Running Head: LOST CHILDREN

The Problem of Lost Children

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The Problem of Lost Children

Ken Hill has been living with the ghost of a 9-year-old Nova Scotia boy for over

18 years. Hill can picture Andrew Warburton as he was on a sunny day in July, 1986

when he was enjoying activities near his aunt's rural home. Dressed in swimming

trunks, a tank top, and sneakers, he independently set off to meet his older brother at a

lake several hundred meters from the house. Although he had previously walked the

trail with playmates, Andrew disappeared in the forest on his way to the lake. A massive

search effort resulted, ultimately involving over 5,000 community volunteers, fire

fighters, and military personnel. The police search manager called the nearby university

and asked for a psychologist who knew anything about children's spatial behavior.

Professor Ken Hill agreed to meet the search manager at the incident command post.

Hill was asked to indicate on a map of the surrounding environment where search

efforts should be focused. Hill remembers that he could think of nothing in the sizable

literature on the development of children's spatial representation that applied to this

problem. It was obvious that Hill had little to offer, and as the coordinators of the search

continued to converse among themselves, Hill slipped away from the post to join one of

the ground search teams. After 8 days of the search effort, Andrew Warburton was

found deceased from hypothermia, approximately 3.2 km from the place where he had

last been seen.

Ken Hill never knew Andrew Warburton, but the impact of the youngster's

disappearance and the helplessness that Hill experienced changed his career. Hill

joined the local search and rescue team and as a field researcher began conducting

interviews with lost persons who had recently been rescued. As a start, Hill segmented their descriptions into their initial experience of disorientation, their efforts to find safety and the eventual outcome of the incident. Hill discovered the statistical summaries of lost person behavior self-published by Syrotuck (1977) and began keeping similar records of the distance traveled by persons lost in Nova Scotia's environs. In 1996, Hill was asked by the United States National Association for Search and Rescue to write their handbook Managing the Lost Person Incident. In 1999, Hill edited Lost Person Behavior for the Search and Rescue Secretariat of Canada. Now he believes that he can provide a good estimate of where to search for children like Andrew Warburton.

Definition and Incidence

As are most interesting psychological states, being lost is difficult to define. People are considered to be oriented—to know where they are—if they label or otherwise state their location accurately within some frame of reference. Yet, recently wilderness wardens and rangers have reported incidents of lost adults with portable global positioning systems who knew exactly where they were according to the geographic coordinates used to map our planet. Nevertheless, these adults could not translate their coordinates into routes or procedures for getting to where they wanted to be. Montello (1998) also points out that in most day-to-day activities people efficiently travel to disparate locations yet are biased or surprisingly inaccurate when asked to estimate distances or indicate their bearings by pointing to landmarks. Evidently, people do not feel lost unless they are uncertain about how to get to their intended destination.

This more procedural or route-based geographic disorientation is not unusual; it includes episodes when way finders encounter an unexpected scene or path or when they cannot find a particular person, road or landmark. People usually tolerate these events but may begin to feel lost as the time or distance of travel increases beyond what was expected. People also report that they may not feel truly lost as long as they can see other people. Children wandering in urban environments may feel lost because they are shy, afraid or instructed not to approach strangers. In sum, lay descriptions of being lost include cognitive components such as failure of way finding procedures as well as emotional components such as anxiety and fear (Montello, 1998; Hill, 1999).

Police and search and rescue agencies operationally define a lost person as the subject of a search. As we shall see, this definition has a statistical application and overlaps with the more common and inconsequential forms of being lost. For example, in the Canadian Police Information Centre, a missing child incident is categorized as a case of a child becoming lost when the police report indicates that a person under the age of 18 is presumed disoriented or confused, has wandered from supervision, has without judged way finding competence departed from a care facility or institution, has not returned when expected when hiking, camping or participating in other wilderness activities, is overdue or in unfamiliar territory after leaving home or other family location, or has not returned when expected from school, a friend's house, or a meeting (Dalley, 2002). This lost category was assigned to 594 incidents, accounting for 1% of 66,532 missing children reports in Canada in 2002. Seventy-nine percent of these missing children reports involved the runaway category, youngsters who are usually

adolescents. The yearly number of lost children incidents in this registry ranged from 496 to 822 within the decade 1993 to 2002.

Although most lost child incidents end with the child returned to safety within 2 to 4 hours of police or other search and rescue agencies becoming involved, search is dictated as an immediate response when one of the following conditions occur: the child is 12 or younger, is alone, is mentally or medically challenged, is in a hazardous environment, is in inclement weather, is judged to be incapable of way finding and in unfamiliar territory, or is unprepared, without adequate clothing or other necessary resources (Hill, 1997; ERI, 2001). In some Canadian locales, such as Nova Scotia or Ontario suburbs bordering on forests and watersheds, police call outs for search for lost children may occur 1 to 6 times a year. Between 7 and 19% of searches for people lost in rural or wilderness environments involve searches for lost children (Hill, 1997; Syrotuck, 1977).

Despite the low proportion of missing children who are lost, diligent police and search and rescue agencies begin investigation and analyze the urgency of each probable incident upon receipt of the call. The area for search expands quadratically as time passes. Professional agencies have trained search managers who may call out considerable resources, including command post trailers, specialized terrain vehicles and snowmobiles, helicopters and fixed wing aircraft, watercraft, and certified diver, canine, equestrian, mountain bike, cross country ski and ground search teams. An emergency response by professionals is justifiable because the lost child may be vulnerable to criminal predation or environmental hazards, may be experiencing

traumatic fear, or may die alone and exposed. During search operations, it is not unusual that a lost child's parents, friends or community leaders undergo anguish that impairs judgment. The situation may be incomprehensible to the family of victims, especially when the child has become lost while innocently indulging in outdoor play. For example, in1994, 8-year-old Ashley Krestianson took up her sister's challenge to race to a horse back ride in a remote area of rural Saskatchewan. Ashley apparently intended to win the race by taking a short cut. When she did not appear for hours, a massive search effort ensued, continuing unsuccessfully for several weeks. Months later, her body was found by a hunter. Ashley had died of hypothermia.

Events such as these haunt most experienced search managers. The argument that it is rare that children become seriously lost or that urban incidents typically end without consequence is no help when search managers have to decide where to deploy their resources.

Approaches to Research

Several lines of research may help with the problem of lost children. The most applicable is analyses of actuarial data, or case histories from police and wilderness ranger's files (Syrotuck, 1978; Hill, 1997; Heth & Cornell, 1998). Data such as the typical distance traveled have been aggregated to provide useful generalizations about lost person behavior. In addition, search and rescue organizations are increasingly maintaining records of local incidents; indigenous data reflect environmental features and outdoor user profiles that are unique to the area. For example, regional search and

rescue veterans will know that a bike trail has a tricky turn that, if missed, leads a cyclist into a different network of trails.

Another line of research is process oriented, examining what leads children astray and how they navigate on their own. This research studies the attention, memory and problem solving abilities of children of different ages during exploration and way finding. The results provide clues about typical behavior, such as forecasting where a 6-year-old might step off path when returning along a new route. We provide representative examples of these lines of research in the sections that follow.

Distance Traveled as the Crow Flies

The basic index of travel of lost children is the distance as the crow flies between the point last seen and the point found. The crow's-flight distance is measured as a straight line drawn on a scaled map. The line does not intend to represent the actual path that a child took to arrive at the point found, a path that usually is longer and includes turns. There are two reasons why the crow's-flight distance is an important summary.

First, actuarial records of lost child incidents typically only specify the point last seen and the point found. Sometimes the investigation conducted during the search will reveal the intended destination of the child, which is also punctate. It is rare that records include a map of the actual paths taken by the child during his or her wandering. These maps may be included when there is a trail of evidence or footprints, but the trails usually have large gaps.

Actuarial records seldom include a reconstruction of the incident by the lost person. Lost persons typically have difficulty retrieving memories of their wandering, and their reported activities are poorly anchored in space and time. When found, a lost person may be mobile and able to converse in a normal manner, but "Only upon close questioning does it become evident that they are unable to remember where they spent the first night, whether they had any water to drink, or whether they crossed the river yesterday or the day before (Syrotuck, 1977, p. 8)". Such memory deficits are associated with systemic response to fear. For example, LeDoux (2002) summarizes how the hormones produced under stress disrupt perception, problem solving and the formation and retrieval of memories. He describes a "hostile takeover of consciousness by emotion (p. 226)" as the amygdala, in concert with numerous other structures in the brain and body, comes to dominate the processing of information when people are afraid.

Because memories may have been inadequately encoded during their wanderings, the subsequent reconstructions of incidents by lost persons often become schematic, resembling a heroic struggle in which the lost person began with a reasoned plan but encountered natural obstacles which in turn required sub plans and resolution (Hill, 1997). However, evidence of lost persons running in panic or wandering past people while in shock is not consistent with these reconstructions. Experienced search managers believe that there is a short window between when a found child is calm enough to provide good recall and when the child has reconstructed events several times, assimilating the nature of questions and stereotypical attributions of searchers,

investigators, parents, media and peers. The study of children's eyewitness memory and testimony suggests procedures that may lead to valid interviews of found children (e.g., Milne & Bull, 1999).

The second important characteristic of the crow's-flight distance measure is that it can be mapped as a radius for a circle that defines an area for search operations. Examining cases from wilderness parks, Syrotuck (1977) organized 46 records of children's crow's-flight distance traveled. He plotted distributions that search managers could use to prioritize circular areas around the point last seen. Syrotuck suggested that the median crow's-flight distance traveled was a good probabilistic estimate of the distance walked by a subject of a wilderness search; his distributions, as subsequent summaries, are skewed by one or two case histories of subjects who were found at unusually long distances from the point last seen (Heth & Cornell, 1998; Hill, 1999). Syrotuck recognized that forecasting children's behavior would be more accurate if distributions reflected variables such as the age and behavioral tendencies of the lost child as well as characteristics of the environment. For example, he noted that in bad weather some small children (between 1 and 6 years of age) were difficult to detect as they had burrowed or covered themselves in an effort to keep warm. His comparison of the elevations of the point last seen and the point found was consistent with reports that the majority of small children used game trails or followed a drainage channel that afforded a downward path of least resistance.

The circular area defined by the crow's-flight distance radius serves to contain more detailed analysis of environmental variables. In rural and wilderness areas,

evaluation of the features of the terrain such as trails, barriers, watersheds, topography and vegetation usually suggests two to five probable routes that should be searched initially. In contrast, urban and suburban environments are designed to afford ease of pedestrian travel and frequent intersections allow many choices with different headings. Urban police must initiate containment procedures to prevent lost children from encountering traffic, construction, or unsafe neighborhoods. Containment means early posting of personnel near busy intersections, bridges or environmental hazards to watch for the lost child.

Home range

Studies of children's home range indicate how the crow's flight distance measure can be useful for locating children lost in urban and suburban environments. A child's home range refers to the outdoor territory that surrounds his or her home and provides a context for independent travel, play, and exploration (Anderson & Tindal, 1972). When children are reported lost or missing in cities, police typically ask parents about their child's favorite activities and, "Where is the farthest place from home your child has ever gone to alone?" The crow's-flight distance from the home to this location can serve as a radius for a circle to delimit some initial search operations.

The area that a child typically traverses on their way to a distant destination can be represented as a section of this circle. Cornell and Heth (1996) observed the actual paths taken by groups of 3- to 12-year-old children when they walked from their suburban homes to their farthest neighborhood destinations. The section was drawn to include any paths on both sides of the crow's-flight line that were part of the child's

established route and observed wandering to the distant destination (see Figure 1). If the child did not show extensive travel lateral to the crow's-flight line, the section resembled a wedge. The research provides an estimate of the dispersion of children's travel in suburbia, so a search manager can prioritize areas for search when a child's intended destination or favorite sites are revealed by investigation.

Interestingly, the median size of the section increases from 79° to 150° between 7 and 10 years of age, indicating that older children show more dispersion in their distant travel. More than 10% of children between the ages of 7 and 12 select routes that are contained within a section with an angle greater than 180°, indicating that they have gone outside of the half-plane between their home and their intended destination. Travel as disperse as this challenges the argument that development in middle childhood is associated with efficient route choices, or least distance solutions. The expansion of home range is at least partially motivated by the quest for autonomy, exploration, and adventure. During these activities, inattention or miscalculation often leads to errant travel, leading children to realize the value of landmarks (Cornell, Hadley, Sterling, Chan & Boechler, 2001; Hart, 1979).

Some parameters of home range have been derived from interviews and sketch maps by children who live in urban centers and rural towns (Tindal, 1971; Hart, 1979). However, when summarizing travel reported by urban school children, Matthews (1992) discovered that free recall sketching and verbal reporting yielded smaller estimates of home range when compared to the distant locations that children recounted visiting in response to aerial photos and large-scale plan maps. The discrepancy may reflect the

well-known observation that, owing to the amount or structure of information presented to facilitate retrieval, measures involving recall underestimate knowledge relative to measures of recognition. It is risky to underestimate the travel of a lost child. Useful data for search managers may require behavioral observations and unitary indices of distance and dispersion of travel in different environments.

Processes of Way finding

In many communities, parents initially show their children a route and then permit brief unsupervised travel on that route for visits to neighboring friends or play sites within calling range. As early as three years of age, young children enjoy this independence and begin exploring close to home. Their excursions typically involve stepping off an established route without losing sight of familiar territory (Cornell et al. 2001). By ages 5-7, many children have accompanied peers or older playmates to sites that are beyond the views from their home. Children may first experience the problem of way finding when repeating a familiar route and a portion is forgotten. Way finding encompasses a set of perceptual and cognitive skills for orientation and directing travel.

Recognition processes. For example, visual recognition processes can inform children that they are off route in two ways. One is that there is an accumulating absence of familiar or expected cues. The other is noticing something en route that the child is sure that he or she has never seen before. These types of information are correlated, because environments are patchy and features near paths are more likely to be different as the child travels farther from a known area. Novelty can be ambient if a child has established place schemas, or has expectancies of the typical environmental

features within his or her home range (Cornell, Heth & Skoczylas, 1999). For example, playmates may realize that they have misinterpreted the directions to a friend's suburban house if they find themselves amongst high rises.

When unexpectedly lost, young children often seek familiarity. This involves directing scanning, accuracy of recognition memory and judgments of whether a landmark, path or scene has been experienced before (Cornell, Heth, & Alberts, 1994; Heth & Cornell, 1997). Children develop these skills so that by 12 years of age their place recognition abilities are not reliably different from those of adults. Nevertheless, when returning from an off-route excursion, children may correctly recognize an intersection as familiar but not be able to judge the way to turn. Features of all of the intersecting paths would have been seen before from different perspectives. In this situation, off-route way finders may be able to choose between alternative paths by approaching landmarks that were temporally encoded as earlier in their trip or by remembering the direction they chose when they turned off path (Cornell et al. 1999). In other words, to get back en route, places that are recognized sometimes need to be situated in a series of memories of travel.

Serial recall. When they are first learning a route, 8-year-old children remember the places and events at the beginning and end (Cornell, Heth, Kneubuhler, & Sehgal, 1996). When children are 9 to 11 years of age, early in route learning they also note some places where way finding decisions or turns are made (Doherty, 1984; Golledge, et al. 1985). Choice points that occur near the origin and terminus of a complex urban route are more likely to be remembered than those in the middle (Cornell et al. 1992;

Golledge et al. 1992). For example, when 8- and 12-year-old children were asked to point to the way to proceed at intersections while heading back along a 1 km route around a university core, the pattern of correct choices was a downward bowed serial position curve (Cornell, et al. 1966). The bow was not deep, but reliable, and indicates that children tend to step off route at intersections midway during their attempts at reversing a new route. The projection of their errant travel into areas of the university was consistent with data from previous studies that followed children when they had stepped off route. Cornell et al. (1996) showed how the mathematical description of typical route errors could be incorporated into urban police search procedures.

Problem solving. Repeating or reversing a route is not a problem unless inattention or forgetting occurs. Hence, one lesson a child takes from inadvertently stepping off a previously traveled route is that something must be done to prevent such lapses. By 6 years of age, children can be taught prospective strategies that allow them to remember the paths that they walked on the way to their destination (Heth et al. 2002). During outbound travel, the 6-year-old children were repeatedly told at intersections to anticipate what they would see if they were to turn around. The children were then instructed to turn around and check that the landmarks would be there. By 12 years of age, children walking long and relatively unfamiliar routes independently learned to note landmarks at intersections where changes of direction could occur (Cornell et al. 2001). They also independently learned to note landmarks in the skyline that could be seen from a variety of locations. This prospective attention indicated that

12-year-old children are aware of information that allows inferences when they are way finding off route.

Way finding when lost can be thought of as goal-oriented problem solving. The goal is typically not to regain orientation, in the sense that most lost people, children or adults, may only incidentally seek to establish their whereabouts within a known frame of reference. The common goal when lost is to find the most direct route to a familiar place: the original paths, the origin of travel, places with people, home.

Syrotuck's (1977) analyses of a small number of case histories suggested that toddlers under the age of three are unaware of the concept of being lost. They may not feel alone when they are preoccupied with the activities of adventure and may not attempt to "find mommy" for some time. When they do try to get back, they may wander circuitously for several hours. As a result, toddlers are likely to be found in the general area of the point last seen, sometimes hiding or sleeping. Urban search managers describe a "300 meter rule" for toddlers, recommending initial and detailed search within 300 m of the point last seen (ERI, 2001).

In contrast, Syrotuck (1977) suggested that children between the ages of three and six have a concept of being lost, will often make some effort to return home, but lack strategic way finding skills. As a result, they tend to use paths of least resistance and may wander progressively from the point last seen. For example, one 5-year-old child was found 6.4 km down a gentle slope in hilly terrain surrounding the point last seen.

Although when alone many children older than 6 appear to move randomly as an initial reaction to being lost, most settle down and attempt a more effective response. Hill's (1999) interviews suggest that children use four of nine strategies that lost adults reported they had used "for getting unlost". Hill acknowledges that some of these strategies may not be unequivocally rational. For example, the strategy of trail running sometimes occurs after children realize that they are disoriented or have not seen familiar cues for some time. They then hasten down the nearest trail or least effort course. In some instances, the strategy is intended to find out quickly what the travel corridor leads to. Minimizing effort while seeking new information is a rational strategy. Trails are thought to go somewhere, there is the possibility that other people are on the trail, and sights along the trail may help to reestablish bearings. However, in their anxiety to achieve any of these ends, or because of systemic reactions to fear, children will often run to exhaustion and even though a trail is fading or taking them farther into rugged new territory, they are unlikely to reverse their direction.

The other strategies recorded to be used by lost children are classified as direction sampling, view enhancing, and staying put. Direction sampling and view enhancing are brief excursions to obtain more information about the surrounding terrain. These strategies involve procedures to return to an anchor point once a bearing or view has been sampled and not found to be informative. As an example of direction sampling, in one urban incident two 9-year-old girls used a playground knoll as an anchor point for search for familiar cues. One girl watched on the knoll while the other walked down a street to stand on her toes and look for their school. She progressed to

the farthest point she could while keeping her friend in view, then returned to knoll. The girls took turns going out, moving clockwise around the knoll systematically to search adjacent streets (Cornell & Heth, 1983/1999). The view enhancing strategy is illustrated by a rural incident: a 13-year-old boy reported that he interrupted his walking to climb trees to scan for any house (Hill, 1999).

Notice in both the urban and rural incidents that the children's primary goal, to find their own way home, was recast as an immediate sub goal: to gain new information. The analytical decomposition of the problem had not been taught and the children's creation and execution of the strategies is striking. A full description of children's cognitive development could benefit from research on attention, memory and problem solving in these natural but extraordinary circumstances. Reciprocally, forecasting probable locations of lost children could benefit from research on their way finding strategies.

Staying put can be considered strategic behavior if the child has adopted the goal of being found. This is not an obvious goal for many children. Some youngsters have been instructed not to talk to strangers and will avoid searchers who are calling their name, while others do not realize that they are the object of search and will watch with curiosity as searchers sweep areas or police cruisers or helicopters pass by. Some youngsters lost in cities have hidden from the police because they believed that they were in trouble. These reactions help us to understand how children may be lost among people.

However, if the child understands that one solution to becoming unlost is to be found, he or she may go to a familiar or popular site. For example, there is a community police station within West Edmonton Mall, the largest shopping complex in the world. One of the effective police protocols for the almost daily incidents of lost children is to notify the staff at one of the two MacDonald's restaurants. The child is described and staff may have already noticed an anxious isolate. Staying put can be considered to be strategic if, when found, the lost children state that they were following parental instructions or they realized that their travel could lead them farther from home. In rural and wilderness incidents, some children have perched on promontories to wait, despite the exposure to weather (Cornell & Heth, 1983/1999). They state that this helps them to be seen or that this helps them to see large areas where somebody might come. Notice that these strategies require that the children take the perspective of a searcher.

Because young children who are wandering while lost typically are tired and frightened, they may not be staying put with the intention to be found when they are subsequently located asleep, hiding, or resting alongside a trail. Lost persons rarely stay put, even though it is the course of action recommended by search and rescue experts and is commonly instructed by parents. Older children, adolescents, and adults will persevere with way finding for days, even though the daily distance they travel decreases with accumulating fatigue and exposure. These older individuals may have the wherewithal to organize their activities after episodes of panic and can be quite embarrassed by attributions of way finding incompetence.

Social Context

Parental restrictions. Now, as in the past, one of the chief tasks of parents is to inhibit their youngsters from wandering out of supervised care. Fairy tales telling of dark woods, witches and wolves have been updated as urban myths telling of bad neighborhoods, strangers and mean dogs. Less dramatically, while walking with their child in their neighborhood, parents may caution or forbid and thereafter assume that their child is not attempting independent way finding. There is evidence that many children do not adhere to these admonitions (Cornell et al. 2001; Cornell, Heth, Faulkner & Marusiak, 2004; Hart, 1979; Valentine, 1997). Their activities out doors suggest that even young children should be instructed about procedures for safe way finding and what to do when they think that they are lost.

Although typically not recorded as a childrearing variable, parent's regulation of their children's travel fits with the typologies of authoritative, authoritarian, permissive or uninvolved parenting (Maccoby & Martin, 1983). For example, Hart (1979) described negotiated and monitored range restrictions that are characteristic of authoritative parenting. Parents usually initiated control of outdoor travel by specifying the destination for each excursion. After showing that they would comply with restrictions, children would sometimes suggest a new place they could visit on their own. In addition, children would sometimes assume (but not ask) permission, and then go to familiar places and return home to report their activities candidly. Hart reported examples of children fooling their mothers concerning where they played, but usually not for long without being found out. While the reactions of most parents to rule breaking were grounding their child to

home for some period, some parents treated the excursion as a sign that their child was capable; the parents subsequently loosened their range restrictions. Similarly, some parents report that they allowed extraordinary travel because their children had visited distant sites before restrictions had been set. (Cornell, et al. 2004).

In general, children report that they go to more distant destinations when they have parental permission than when they are free ranging (traveling alone without having to ask or tell anyone where they are going; Hart, 1979; Matthews, 1992). Children also report that they go to their most distant destinations when their parents give them permission to be accompanied by older siblings or friends. These self-reports of unsupervised travel attest that children know that it is important to comply with parental regulations.

Vagaries of childhood. Nevertheless, urban police who are experienced search managers will know many incidents involving normally well-disciplined children. Some youngsters become intrigued with adventures of the moment and travel beyond their ability to find their way home. They may accompany friends or siblings to sites and inadvertently become separated from the group. Many will experience errant travel when exploring new routes or devising shortcuts to known sites (Cornell et al. 2001).

Hart (1979) provides fascinating observations that independent children often go out of their way to take 'shortcuts' that are frequently longer and more hazardous than the original routes that they knew. There seems to be prestige associated with retelling these adventures and knowledge of secret routes. Certainly, cognitive prowess underlies efficient shortcutting; shortcuts require the child to rely on survey

representations and strategies for way finding rather than specific route knowledge. When asked to make shortcuts by taking new paths in their neighborhood, 8-year-old children traveled approximately 49% farther than the shortest possible route, whereas 12-year-old children walked only 14% more than necessary (Cornell et al. 2001). Adults attempting shortcuts in an unfamiliar neighborhood walked about 28% more than the least distance shortcut (Cornell, Sorenson, & Mio, 2003).

Sometimes an uncharacteristic argument with peers or parents may cause children to travel beyond their abilities to find their way. Heth and Cornell (1998) found that case histories of runaways and despondents showed a unique distribution of crow's-flight distance between the point last seen and the point found. These subcategories of lost persons exhibited skewed distributions, with more records of distant travel. Upset children may be traveling in response to conflict rather than as part of recreational activities; they may hasten to get away from places, rather than intending to go to places. They are often preoccupied with social imbroglios and not attending to time, landmarks, or bearings. Even when they realize that they do not know how to return, they may avoid searchers until food or shelter takes priority.

Summary

Modern children living in cities and suburbs are supervised, bussed and driven. The child's independent travel to play sites and school is a gradual accomplishment, usually involving the showing of routes, accompaniment by competent peers and the child demonstrating knowledge of his or her address and phone number. Environmental design provides for ease of travel, elimination or isolation of hazards, and way finding

aids such as distinguishable pedestrian, cyclist and vehicle routes and signage. Given these circumstances and an evolutionary history that selected for exploration, foraging, and the ability to return home, the problem of lost children is rare.

Nevertheless, hundreds of incidents do occur and communities have supported the readiness of police and search and rescue organizations. These groups are the real catcher in the rye. They have been deeply affected by their successes and failures and have learned to treat search as an emergency and an investigation. It is only as a last resort that search managers line volunteers shoulder-to-shoulder to blanket an area ploddingly. Instead, search managers first respond by prioritizing areas for search. To do so, they consider the victim's motivations, cognitive abilities and experience, and lost person behaviors in the context of the particular environment. Research in environmental psychology is beginning to help them.

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Figure Caption

Figure 1. The crow's flight distance is measured along a straight line between the child's

home (H) and intended destination (ID). The child's actual path is depicted as an

irregular dashed line and the dispersion of travel can be indexed as the angle of the

section that minimally includes the actual path. Here, the child's path is on both sides of

the crow's-flight line, so the total angle of dispersion consists of a small and large angle.

Cornell & Heth (1996) listed distributions for different age groups when the size of each

child's large angle was doubled. The researchers suggested that search managers

could center a median result on either side of the crow's-flight line between the point last

seen and the intended destination of a lost child. This would provide a section to delimit

search when it was not known whether the child would travel farther to one side or the

other.

ID