topic by following gaze - copies facial expressions		- vocal turn-taking with care-providers - facial expressions: tongue protrusion, "oh", raspberries.
6-9 months	- calls to get attention - demonstrates attachment - shows self/acts coy to Peek-a-boo (first true communicative intent) - reaches/points to request	**Development:** - Early inhibitory control emerges - tolerates longer delays and still maintains simple, focused attention	- peek-a-boo - place toys slightly out of reach - imitative babbling - imitating actions (waving, covering eyes with hands).

9-12 months	- begins directing others - participates in verbal routines - repeats actions that are laughed at - tries to restart play - uses play routines to give & take, build & bash - vocalizes with gesture to **protest, reject, request objects or action, call, express feelings, notice/comment, respond to others, refuse** * frequency of communicative acts = 2.5/min of free play	**Development:** - Early inhibitory control emerges - tolerates longer delays and still maintain simple, focused attention	- singing/finger plays/nursery rhymes - routines (so big! where is baby?), peek-a-boo, patta-cake, this little piggy - stacking blocks/knocking them down - waving goodbye - pushing toys/food away; shaking head for "no" - "up" with arm raise to be picked up - put objects out of reach for child to reach - vocal play/imitative babbling
12-18 months	- imitate routines - imitates other children - uses words to **protest/reject, greet/call, respond to others, label/notice, request objects/action, express feelings/wants.** - controls behavior of self and others - responds to adult conversational attempts but not contingent - closer to 18 months, uses words to: **request information, initiate pretend play, comment/tell info, acknowledge/answer.** *Frequency of communicative acts: 5/min of free play	**Development:** - can inhibit certain behaviors and shift to new response sets - some self-monitoring and early ability to identify errors (inconsistent) - impulsive behaviors reflect immature attentional system, distractibility, and undeveloped inhibitory control	- model single words for age-appropriate functions - play routines (playing with a doll, pretending to talk on the phone, pushing trucks) - put toys out of reach but in sight for child to point/request with voice - "ignore" child and wait for child to vocalize to get attention - waving "hi", modeling "please" and "thank you" (speech or sign). - using "no" to reject - joint attention activities—commenting on what the child is looking at. Modeling pointing/commenting - asking "wh" questions ("where are your shoes?" "what's that?" "where's daddy/sister/brother/mommy?")

18-24 months	- Uses longer utterance (2-3 words) to express intentions: **protest/reject, greet/call, respond to others, label/notice, request object/action, express feelings, request information, initiate pretend play, comment/tell info, acknowledge/answer** **-** practices familiar conversational frames and schema (book reading routine, go to restaurant schema). * Frequency of communicative acts: 7.5/min	**Development:** - can inhibit certain behaviors and shift to new response sets - some self-monitoring and early ability to identify errors (inconsistent) - impulsive behaviors reflect immature attentional system, distractibility, and undeveloped inhibitory control - Begins to identify correct vs. incorrect block constructions (compared to designs) but unable to "fix" incorrect version.	- two- and three-term semantic relations - words for emotions - shared reading activities - "what's that?" - put toys out of reach, in front of others, for child to label. - verbal turn-taking
24-30 months	- "please" used for polite requests - New intents include: **symbolic play, talk about absent objects, misrepresenting reality (lies, teases)** - Narratives are "heap stories", primarily labels and descriptions - Uses speech to announce intentions - takes two turns in conversation - verbally introduces and changes topics - uses words to express emotion - begins to give descriptions to aid listener - clarifies by repeating - requests clarification	- 2 ½ year olds demonstrate knowledge of rules but unable to shift or alter behaviors, demonstrating perseveration	- target emotion words - use of imaginative language (think, feel, wonder) - teasing ("that's silly") - requests for clarification - feign lack of understanding: strategies for repairing communication breakdown (ex: providing more information). - "experience books" for talking about past experiences. - "drama" activities (dropping things, breaking things, getting hurt, making a mess) - early pronouns
30-36 months	- converses in sentences - attempts to control situations verbally	**Development:** - most choices are made by chance are	same as 24-30 months

	- uses polite "nice" intonation patterns - responds to requests to clarify - apologizes by saying "I'm sorry" - topic continuation near 50% - topics are continued by adding new information - use of language in play increases - narratives are "sequences," with theme, but no plot. - **ToM:** understands that others can want different things (passes a "diverse desires" task at about 3 ½ years of age).	disadvantageous - Unable to delay gratification	
36-42 months	- takes 4 to 5 conversational turns - uses fillers to acknowledge - begins to shift register with younger children - requests permission - uses language for teasing/jokes/fantasies - consistently uses descriptions to clarify - corrects others - uses pronouns to mark old information - requests using "yes/no" questions - more flexibility in requesting, including: **permission directives ("can you…?"), and indirect requests ("would you…?").** - Direct requests decrease and indirect	**Development:** - increased attention, self-control, concentration, and inhibition, but not mature. - gradual decline in impulsivity, although still present - occasional perseverative behavior - incremental improvements in verbal fluency - gradual improvements in processing speed and accuracy on impulse control tasks - 3-year-olds demonstrate knowledge of rules and emerging ability to shift behaviors, but only for one rule necessary for task success.	- "What's missing" game - elaborated conversations ("tell me about what happened at school today"—may need to model this type of conversation). - modeling "baby talk" with younger kids - requests for information and clarification (deliberately obscure input to child/"practice" requests for info/clarification). - retelling simple stories - pronouns

	requests increase. - Primitive narratives: theme and some temporal organization.		
42-48 months	- has long, detailed conversations - tells two events in correct order - tells story mixing real and unreal - uses pronouns across sentences to mark object - New functions emerge: **reporting on past events, reasoning, predicting, expressing empathy, creating imaginary roles and props, maintaining interactions.** **ToM:** understands that others can have different beliefs (passes a "diverse belief" task by 4 years of age).	**Skills:** - Runs simple errands ("get your shoes from the bedroom") - Tidies bedroom with some assistance - Performs simple chores and self-help tasks with reminders - inhibits behaviors (don't touch a hot stove, don't run in the street, don't hit, bite, etc.)	- following one- and two-step directions - retelling simple stories in correct order - sequencing three to four pictures and then describing the events - determining which "step" is missing in a three- to four-step event ("What comes next?" "What do you do before you cut the sandwich?") - reporting to parent what happened in therapy/school/activity (child needs support for this—experience book). - predicting what comes next in a story - practicing empathy for a toy/doll that falls and gets hurt. - self-talk
4-5 years	- uses hints that do not mention the intention in the request - ability to address specific requests for clarification increase - narratives are "chains" with some plot, but no high point or resolution - correctly changes reference with **this/that, here/there, go/come** - ends conversations abruptly - changes topics appropriately	**Development:** - 4-year-olds able to process 2- to 3-step units of information - 5-year-old able to process 4-step units of information - 4-year-olds begin to demonstrate ability to shift and flex between two simple task requirements, but continue to have difficulty when response sets increase in complexity	- understanding sentences with 2-, 3- and 4-critical elements - simple games (go fish, bingo, lotto) - understanding simple riddles ("This is an animal that lives on a farm"). This is the beginning of inferential reasoning. - retelling stories - taking the perspective of others during story retelling

	- uses apposition to cue the listener (Mary, my friend's sister…) - uses **this/that/these/those** from the listener's perspective - initiates easily - politely interrupts adult conversation **ToM:** child understands that s/he can know something that someone else doesn't know (passes a "knowledge access" task by 4 ½ years of age). **ToM:** child understands that others can act erroneously based on a false belief (passes a "false belief" task by 5 years of age).	- 4-year-olds begin to have more successful task completion due to increase in mental flexibility and rapid switching between two simple response sets. - 4-year-olds begin to make more advantageous choices - 4-year-olds capable of generating new concepts and ideas **Skills:** same as above	
5-6 years	- uses focused chains for narratives - gives threats/insults - issues promises - may give praise - stays on topic for 10 turns - uses pronoun reference as a cohesive device - self-monitors speech for errors - negotiates play roles, turns, and ending of play **ToM:** child understands that a person can feel one thing but those feelings can be hidden or not apparent on the face (passes a "hidden emotion" task between about 5 and 5 ½ years of age).	**Development:** - by age six: ability to resist distractions and maintain attention begins to increase. - begin to use silent, verbal mediation as language becomes more complex - 6-year-olds able to process up to 5-step "moves" in simple problem-solving - 5-year-olds demonstrate difficulty switching between multiple rules, even when verbal cues are given. - spurt of development in mental flexibility around 6 years - decline in perseverative behavior - emerging capacity to learn from mistakes and create alternative	- barrier games (following directions, providing specific directions) - 20 questions (who am I?) - "Headbandz" game - written language (draw a picture, write the story that goes with it). - similarities and differences ("how are a bike and tricycle the same? How are they different?") - higher level inferential tasks ("he came downstairs early in the morning and saw the tree." What is happening?). - address multiple meaning words as they come up. - inferring meaning from context ("I'm going to put this word in a sentence

			strategies for simple problems - 4- to 5-year-olds begin to delay initial choices for behavior, selecting goals that lead to "better" rewards later on. - simple strategic planning skills emerge - make better choices **Skills:** - follows two- to three-step directions - tidies bedroom or playroom - Performs simple chores, self-help tasks; may need reminders - Brings papers to and from school - Completes a 20 minute homework assignment - decides how to spend money (allowance) - Inhibits behaviors (follows safety rules, doesn't swear, raises hand before speaking in class, keeps hands to self).	and you try to figure out what it means?). - infer feelings of characters in a story. - negotiating roles in games: "Who do you want to be?" "Who will you be?" - Blanks Level IV questions: "how do you know?" "What could you have done differently?" "What should he have done instead to avoid that problem?" - giving clues that include function ("This is used for…")
6-8 years	- can give multiple step directions - uses well-formed narrative - uses multiple sentence descriptive language (creates riddles, describes characters) - makes and responds appropriately to evaluative comments/correction - check's listener's comprehension - produces full explanations - responds appropriately to compliments		**Development:** - Selective attention begins to develop and mature - 7-year-olds struggle with switching behavior sets that are contingent on multiple demands - 8-year-olds demonstrate increase in focus, sustained and shifting attention - demonstrate more frequent strategic and planned goal choices and behaviors, but not yet mastered	- expressive narrative skills/story grammar - describing character motives and feelings - formulating complex sentences given clauses without using coordinating conjunctions (and, but, so, then). - descriptive language: describing pictures in detail so that the listener can select the correct picture - role playing challenging social

	- apologizes and responds to apologies appropriately.	**Skills:** Same as above	situations ("let's act out what you can do if someone is asking you to do something you don't want to do.") - word attack skills: "How can you turn this adjective into an adverb?" "What part of speech is that?"
8-9 years	- Language is used to establish and maintain social status - increased perspective-taking allows for more successful persuasion - provides conversational repairs by defining terms or giving background information - begins to understand jokes and riddles based on sound similarities - can perform successfully on simple referential communication tasks.	**Development:** - 9-year-olds begin to have more success switching rules/sets between multiple or changing demands. - Rapid surge in development of planning and organizational skills that reflect consideration of task parameters more so than personal or impulsive desires. - strategic behavior and efficient reasoning become more obvious. **Skills:** - Runs errands that may involve a time delay or a greater distance—going to the store, remembering to do something after school ("prospective memory") - Tidies bedroom or playroom (may include vacuuming or dusting) - Performs chores that take 15 to 20 minutes - Brings books, papers, assignments home and takes them back to school. - Keeps track of belongings when away from home	- practice taking the perspective of others - multiple meaning words, jokes, riddles. - Mad-libs - Games such as: Scattergories (working memory), Taboo (inhibitory control), Stare (visual memory). - high-level categories (ex: things that can be rolled). - inferential reasoning skills (higher level). - visualizing activities ("What will it look like when you're done?")

		- completes homework assignments (1-hour maximum) - plans simple school projects such as book reports (selects the book, reads the book, writes a report) - Keeps track of a daily changing schedule - Saves money for desired objects - inhibits/self-regulates (behaves when the teacher is out of the classroom; refrains from rude comments, temper tantrums, bad manners)	
9-12 years	- Stories include complex, embedded, and interactive episodes - understands jokes and riddles based on lexical ambiguity	**Development:** - Significant improvement in ability to inhibit impulsive actions. - Selective attention nears maturity; better ability to selectively attend to relevant and necessary information in the environment. - Able to monitory and regulate actions well. - Relatively mature attentional functions - Able to limit preservative errors at adult level - Temporary increase in impulsivity for short periods - Verbal fluency near maturity - significant gains in processing speed - ability to switch between multiple tasks demands continues to improve	- multiple meaning words - idiomatic expressions/figurative language - riddles - written narratives: Story Grammar Marker (as an example). - assign personality traits to characters in books based on actions (address high-level vocabulary) - identify character beliefs based on actions (address high-level vocabulary) - identify motives for actions in books - games like Balderdash, Apples to Apples.

		- decline in perseverative, non-task oriented behaviors - increasing capacity to learn from mistakes and devise alternative strategies for more complicated and multi-dimensional problems. - Rapid surge in development of planning and organizational skills that reflect consideration of task parameters more so than personal or impulsive desires. - strategic behavior and efficient reasoning become more obvious. **Skills:** Same as above	
12-14 years	- Expository texts used in school-sponsored writing - Most academic information is presented in expository format - Understands jokes and riddles based on deep structure ambiguity	**Development:** - Relative maturity of cognitive flexibility - Perseverative behaviors are rare - Improved flexibility to switch between changing performance demands and initiate deliberate behaviors - Developmental spurt for goal-setting skills, around age 12 - increased ability to use strategies for problem-solving - complex planning skills near maturity - 12-year-old may demonstrate adult-levels of planning abilities and	- practice empathetic response to peers - self-evaluation of social interactions - strategies for identifying figurative language in literature (identify unfamiliar language; keep a written record; practice practice practice). - organizational strategies (Cornell notes, planners, color-coding homework, time-lines, working backwards from deadline in step) - assistive technology (iPads, iPod Touch). -break assignments into chunks with time frames for completions - "to do" lists with timelines

			performance of planned behavior **Skills:** - Helps out with chores around the home, including daily responsibilities and occasional tasks (emptying dishwasher, raking leaves, shoveling snow). Tasks may take 60-90 minutes. - Babysits younger siblings or other kids for pay - uses system for organizing school work, including assignment books, notebooks, etc. - Follows complex school schedule involving changing teachers and changing schedules - plans and carries out long-term projects, including tasks to be accomplished and reasonable timeline to follow; may require planning multiple large projects simultaneously - plans time, including after-school activities, homework, family responsibilities; estimates how long it takes to complete individual tasks and adjusts schedule to fit. - inhibits rule-breaking in the absence of visible authority.	- use large, color-coded, erasable calendars for long-term assignments and projects - use a "date stamp": **due on** and **received on** - vocabulary apps! - keep a vocabulary notebook - identify the main idea (color code); identify supporting details (color code) or supporting evidence (color code). - identifying relevant vs. irrelevant information in writing (own/others').
15-18 years	- Language is used to maintain social bonds ("just talking") - Persuasive and argumentative skills reach near-adult levels.		**Development:** - Perseverative errors are rare - Working memory increases significantly.	**Paper writing**: "outline to paper" method (outline headings: five main points of the paper; slowly add supporting details/evidence until paper

		- increased verbal fluency and sequencing - more complex planning and organizational skills - strategy development and its use in complex, multidimensional goal-oriented behavior continues to improve - overall skills in decision-making, goal selection, and capacity to orchestrate efforts necessary to attain goals continue to improve **Skills:** - manages school work effectively on a day-to-day basis, including completing and handing in assignments on time, studying for tests, creating and following timelines for long-term projects, and making adjustments in effort and quality of work in response to feedback. - establishes and refines a long-term goal and make plans for meeting that goal. - makes good use of leisure time, including obtaining employment or pursuing recreational activities during the summer - inhibits reckless and dangerous behaviors.	is complete).

* **Focus on cognitive language, memory, prediction, and reasoning during all interactions**. Examples: "What do you think?" "Do you remember what happened?" "Can you tell mom that story?" "We have a problem. What is a good solution for this?" "What are some alternative solutions?" "What is the main point of the lecture?" (color code) "What are the details that support the main point?" (color code). "What are the most important things to remember?" (color code).

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