



AAA CENTER FOR DRIVING SAFETY & TECHNOLOGY



2017 TOYOTA COROLLA SE

INFOTAINMENT SYSTEM* DEMAND RATING

High Demand



The Toyota Corolla SE with Entune™ generated overall high demand on drivers in the study. Accessing phone functions, sending text messages and selecting audio entertainment via the center stack required little time, but imposed very high cognitive (mental) demand, while voice commands proved better at keeping drivers' eyes on the forward roadway.

Standard and Optional Features in the 2017 Toyota Corolla

	L	LE	XLE	SE	XSE
○ Optional ● Standard					
Android Auto					
Apple CarPlay					
Mobile App Support		○	●	○	●
Text Messaging	●	●	●	●	●
Navigation		○	●	○	●
Touch Screen	●	●	●	●	●
Gesture Control					
Heads-Up Display					
Voice Commands	●	●	●	●	●
Console Control					

Additional trim levels are available.

ABOUT THE STUDY

Researchers evaluated 30 new 2017 vehicles' infotainment systems* to measure overall demand** placed on a driver when using voice command, touch screen and other interactive technologies to make a call, send a text message, tune the radio or program navigation, all while driving down the road.

STRENGTHS

- While the voice system is active, the touch screen displays a concise list of available commands to reduce the demand on drivers using the system to place phone calls.
- The touch-screen audio menu has a clear and uncluttered design.
- As a safety measure, the touch screen limits access to the phonebook and dial pad while the vehicle is in motion.

WEAKNESSES

- Sending a text message via voice is highly time-consuming and demanding.
- The touch-screen main menu is dense with small buttons that are sometimes difficult to select while driving.

* Infotainment System: Vehicle system that combines entertainment and information content

**Overall demand measured: visual (eyes-off road), cognitive (mental) and time-on-task

VEHICLE OVERVIEW: CONTROLS AND DISPLAYS



VOICE COMMANDS



STEERING WHEEL COMMANDS



INSTRUMENT CLUSTER



CENTER STACK

INFOTAINMENT SYSTEM

The Entune™ In-Vehicle Infotainment System offers the following features:

CALLING AND DIALING



The Toyota Corolla's Entune™ system offers calling and dialing via voice commands and the center stack when a phone is paired via Bluetooth, with some limited functionality via steering wheel buttons. When no phone is paired, the system will conveniently load the Bluetooth setup page to begin the phone pairing process on the touch screen if the user attempts to access any phone-related menu. While the vehicle is stationary, drivers can place calls to contacts and dial phone numbers using voice commands or the touch screen. As a safety measure, the touch screen limits access to the phonebook and dial pad while the vehicle is in motion.

In the on-road study, placing calls and calling contacts resulted in moderate demand. Placing calls using voice commands allowed drivers to keep their eyes on the road, though at the expense of a longer task interaction time and very high cognitive (mental) demand. The average task completion time of 26 seconds♦ may be due, in part, to the markedly long system processing time. However, the voice system did exceptionally well guiding users through the calling process and it accepted conversational, flexible commands. On-screen help and command examples were provided for additional visual aid.

In contrast to the voice system, placing calls using the center stack required very high levels of cognitive (mental) and visual (eyes-off-road) demand from drivers, albeit for a short period of time. The touch screen phone menu displays a cluttered layout with small buttons, which presents challenges when attempting to make accurate selections while driving. This may account for the very high demand levels. The system restricts access to the phonebook and dial pad while driving, but allows the driver to select a contact from a favorites list.

TEXT MESSAGING



With a phone paired over Bluetooth, drivers can use the Corolla's Entune™ system to read and send text messages via the center stack and voice command system. Drivers can select messages from their inbox on the touch screen to be read aloud and then send replies with one of 15 predefined messages while driving. Voice commands can be used to send new messages to a stored contact or new phone number. While driving, restrictions prevent the user from viewing a message on the touch screen, but the user can still scroll through the list of responses to choose a reply. The predefined messages can be customized while the vehicle is stopped.

Sending messages using the voice command system and the touch screen resulted in an overall very high demand. While the voice system understands messaging-related commands with high accuracy, selecting a message for reply proved to impose very high cognitive (mental) demand for an average of 45 seconds♦. The system displays a long list of potential replies on the touch screen from which drivers can select a response through voice or touch. Searching through such a long list likely contributed to the very high cognitive demand demonstrated.

Drivers were able to quickly send messages using the touch screen, but their visual (eyes-off-road) and cognitive (mental) focus were drawn away from the road. The messaging menu is overloaded with tiny buttons and labels, while the list of predefined messages appears to be condensed in order to save space. Searching for the desired option in the cluttered menu proves to be a difficult and highly demanding task.

♦ Compared to a recommended maximum of 24 seconds.



The audio entertainment system includes: AM, XM, and FM radio; CD; USB; Bluetooth; and auxiliary audio via the center stack touch screen and additional touch-sensitive buttons. The voice command system does not support audio commands, although limited audio options are available via steering wheel buttons. Current audio entertainment information is displayed on the touch screen when any audio menu is loaded. If any other menu is currently loaded, any audio-related changes made are conveniently displayed in a temporary dropdown ribbon along the top of the screen.

Overall, the center stack generated moderate demand when using the audio entertainment system. Drivers are subjected to very high visual (eyes-off-road) and cognitive (mental) demand while interacting with the touch screen and accompanying buttons, for an average of 15 seconds[♦]. However, users can quickly change the radio using the 36 available presets and responsive tuning dials.

[♦] Compared to a recommended maximum of 24 seconds.

VEHICLE CONTROLS AND DISPLAYS

VOICE COMMANDS



The voice command system is only available when a phone is paired over Bluetooth. After pressing the clearly labeled voice command button on the steering wheel, drivers can use voice commands to access phone functions and text messaging with a paired phone. A consistent, prominent delay between the time of any user input (whether a steering wheel button press or voice command) and system output occurs, generating confusion and increasing the time it takes to complete any given task. To potentially combat this issue, the Corolla offers an optional continuous-listening setting in which the system is always listening for a command during the voice interaction.

INSTRUMENT CLUSTER



The instrument cluster, located behind the steering wheel, features a central 4.2-inch digital display surrounded by familiar gauges detailing vehicle information, performance, advanced driver assistance system (ADAS) status, vehicle warning messages and other settings.

STEERING WHEEL CONTROLS



The steering wheel contains 17 easy-to-reach buttons labeled with familiar icons. Eight buttons on the left side control audio entertainment shortcuts and voice command system activation. Nine buttons on the right side control the cluster display, cruise control and ADAS.

CENTER STACK



The center stack comes equipped with a 7-inch full-color touch screen, along with two dials and eight touch-sensitive buttons, giving access to audio entertainment, phone function and vehicle settings. Below the touch screen, seven physical buttons and three toggle buttons give access to the Corolla's climate control. Each button illuminates when active, and the climate status is presented on a monochromatic display.

VEHICLE SALES SUMMARY

The 2017 Toyota Corolla is the fifth best-selling vehicle in the United States, with 378,210 vehicles sold during 2016¹.

¹Source: Automotive News at autonews.com; Wall Street Journal at wsj.com – data updated to 2/25/2017.