Improving Wayfinding for Older Users With Selective Attention Deficits

These design recommendations build on and extend existing guidelines for making signage that is distinctive, consistent, and reassuring.

By Ada D. Mishler & Mark B. Neider

FEATURE AT A GLANCE:
Older adults experience difficulties with navigating their environments and may need to rely on signs more heavily than younger adults. However, older adults also experience difficulties with focusing their visual attention, which suggests that signs need to be designed with the goal of making it as easy as possible to attend to them. This article discusses some design principles that may be especially important to compensate for declining attentional focus. These principles include distinctiveness, consistent appearance and location, standardized images, simplicity, isolation from other elements of the environment, and reassurance about the current route.

KEYWORDS:
aging, older adults, navigation, mobility, spatial orientation, wayfinding, wayfinding aids, attention deficit, directional signs, sign design

As the proportion of older adults increases, it is increasingly important to design public spaces with older adults' needs in mind. One area in which older adults need extra support is in wayfinding. Spatial memory and route-learning performance decrease with age (Head & Isom, 2010; Wilkniss, Jones, Korol, Gold, & Manning, 1997), as does the ability to use maps (Lipman & Caplan, 1992), to navigate an environment (Burns, 1999), to identify turning points in routes (Lipman, 1991), and to form and use mental maps (Head & Isom, 2010; Iaria, Palermo, Committeri, & Barton, 2009).

The consequences of wayfinding difficulties extend beyond annoyance and wasted time; older adults who have trouble with wayfinding tend to avoid driving, which decreases their mobility (Burns, 1999). In turn, loss of mobility contributes to a host of problems, including poor physical and mental health (Fisk, Rogers, Charness, Czaja, & Sharit, 2009). It is therefore important for those who design wayfinding for public spaces to consider, to the greatest extent possible, facilitative measures that support a healthy level of mobility and independence in older adults.

Given that maps and mental maps are not easy for older adults to use or maintain, one of the best options for age-inclusive wayfinding support may be signage. Head and Isom (2010) found that providing directional arrows within a virtual route eliminated age-related decrements in wayfinding performance. However, visual performance may be a barrier to signage use for older adults. Basic sensory declines can be mitigated by following good visibility practices in signage design (see Calori, 2007, for guidelines for the general population), but cognition-related declines in visual performance also occur among older adults. Many researchers believe that these higher-order visual decrements are attributable to a decline in selective attention, the ability to attend to some information while ignoring other information (e.g., Allen, Weber, & Madden, 1994; Hasher & Zacks, 1988; McCarley, Yamani, Kramer, & Mounts, 2012).

The purpose of this article is to point out and expand on the guidelines that selective attention research suggests will be the most important to compensate for age-related attentional difficulties. We also indicate some areas in which current guidelines may not be strict enough to accommodate older users.

A DECLINE IN SELECTIVE ATTENTION

There is considerable evidence from the visual search literature in favor of a selective attention deficit associated with old age. First, various forms of irrelevant information hurt older adults' performance more than younger adults', indicating a reduced ability to filter out irrelevant information. For example, distractors degrade performance disproportionately for older adults (e.g., Scialfa & Kline, 1988). Visual clutter does as well, even when it should be nondistracting (McCarley et al., 2012), and disproportionately reduces older adults' visual acuity (Scialfa, Cordazzo, Bubric, & Lyon, 2013). Older adults also narrow their attentional focus more than do younger adults when perceptual load is high (Maylor & Lavie, 1998) and when distracting information is present (Sekuler & Ball, 1986).

Second, older adults perform similarly to younger adults when searching for objects defined by a single feature, but they exhibit a disproportionate degradation in speed when searching for objects defined by conjunctions of multiple features (e.g., Humphrey & Kramer, 1997; Plude & Doussard-Roosevelt, 1989). For example, university buildings often use very similar signage to provide directions to a room and to name the room. Searching for directional signs may therefore require searching not only for a particular color but also for the presence of simplified shapes such as arrows that indicate a directional sign. The item must have a conjunction of the right color and the right symbols to be a directional sign; searching for such a sign will be more difficult for older than for younger adults if similar colors and shapes occur elsewhere within the environment.

Triesman's feature integration theory proposes that single features can be found preattentively, but conjunctions of features must be found by a process that serially attends to single objects (Treisman & Gelade, 1980). Poor search performance with feature conjunctions would therefore indicate poor performance when selective attention is required. Third, there is some evidence that task maintenance (enhancing the processing of relevant information in order to complete a task) is sometimes difficult in visual search tasks for older adults (e.g., Allen et al., 1994).

Finally, extra guidance in the form of knowing an object's location (Madden & Gottlob, 1997; Plude & Hoyer, 1986) or having redundant information in the display (Allen, Madden, Groth, & Crozier, 1992; Gottlob, 2007) serves to boost visual search performance for older adults, often even more than it boosts performance for younger adults. This effect suggests that extra attention-guiding information can compensate for age-related selective attention deficits. Knowing in advance about an extra feature within an object also boosts older adults' search performance more than it does younger adults', suggesting that prior knowledge can also compensate for selective attention deficits (Humphrey & Kramer, 1997; Madden et al., 2002).

The selective attention deficits evident in old age indicate that some good practices in signage design will be especially important for older adults' performance. These principles are useful for all users of wayfinding signage, but they will be especially important for age-inclusive design, because they may reduce the wayfinding performance gap between older and younger adults. A summary of the principles is provided in Table 1.

Most of these guidelines have been discussed in previous work. Existing guidelines indicate that wayfinding signs should be consistent in their appearance and placement and should be simple and uncluttered (Arthur & Passini, 1992; Calori, 2007; Carstens, 1993; Fisk et al., 2009; Passini, 1992). Many authors also argue that wayfinding signs should be distinct from their background and from other types of signs (Caduff & Timpf, 2007; Fisk et al., 2009; Passini, 1992); some guidelines suggest accomplishing this distinction through visual saliency and redundancy. Finally, reassurance signs are already recommended in some guidelines (Arthur & Passini, 1992; Passini, 1992).

However, the aforementioned suggestions are included within large, multipurpose sets of guidelines, without reference to the relative importance of each guideline. When a trade-off is necessary between two design considerations (e.g., balancing simplicity of the signs against the use of wayfinding signage to attract people to a downtown area), the one that will minimize the impact of attentional decrements should be given priority. Some currently existing guidelines may also need to be more stringent than they currently are; for example, Arthur and Passini's (1992) InfoBands (discussed later) may need to be more strictly simplified than these authors suggest, and the strategic placement of signage on salient landmarks needs to be approached very carefully to avoid distraction by the landmarks themselves. Toward that end, the following guidelines are recommended as being the most important to compensate for selective attention decrements in old age.

IMPLICATIONS FOR SIGNAGE DESIGN

The guidelines that follow are intended to compensate for selective attention deficits in older users. Distinctiveness, consistency, and isolation should help older users focus on the signs. Simplicity helps users process information within the signs, and reassurance helps users maintain their goal and information related to it.

Distinctiveness. Distinctiveness is an important feature of signage design (Caduff & Timpf, 2007), but it has especially high potential for older adults. Older adults' attention is captured more easily by salient objects more so than younger adults' attention (Fisk et al., 2009), and as a result, older adults have a tendency to attend to salient information within their environment and to depend more than do younger adults on salient cues for wayfinding. If the salient cues are not informative about their route, older adults may even attend to the salient cues to the detriment of their wayfinding performance (Lipman, 1991).

The visual search literature indicates some methods for distinguishing wayfinding signage from its surroundings. Because redundant information disproportionately improves older adults' performance, visual redundancy may be a good candidate (Fisk et al., 2009). Specifically, signage could be designed to include multiple features (e.g., color and shape, or two different colors within a sign) that differ from its surroundings.

The problem with the latter option may be that people want signs to fit with the environment, and multiple distinct features may prevent that from happening. A further option would be to use triple-feature conjunctions, which provide an extra feature to support older adults' performance (Humphrey & Kramer, 1997; Madden et al., 2002). Instead of making the signs entirely distinct from the environment, triple conjunctions would take three features from the surrounding environment (for example,

Table 1. Wayfinding Signage Design Principles to Compensate for Declines in Selective Attention

Principle	Definition	Example
Distinctiveness	Signs should be easy to pick out from the surrounding environment and easy to distinguish from conceptually different signage.	A blue triangular sign along a street with brown buildings and square windows would differ from the environment in more than one way: color (blue instead of brown) and shape (triangular instead of square).
Consistency	Features and placement of related signs should remain consistent, and standardized images should be used when they are available.	If all of the wayfinding signs in a building are brown with white sans serif lettering, people who have seen one sign will know to look for another brown sign with white sans serif lettering.
Simplicity	Signs should contain only three to four units of wayfinding information and minimal extraneous information.	If a sign in a three-wing building provides only general information, such as "West Wing This Way," for destination in other wings, it can reduce the amount of information in any one sign. Keeping advertisements and wayfinding signs separate will also reduce the amount of irrelevant information on the wayfinding signs.
Isolation	Signs should be placed in locations that have little other information.	If advertising signs and wall decorations are kept out of a roughly eye-level zone on the walls, wayfinding signs can be isolated within that zone.
Reassurance	Additional signs should be placed along a route to reassure users that they are still on the correct route.	If a sign is placed halfway down a long hallway with the upcoming locations on it, it can reassure and remind users of their route and the appearance of further signage.

a directional sign at a shopping complex could borrow the shape of the windows, the color of the building trim, and the font used on the storefronts) and combine them into the signs. The signs would share one feature with each of those three components of the landscape but would be distinguished by two features from each of the other components. This design might fit the signs nicely into the environment without rendering them difficult to distinguish.

Fisk et al. (2009) also suggested pairing wayfinding signage with distinct landmarks so that older adults can later remember where the signs are located. The suggestion of those researchers would do more than make it easier for older adults to remember signage later; it would make it easier for older adults to find the signage in the first place. However, this option might sometimes prove undesirable, in that older adults might be more inclined to pay attention to the landmark than to the sign, which suggests that the sign itself would have to be distinctive even on a distinctive landmark. Additionally, distinct landmarks may not be available at every decision point in a wayfinding environment.

Finally, it is important not only to make signs easy to pick out from their surroundings but also to make it easy to distinguish between conceptually distinct signs, such as signs that identify a location and those that provide directions to a location. This distinction helps younger adults as well (Passini, 1992) but is especially important for older adults, who might be more prone to becoming distracted by signs they do not need if they are not given extra guidance toward the signs that they do need.

Consistency. Consistent appearance and placement of signage, as well as the use of standardized (culturally consistent) signage graphics, have been suggested by several authors (e.g., Apelt, Crawford, & Hogan, 2007; Arthur & Passini, 1992; Calori, 2007; Carstens, 1993; Fisk et al., 2009; Passini, 1992); but, as with distinctiveness, it may be disproportionately important for older adults.

Passini (1992) argued that consistency helps avoid information overload (the presence of too much information, resulting in a degradation of information processing) by helping people combine the information into a few chunks based on appearance. The visual search literature suggests that consistent appearance also provides people with prior knowledge about what features will indicate a sign; that prior knowledge can serve as the extra guidance that older adults need to overcome selective attention difficulties.

Consistency in the size, color, shape, and layout of conceptually related signs is therefore recommended. For example, if the previous directional sign was a brown rectangle with white sans-serif lettering, it is useful to look for another brown rectangle with white sans-serif lettering when seeking the next sign. The same is true of standardized graphics, which give people the opportunity to be guided by an image with which they are already familiar; one example is the male and female figures that indicate a restroom.

Consistent signage location should even further reduce wayfinding performance gaps between older and younger adults. When older adults know where to look for an object, their attentional scope narrows to exclude distracting

information around the object, disproportionately improving their search performance compared with that of younger adults (Madden & Gottlob, 1997). It should therefore help older adults when signs are placed in the same corner of each intersection and at the same height.

Simplicity. Simplicity within an environment is generally not desirable; simple environments provide fewer cues that help older adults understand their environmental layout (Carstens, 1993; Davis, Thierren, & West, 2009), and they are not interesting or satisfying (Passini, 1992). However, simplicity within signs themselves is probably highly desirable, given the increase in distractibility and clutter effects in old age. These effects mean that age-inclusive signage must adhere more strictly to simplicity than signage designed only for younger adults. Signs should be limited in the amount of both wayfinding-relevant and wayfinding-irrelevant information they provide.

Passini (1992) suggested limiting each sign to three to four units of information, because people tend to glance briefly at signs rather than read them carefully and need to be able to quickly extract the information they need. It becomes even more important to minimize the number of bits of information when older adults are reading a sign. Distracting information is disproportionately detrimental to older adults' speed, and increasing the number of distractors increases the age-related decrement (e.g., Scialfa & Kline, 1988). Huelat (2007) pointed out that progressive disclosure (beginning with general information and making it increasingly specific as a route nears the destination) can reduce the amount of information needed on each sign.

Designers should also minimize the amount of wayfinding-irrelevant information on wayfinding signs. Visual clutter, even when it is not mistaken for relevant information, reduces visual search performance (McCarley et al., 2012) and visual acuity (Scialfa et al., 2013) in older adults. This decrement indicates that irrelevant information, such as an unnecessary logo or advertising images, will make it difficult for older adults to absorb the information that they actually need from the sign, even when a younger adult would not experience much difficulty. This is not meant to imply that all logos and other images are unnecessary information; often, they are relevant and can provide redundancy. For example, combining the name of a destination with its well-known logo on a directional sign might make it easier to find that particular unit of information.

Isolation. The external analog to simplicity within a sign is simplicity in the area surrounding the sign. Distractibility and sensitivity to clutter – the same effects that make simplicity desirable in a sign – also mean that a wayfinding sign will be especially difficult for older adults to find if it is placed in an area that contains numerous other objects.

Arthur and Passini (1992) suggested two zones for wayfinding signage that should not contain distracting information. The first zone, InfoBand 1, should extend from 47 to 63 inches off the floor or ground for easy reading height. The second zone, InfoBand 2, should extend from 87 to 118 inches off the floor for large, location-identifying signs. The height of these two bands is specific to pedestrians, but a similar idea would work for drivers.

Adhering to Arthur and Passini's suggestion should help older adults even more than it helps younger adults by isolating wayfinding signs from distractions that would make it difficult to selectively attend to the signs. Additionally, having signage reliably within the two zones increases certainty about their location, which will help older adults not only by reducing the number of distractions but also by helping them narrow their attention away from distractors that still occur. Finally, isolated wayfinding signs are easier to render salient, so that older adults' attention is easily drawn to them. Environmental complexity may therefore be better left outside of the InfoBands.

The age-related increase in clutter effects suggests a further restriction on Arthur and Passini's (1992) InfoBands. Besides avoiding distractions, the InfoBands should not contain visual information that would not be considered distracting for younger adults. For example, a complex pattern on the wall might make it difficult to find a sign or reduce visual acuity while trying to read the sign.

Again, this recommendation is not meant to refer to the entire environment, which would ideally be interestingly complex. In fact, beyond the interest and the richness of memory cues available in a complex environment, complexity outside the bounds of the InfoBands could actually help older adults focus on wayfinding information. Maylor and Lavie (1998) found that older adults may narrow their attentional focus when there is a high load on their visual system. That is, given a consistent band of low-complexity wayfinding information, high-complexity information outside the band may help older adults narrow their focus to the InfoBand and ignore distracting information outside of it.

Reassurance. Reassurance signs, or signs that tell people that they are still on the correct route, have been suggested for long routes (Apelt et al., 2007; Calori, 2007; Passini, 1992) but may be important even for shorter routes for older adults. Because older adults sometimes find task maintenance difficult (Allen et al., 1994), providing reassurance signage could help to refocus older adults' attention on the wayfinding task and on the subtask of finding further signs to support further wayfinding decisions. Additionally, the presence of reassurance signs could maintain a fresh image of the features that later signs will contain. Finally, reassurance signs may help older adults by providing redundant information. If a sign was missed earlier in the route, the reassurance sign provides people with another opportunity to find out that they are on, or are not on, the correct route.

Figure 1. Example of a sign that adheres to recommendations for distinctiveness, consistency, simplicity, and reassurance.

However, the use of reassurance signs should be balanced with the need to minimize distraction and clutter around the signs. Providing large numbers of reassurance signs could create an overwhelming system in which any one sign is difficult to find.

The sign pictured in Figure 1 is inspired by a building on a university campus. The sign would blend well with brownstone, red brick, and white trim in the building while adhering to the principle of distinctiveness, in that it combines three of the features (rectangular like the bricks, brown like the stone, and white like the trim) into a single sign. Second, the sign adheres to the principle of consistency by matching the brown and white of other wayfinding signs within the building as well as by using standardized symbols from AIGA (AIGA, 2016). Third, it adheres to the principle of simplicity by containing only three units of information and by eliminating irrelevant information. Finally, the sign adheres to the principle of reassurance by reassuring users that they are in the Smith building. Such a sign should be isolated from nonwayfinding signage in order to make it easy to find.

CONCLUSION

Older adults frequently exhibit difficulties in wayfinding. Because maps and other layout information may not be easy for older adults to use, providing environmental support through wayfinding signage might be the best way to mitigate these difficulties. However, visual selective attention, which is needed to find and read a sign, declines in old age, which makes it particularly important to adhere strictly to certain guidelines for signage design.

The principles discussed in this article are not meant to be a comprehensive list of design guidelines. Instead, they are pointed out as principles that must be considered, possibly more strictly than was originally intended, because of age-related attentional limitations. Wayfinding signage should be designed with the goal of minimizing the difficulty of selective attention as well as maximizing older users' ability to employ compensatory mechanisms. Adhering closely to the principles of distinctiveness, consistency and standardization, simplicity, isolation, and reassurance should help not only to improve wayfinding performance for all users but also to reduce the performance gap between older and younger users.

Providing age-inclusive signage could help to maintain high mobility in older adults, prevent them from becoming isolated from their communities, and therefore help to avoid the mental and physical health issues that tend to be comorbid with age-related isolation. Additionally, given the aging of the workforce in the United States, making it easy for older adults to find their way to job interviews, travel to meet clients, and engage in other business-related travel is an important way to help them remain competitive in the workforce. Age-inclusive signage design is therefore an increasingly important topic in an aging population.

REFERENCES

AIGA. (2016). *Symbol signs*. Retrieved from www.aiga.org/symbol-signs/

Allen, P. A., Madden, D. J., Groth, K. E., & Crozier, L. C. (1992). Impact of age, redundancy, and perceptual noise on visual search. *Journal of Gerontology, 47*, P69–P74. doi:10.1093/geronj/47.2.P69

Allen, P. A., Weber, T. A., & Madden, D. J. (1994). Adult age differences in attention: Filtering or selection? *Journal of Gerontology: Psychological Sciences, 49*, P213–P222. doi:10.1093/geronj/49.5.P213

Apelt, R., Crawford, J., & Hogan, D. J. (2007). *Wayfinding design guidelines*. Report of the Cooperative Research Center for Construction Innovation. Retrieved from eprints.qut.edu.au/27556/

Arthur, P., & Passini, R. (1992). *Wayfinding: People, signs, and architecture*. New York, NY: McGraw-Hill.

Burns, P. C. (1999). Navigation and the mobility of older drivers. *Journal of Gerontology: Social Sciences, 54B*, S49–S55. doi:10.1093/geronb/54B.1.S49

Caduff, D., & Timpf, S. (2007). A framework for assessing the salience of landmarks for wayfinding tasks. *Cognitive Processing, 7*, 23.

Calori, C. (2007). *Signage and wayfinding design: A complete guide to creating environmental graphic design systems*. Hoboken, NJ: Wiley.

Carstens, D. Y. (1993). *Site planning and design for the elderly: Issues, guidelines, and alternatives*. New York, NY: Van Nostrand Reinhold.

Davis, R. L., Therrien, B. A., & West, B. T. (2009). Working memory, cues, and wayfinding in older women. *Journal of Applied Gerontology, 28*, 743–767. doi:10.1177/0733464809332785

Fisk, A. D., Rogers, W. A., Charness, N., Czaja, S. J., & Sharit, J. (2009). *Designing for older adults: Principles and creative human factors approaches*. Boca Raton, FL: CRC Press.

Gottlob, L. R. (2007). Aging and capacity in the same-different judgment. *Aging, Neuropsychology, and Cognition, 14*, 55–69. doi:10.1080/13825890969528

Hasher, L., & Zacks, R. T. (1988). Working memory, comprehension, and aging: A review and a new view. *Psychology of Learning and Motivation, 22*, 193–225. doi:10.1016/ S0079-7421(08)60041-9

Head, D., & Isom, M. (2010). Age effects on wayfinding and route learning skills. *Behavioural Brain Research, 209*, 49–58. doi:10.1016/j.bbr.2010.01.012

Huelat, B. J. (2007). *Wayfinding: Design for understanding*. Position paper for the Center for Health Design's Environmental Standards Council. Retrieved from www.healthdesign.org/chd/research/wayfinding-design-understanding

Humphrey, D. G., & Kramer, A. F. (1997). Age differences in visual search for feature, conjunction, and triple-conjunction targets. *Psychology and Aging, 12*, 704–717. doi:10.1037/0882-7974.12.4.704

Iaria, G., Palermo, L., Committeri, G., & Barton, J. J. S. (2009). Age differences in the formation and use of cognitive maps. *Behavioural Brain Research, 196*, 187–191. doi:10.1016/j.bbr.2008.08.040

Lipman, P. D. (1991). Age and exposure differences in acquisition of route information. *Psychology and Aging, 6*, 128–133. doi:10.1037/0882-7974.6.1.128

Lipman, P. D., & Caplan, L. J. (1992). Adult age differences in memory for routes: Effects of instruction and spatial diagram. *Psychology and Aging*, *7*, 435–442. doi:10.1037/0882-7974.7.3.435

Madden, D. J., & Gottlob, L. R. (1997). Adult age differences in strategic and dynamic components of focusing visual attention. *Aging, Neuropsychology, and Cognition*, *4*, 185–210. doi:10.1080/13825589708256647

Madden, D. J., Turkington, T. G., Provenzale, J. M., Denny, L. L., Langley, L. K., Hawk, T. C., & Coleman, R. E. (2002). Aging and attentional guidance during visual search: Functional neuroanatomy by positron emission tomography. *Pscyhology and Aging*, *17*, 24–43. doi:10.1037//0882-7974.17.1.24

Maylor, E. A., & Lavie, N. (1998). The influence of perceptual load on age differences in selective attention. *Psychology and Aging*, *13*, 563–573. doi:10.1037//0882-7974.13.4.563

McCarley, J. S., Yamani, Y., Kramer, A. F., & Mounts, J. R. W. (2012). Age, clutter, and competitive selection. *Psychology and Aging*, *27*, 616–626. doi:10.1037/a0026705

Passini, R. (1992). *Wayfinding in architecture*. New York, NY: Van Nostrand Reinhold.

Plude, D. J., & Doussard-Roosevelt, J. A. (1989). Aging, selective attention, and feature integration. *Psychology and Aging*, *4*, 989–105. doi:10.1037//0882-7974.4.1.98

Plude, D. J., & Hoyer, W. J. (1986). Age and the selectivity of visual information processing. *Journal of Psychology and Aging*, *1*, 4–10. doi:10.1037//0882-7974.1.1.4

Scialfa, C. T., Cordazzo, S., Bubric, K., & Lyon, J. (2013). Aging and visual crowding. *Journal of Gerontology Series B: Psychological Sciences and Social Sciences*, *68*, 522–528. doi:10.1093/geronb/gbs086

Scialfa, C. T., & Kline, D. W. (1988). Effects of noise type and retinal eccentricity on age differences in identification and localization. *Journal of Gerontology: Psychological Sciences*, *43*, 91–99. doi:10.1093/geronj/43.4.P91

Sekuler, R., & Ball, K. (1986). Visual localization: Age and practice. *Journal of the Optical Society of America*, *3*, 864–867. doi:10.1364/JoSAA.3.000864

Treisman, A. M., & Gelade, G. (1980). A feature-integration theory of attention. *Cognitive Psychology*, *12*, 97–136. doi:10.1016/0010-0285(80)90005-5

Wilkniss, S. M., Jones, M. G., Korol, D. L., Gold, P. E., & Manning, C. A. (1997). Age-related differences in an ecologically based study of route learning. *Psychology and Aging*, *12*, 372–375. doi:10.1037/0882-7974.12.2.372

Ada D. Mishler *is a doctoral fellow in the Applied Experimental and Human Factors Psychology Program at the University of Central Florida. She received a BS in psychology from Colorado State University. Her research interests include visual attention, age-related changes in visual cognition, and visual displays. She may be reached at ada_mishler@knights.ucf.edu.*

Mark B. Neider *is an associate professor at the University of Central Florida in the Department of Psychology. He received his PhD from Stony Brook University and was a Beckman Institute postdoctoral fellow. His lab studies attention and cognition in applied contexts, as well as differences across the lifespan, with focuses on technology and training.*

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