Monotype

How to win the in-car technology race

In-car technology is becoming a major factor in consumer buying decisions

While today's drivers aren't in flying or even autonomous cars just yet, the demand for in-car technology has skyrocketed. For car shoppers, a majority said the right Human Machine Interface (HMI) is more important than the car's color and nearly half said the technology is more important than brand name or even body style.[1] And in an increasingly competitive landscape where global giants like Google and Apple offer free, seamless products that directly compete with OEM's technology, it's a tight race.

SMARTPHONES HAVE DISRUPTED THE AUTOMOTIVE INDUSTRY

So what does the "right" in-car technology look like? A smartphone-level experience. Today, over 80% of the global population has a smartphone in their pocket, which has created an expectation amongst consumers that all screens must function at a high level - even those in cars.[2] In fact, almost a third of people said they'd give up on a car if its technology was difficult to use, and those shoppers said they'd consider a different vehicle altogether.[3]

A key component of UX for in-car technology is legibility. Through research with Massachusetts Institute of Technology AgeLab, we found that typeface design features can have a measurable impact on how legible the in-car experience is. There are also environmental factors like size, illumination and color that contribute to legibility. Understanding what makes for a legible driving experience will help you build better in-car experiences for drivers all over the globe.

Offer a flawless driver experience

For drivers, a second - or even a fraction of a second - can be the difference between getting into an accident or driving away safely. While many premium vehicles ship with safety features like blinking sensors and backup cameras, robust in-car infotainment centers will provide new ways to communicate a variety of details to drivers, and in order for them to be useful, they must be legible at a glance.

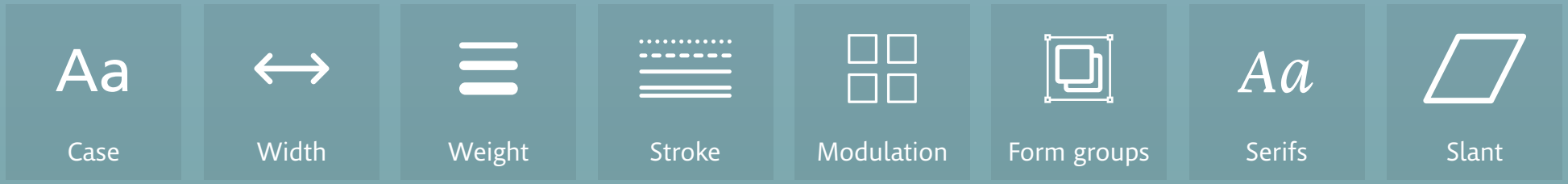
In partnership with MIT AgeLab, Monotype has been studying the impact of typography design on legibility in driving environments. By setting up a driving simulation experiment in a car with eye-tracking technology, we were able to explore the effects typeface design has on glance time and response time across a number of variables.

CONTRIBUTING FACTORS

There are a number extrinsic and intrinsic factors[4] that contribute to legibility around type.

Extrinsic factors: features outside of the type's shape

Intrinsic factors: features of the type itself



Because of this, we tested multiple typefaces with different intrinsic design features, in different settings: well-lit vs. dimly lit and across polarities (black on white text vs. white on black text).

TYPEFACE DESIGN

The first study compared the relative legibility of two typefaces that are actually being used in auto HMIs. We tested a square grotesque style typeface, Eurostile®, and a humanist style typeface, Frutiger®, which has a number of features that should make it more legible in auto HMIs.

LIGHTING

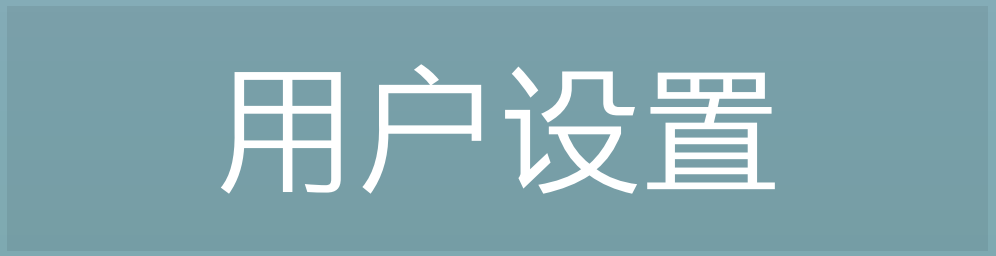
To test the same typeface design features against a variation in one of the extrinsic factors, the same methodology was used but in a dimly lit room with a bright display to mimic nighttime driving.

Eurostile

Frutiger

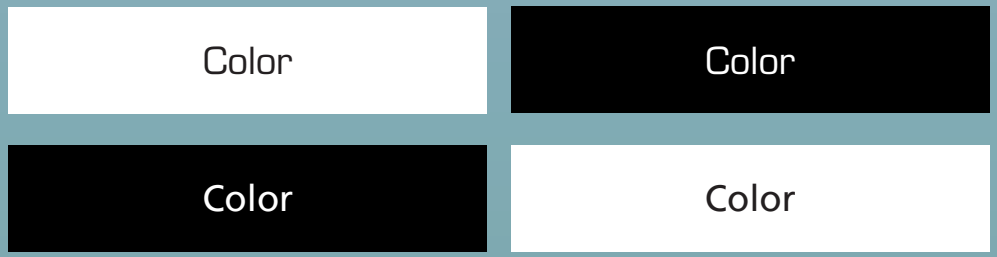
TYPEFACE DESIGN FOR CHINESE TEXT

To better understand which design features improve legibility for Chinese typefaces, we tested five against each other under glance-like conditions, using a methodology that mirrors the occlusion testing standard commonly used in driving research.



COLOR

This study tested the effect of color on legibility by comparing two different typefaces (a grotesque style vs. a humanist style) in two different polarity conditions: positive polarity, black text on a white background; and negative polarity, white text on a black background. Testing color polarity settings provided a way to compare the legibility of a dark screen with light text against a light screen with dark text.



WHAT WE LEARNED

Through the series of studies, we were able to conclude that selecting a typeface with certain characteristics can optimize the appearance of an auto HMI and reduce glance time for drivers.

10.6% For men, Frutiger required 10.6% less glance time than Eurostile.[5]

3.1% Both men and women showed a 3.1% lower error rate when presented with the Frutiger font.[5]

8.7% In dim lighting, participants responded 8.7% faster with Frutiger compared to Eurostile[5]

33.1% The most legible Chinese typeface (M YingHei) was read 33.1% faster than the least legible typeface.[6]

WHAT MAKES A TYPEFACE LEGIBLE?

A legible interface is arguably the most important feature in a car. Humanist typefaces are comprised of many features that promote glance-based legibility. Open spacing and highly distinguishable shapes help ensure drivers get the message no matter the condition.

Open shapes

Ample intercharacter spacing

Unambiguous forms

Varying proportions

Put it in practice

MASTER THE BALANCE OF LEGIBILITY & BRAND IDENTITY

These 10 typefaces feature design attributes that make them highly legible and well-suited for automotive HMIs.

Akhbar™	إعدادات المستخدم
Avenir® Next	User Settings
M Ying Hei™ PRC	用户设置
Daytona™	User Settings
Frutiger™	User Settings
Mayberry®	User Settings
Slate™	User Settings
Tipperary™	User Settings
Trade Gothic®	User Settings
Unitext™	User Settings

ENSURE DYNAMIC LEGIBILITY

Once you have a font chosen, it's also wise to leverage technology that allows you to optimize typeface display or even give control over appearance. Edge™, a module of Monotype M-Kit, allows you to make precise adjustments to the darkness and sharpness of a font, so text is always crisp and clear, regardless of intrinsic or extrinsic factors.

Tuning, or modifying the sharpness or thickness of a typeface, doesn't affect character spacing. This means you can control the look of text at any stage in the development workflow, from design to implementation, without impacting the flow of text. You can even allow customers to tweak the tuning themselves.

Choosing the right typeface and rendering technology can ensure that your HMI will be highly legible in any condition, in any language.

Edge™ Tuning

Be poised for global growth

By 2020, global profits for automotive OEMs are expected to rise by almost 50%, and emerging markets like BRIC (Brazil, Russia, India and China) will account for approximately two-thirds of the total automotive profit, with China ultimately driving the force.[7] In these regions, native speakers rely on text in Arabic, Chinese, and Cyrillic, three languages that have huge, complex character sets compared to Latin text. In order to build HMIs that cater to drivers in these regions, it's critical to pay careful attention to text to ensure screens are legible and efficient without getting bogged down by massive character sets.

BUILD ONCE, SHIP GLOBALLY

When building HMIs with Arabic, Chinese and Cyrillic text, large character sets and complex shaping requirements can mean huge file sizes. Font Linker™, a module of Monotype M-Kit, makes it possible to build attractive, legible displays in any language and the technology works seamlessly in any environment (Android Auto, FreeType, proprietary). Instead of managing multiple font files or embedding one heavy file with all languages, Font Linker™ optimizes memory capacity and simplifies the character search process, freeing up space for other utilities. Font Linker™ allows you to build HMIs for emerging markets while reducing memory and improving time to market without adding costs.

The road ahead

RETHINK THE INTERFACE

A key trend that is dramatically shifting the automotive industry is the prevalence of open-source technology environments. As consumer demand for seamless HMIs has increased, companies traditionally outside the automotive industry, like Google and Apple, have stepped in with solutions like Android Auto and Apple CarPlay.

While open-source environments might not make sense for every OEM, manufacturers like Audi and Volvo have both publicly committed to using Android Auto in all of their cars.[8] Regardless of environment, the same principles around legibility and UX apply, it's simply a matter of choosing technology and content to build the most seamless HMI possible.

USE NEW MEDIUMS

AR/VR has also expanded into automotive in recent years. As automakers adopt heads-up displays (HUDs) and build AR/VR experiences for marketing, consumers have warmed up to the technology, signaling a future where AR dashboards might ship in more than just premium vehicles. As brands like Toyota have come to find, virtual reality can also enhance the car shopping experience. A recent survey revealed that 82% of people want to explore and configure their vehicle in AR/VR. Toyota's marketing campaign for the Toyota C-HR featured a real car seat in a VR experience, which allowed customers to explore, configure and sit inside the vehicle prior to production.[9]

82%

of people want to explore and configure their vehicle in AR/VR.

PREPARE FOR AUTONOMY

While there's still a handful of legal and safety measures to mitigate before autonomous vehicles are ready for mainstream adoption, consumers are growing accustomed to the concept. According to AutoTrader, 70% of shoppers are likely to consider a new vehicle with autonomous driving features.[3] Infotainment centers will be the passenger's lifeline in driverless cars, providing a variety of information to keep them safe, entertained and productive on their journeys.

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Guiding principles

For those in the automotive ecosystem who traditionally serve multiple brands and models across global markets, it's a challenge to build HMIs that cater to every customer segment. By understanding what contributes to a legible experience, taking the right measures to serve global markets and adapting to tech-driven change, you have the keys to creating an engaging, seamless in-car experience.

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