Appendix D: Problem-Solving Strategy Codebook

Code	Description	Example(s)
PROBLEM-SOLVING STRATEGIES	mental and physical tools individuals leverage to overcome challenge	
Resting	When they explicitly refer to rests or recovery	“I stayed at that rest as a long as possible until I could get something back”
Pacing	this refers to instances when they talk about speed, tempo, changing pace	"And yeah, the rest of it was just like sprint to the finish and get as much back as you can" "I'd say the second thing I look for is knowing where the tempo changes."
Subset of Pacing: Taking your time	mentions of patience; not rushing; stopping and having to think about your next sequence	"I mean, it forces me to like: like slow down and like feel the move"
IDENTIFYING Constraints: Cruxes	Explicit mentions of cruxes (the challenging parts)	“And then I knew that bad hold would be the crux”
IDENTIFYING Constraints: in general	General mentions of constraints in problem-solving	“Every problem has constraints, I just need to identify them.”
IDENTIFYING CONSTRAINTS: Knowing limits	the notion of knowing when to stop	".... knowing there's like a certain kind spatial and like bodily awareness, to know like where my limits are.”
IDENTIFYING CONSTRAINTS: pain	When they mention they are in pain as they are climbing	“ I had to stop because the move hurt too much.”
IDENTIFYING CONSTRAINTS: fatigue	very explicit mentions of fatigue or of getting tired on the wall; or "fighting the pump"	"When I was warming up, I got super pumped right away."
IDENTIFYING CONSTRAINTS: time	Mentions of only having so much time; time as a constraint	"We only have so much time, so it impacts how I approach the

		route."
Mind taking over // Higher-order thinking	Mentions of this moment where you cannot rely on your intuition any more--- you have to start being more *intentional* and think about it more	"then you really have to start thinking about it" "if I can get past like the first half the climb, I don't know exactly like how much power and like energy I'll have left. But like, that's when my my brain really takes into like a higher gear."
IDENTIFYING AFFORDANCES: seeking/considering options	explicit mentions of options in problem-solving	"In the cruxes I do, especially when it comes to clipping stances, : because, like sometimes, there's there's clips where you have to like, really pull in with your right foot or something, but those are a lot more taxing on me. And so sometimes like figuring out a different foot option for my left foot." " Climbing is slow for me--99 percent of the time you are thinking, am I doing this move or am I doing that move?"
IDENTIFYING AFFORDANCES: different solution paths	When participants mention that there are multiple ways at arriving to a solution	" that is the appeal to climbing, you know, ten people can climb one route and every one does it differently and it might not be noticeable at first. It's in the subtle differences, even if it is not apparent at first. We can all do it differently."
Energy Conservation	mentions of conserving energy, saving energy (before getting to fatigue!)	" I knew I had to save my energy for the next sequence."

Backing Off	mentions of down climbing or backing off to re-evaluate movement or needing to regroup	" And then I'm maybe thinking, oh, I can't quite reach the hold that I was going to go to, or I can't hit it at quite the right angle, but I can see that there's a foothold that I could use that is different. But I have to go down and reposition my feet before I move up." "I thought, let's go back, let's regroup, let's see if we can get our act together."
Mental Imagery	mentions of painting a picture or filling in holes; making decisions off incomplete information; simulating movement in your head	"it helps me to fill in the blanks in my environment." “I am imagining the sequence.”
Break Down the Problem	when participants explicitly discussing breaking down the problem into smaller parts	"I am breaking up the different cruxy sections."
Planning Beforehand	mapping out the problem before hand, figuring out movement from the ground	“Planning really happens on the ground.” " But like, heel hooks and drop knees and stuff, I can read those from the ground"
Planning Throughout	Mentions of planning on the wall and figuring out movement while climbing; changing plans while climbing	"I think when I am resting, I really only look ahead to the next one or two moves. " "Flags are only something that I notice when I am on the wall, actually in the movement itself, not something I can anticipate from the ground."

Subset of planning throughout: collect information	When they mention needing to gather information on wall	"When I run into something that's unexpected, I have to stop and wait. Figure out how to proceed. I need to collect information, and sometimes it takes time, just kind of waiting and scanning my eyes back and forth. "
Shifting Perspective	when they mention having some sort of lens and shifting that to solve a problem	"I mean, we are looking at the climb through a different lens, therefore solving problems in different ways."
Feeling the problem	Feeling your way through a problem (how blind people solve rock climbing problems because they cannot plan) ; "searching" "scanning"; seems to be unique to visual impairment	" There's a term we call the yellow paging, where I'm just like searching left like I scan the wall left to right. It's like you like a sweeping motion."
Pattern Recognition	recognizes salient sequences, patterns (this can also be a part of expertise building)	" eventually, I know what holds are better and can identify them immediately."
Reflection	Mentions of looking back on a problem and desiring to understand it better (deliberate recall)	"Yeah, I would say, it's more similar, like, you know, if you make you make errors on the bottom of a route, then you're gonna pay for them later. Getting to the top, or getting to the answer, like, obviously it doesn't always have to be perfect to make it the top. I guess it is the same in math. If you can think about and figure out why your answer doesn't make sense, you can fix it."
Sequencing	linking up very specific movement in a description; phase transitions	Strings of very specific sequencing of movement
Sensorimotor Trial & Error	trying something, it didn't work, try again; mentions of "just going for it;	"F around and find out"

Appendix E: Disposition Codebook

Code	Description	Example(s)
Disposition	Orientations, positioning, beliefs, tendencies, or attitudes that individuals bring to their problem-solving (more temporally stable than affect)	
Connecting to other domains	When participants bring in other experiences from other domains	When participants bring in their experiences from biking, gardening, being a mechanic, product developer, when talking about problem-solving
Surival Mode	When they position themselves in a mode that is grounded in survival	" I am constantly in flight or fight mode, just trying to survive."
Trust	Reliance on your feet, your stength, your endurance, and more generally, your self	“I trust myself that in the moves that are out of the crux sequence, I can find a comfortable position to clip when I am there. “
Adaptablilty/ flexibility/ fluidity	this idea of going with the flow, being adaptable, malleable	“definitely, I can't think of the word for it right now, but like creativity, and like willing to change your answer, learning to try different ways to go through something. Being adaptable. I guess the opposite of stubborn --- flexible!! I think their demeanor when they're solving problems.”
Confidence	When they mention feelings of confidence as they engage in problem-solving	“Yeah, it’s a trust thing I've also been learned to just move through the world with confidence, because i literally have to, I have confidence that I am going to be able to react accordingly on the fly.”

Starting over	when they discuss a stopwatch beginning again//going back to learning how to walk again	"I was reborn when I want blind. and I also am very happy and lucky and fortunate that I have children who also had to like, learning to do things. Cause then, because then well, I'm learning alongside of that. and I have someone to play with me as a little kid learning how to walk, run, ride, a bike, catch a ball." "Once that stopwatch begins again, it feels like you're given a chance to relearn yourself, your body, and how you interact with the world around you. Your preconceptions of how you're supposed to or used to operate gradually falls away and you have to begin remolding."
Clock is ticking	mentions of losing time, you only have so much time	"I don't have time for it...." "Do you want to spend 10 minutes or an hour on a problem? We only have so much time. The clock is always ticking"
Societal Perception/ Comparison	comparisons to non-disabled folk and considering how people percieve them.	"because I thought I'd be so less than, and I was at one point, I've now like made it my goal to be not just equal to an able bodied person, but better, so They can't look down on me."

The belief that there is always a solution	there is always an answer. doesn't need to be done perfectly, but it can ALWAYS be done	"don't say I can't say, how can I?" "so I learned that as long as you keep trying eventually there will be a solution" " And I guess, just known that there's always solutions to your problems. The problems that we do have in our day to day life just aren't that significant.
The belief that there is not always a solution	Not always an answer, and that is okay	" A big theme in my life, not just in climbing but in life, is knowing how to pick your battles. There isn't always an answer, and I have accepted that."
Growth	When participants see problem-solving as an opportunity for growth	"And I would say, that's, when you, when you are not so focused on performance based outcome, where it's just like we're out here to have fun and to explore and to grow."
Acceptance of failure	When they mention failure being a part of the process; not fearing it	"So where you're learning how to solve a problem… Ithink central to that is like not being afraid to fail."
Persistence	trying over and over again, not giving up (not necessarily related to the belief that there is always a solution)	" And because climbing is so adaptable, it has helped me to figure out how to work around things and keep trying."
Freedom	When participants engage in problem-solving as a means to break away from the constraints of their disability in everyday life	"Spending every waking second in a wheelchair and navigating the world in a wheelchair requires so much more thinking and creativity and problem

		solving, when i can leave my chair on the ground and leave that part of me behind. “

Appendix F: Affect Codebook

Code	Description	Example(s)
Affect	The subjective experience of emotions	
Empathy	Mentions of empathy or considering the needs of others when problem-solving	"Okay, if if we're thinking about this like problem-solving in design, right? Design is based on empathy and like your ability to to understand where someone else is coming from."
Patience	When participants mention patience being a part of the problem-solving process	"Problem-solving in a comp to me looks like being patient and listening to my caller."
Relief	When participants mention particular moments of relief when completing a sequence; desiring relief when in a sequence	"…I can't see relief, cause there's a few times that I'll even say, do I have relief coming soon? Because I'm dying!"
Fear	Mentions of fear when problem-solving; overcoming fear	"I have always been afraid of heights, so climbing was a great challenge for me."
Frustration	When participants express frustration or moments or being disgruntled in their process of problem-solving	"I now have a problem to solve. I then took it, as I have 2 options here, I can get frustrated and pissed off, that I have a new problem to solve, or I can get excited, that I'm now given a new problem to solve and make it fun. Like math, math can be fun or you can be irritated by it."
Play/joy/fun	mentioning the fun or playfulness of problem-solving; seeing the joy in it	"How I feel after climbing a route… if it's fun and challenging, I am happy."

Being Present	Mentions of presence while engaging in problem-solving	"I think something I learn from climbing…it's a concentrated and isolated experience of being on the wall. There's a lot there to learn in that present moment."
Empowerment	When participants discuss moments of empowerment when overcoming a challenge	"It is empowering for me to get to the top of a climb"

Appendix G: Expertise Building Codebook

Code	Description	Example(s)
Expertise Building	The development of knowledge that contribute to proficiency in a certain domain.	
Skill Acquisition	The development of a certain set of skills over time.	" I would say, the first thing I look for is like any really hard right foot moves, specifically like right foot clips…this is something that comes with time with route reading"
Improvement	Mentions of getting better over time; improving performance over time	**"**I don't think I do great at reading routes… I have gotten better over time though." "I have developed strength now, so I don't need a walking stick any more. My ankles are so strong now."
Past Experiences	Drawing from past experiences; an accumulation of experiences that contribute to knowing	"Yeah, because I think if you don't have the experience, it's very difficult to figure out the movement… Yeah, you need that knowledge base to pull from." "So yeah, **s**olving problems and situations that I'm unfamiliar with or even like topics, I'm unfamiliar with just having this really big like deep experience base of of having solved a lot of problems"
Intuition/ Optimal Grip/ Smooth Coping	A form of knowing or understanding something without conscious reasoning.	"on the fly…Without even thinking about it";

	It can involve quick judgments or insights that arise “without thought”	"My body is problem-solving for me”; "Mind-body-flow" "My body knows how to react without me telling it how to" “The body is switching over to the drivers seat when I’m climbing."
Pattern Recognition / Memorization	Quickly identifying relevant information that aids with problem-solving	“... But now my brain has memorized, when I see this hold, I now know how to use it.”
Problem-Solving is a Muscle	When participants explictly connect problem-solving as a muscle that can strengthen over time	“Problem-solving is like a muscle. If you let yourself fall into a pit of intuition and assumption, it atrophies.” “Being disabled… I have to flex the problem-solving muscle more…” “Yeah, for example, like I did so many bicep curls, now i can lift anything I want.”

Appendix H: Environmental Factors Codebook

Code	Description	Example(s)
Environmental Factors	The role of the surrounding environment in shaping their engagement with problem-solving	
Safety	Concerns about protection on routes, the potential for falls, and the high stakes associated with certain climbing situations	"When I am climbing outside, I'm assessing rock quality, like just assessing safety, too. I think. Like, when I'm climbing outside, I'm definitely thinking more about safety." "In those moments in climbing when you are so terrified, you then have to use that fear as fuel to get you through to safety. It definitely impacts the way I make decisions on the wall."
Unaccommodating Environment	When participants mention that the environment they are in is made without them in mind; when they mention that the environment is constrained due to their disability	"I think also people with disabilities are usually already quite good at problem solving, because they, because they have to figured out how to move themselves through the world because the world is not designed for them"
Community	When participants talk about problem-solving as a social process; when they discuss the importance of community in their domain	"Problem-solving is about how my past experiences interact with other people. And like me, me, specifically watching how they interact with other people and the world. Me specifically

		watching how they interact with the world.”
Context Matters	When participants discuss how problem-solving differs in different contexts (i.e outside, competition climbing, and gym climbing)	“I think it's much more difficult to break beta bouldering than it is on rope climbing. I also feel like I boulder way harder outside than I do inside I think that is because I am an amputee and the setting of boulders inside force a specific movement, whereas climbing outdoors, there is space for adaptation. “