tobii dynavox®

TD Eye Gaze Pathway for TD Pilot: Instructions & Resources

What is the TD Eye Gaze Pathway?

The TD Eye Gaze Pathway is designed to introduce eye gaze to individuals new to this access method and increase proficiency for those who already use eye gaze but experience access challenges. Through fun activities tailored to individual interests, the TD Eye Gaze Pathway can help increase engagement and grow skills.

TD Eye Gaze Pathway for TD Pilot

https://qrco.de/bfcDtk

TD Eye Gaze Pathway Poster

https://qrco.de/bffWDi

What are the steps in the Eye Gaze Pathway?

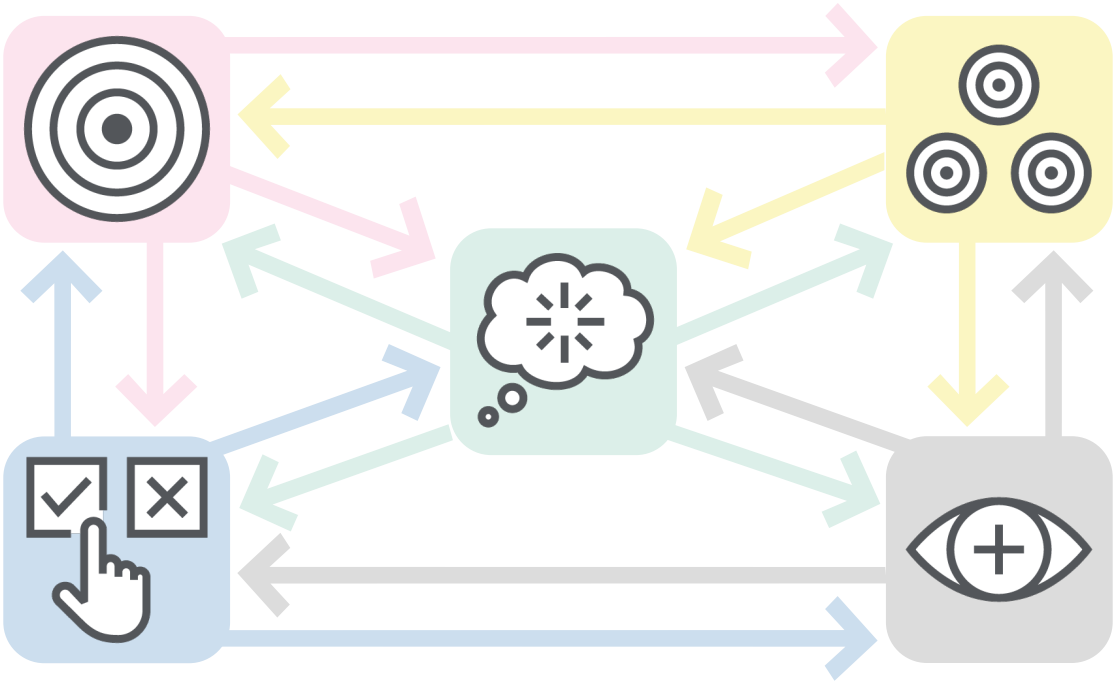
We encourage the goals and activities in each step to be individualized to each person. Their motivations and interests should lead the journey. Not everyone will start at Step 1 and not everyone will go through the Pathway in the same way. This is not a linear recipe card for eye gaze. Everyone is different, so please use your judgment and input from the person using eye gaze to create their pathway to independence with eye gaze access!

When to start?

There is also no correct or incorrect time to start this TD Eye Gaze Pathway. If someone has never used eye gaze before, but it appears to be a possible access method, this is a great time to start. If someone is using eye gaze on a device already, but limited by their access, this is also a perfect time to work on this eye gaze pathway.

How should we use the TD Eye Gaze Pathway?

As we discuss the 5 steps for the TD Eye Gaze Pathway, visualize them as an integrated process rather than a staircase. They build upon each other, but they are not prerequisites to the next skill, nor do they need to be targeted in any particular order.



If you are working on skills in one step, do not hesitate to move on even if you don't feel that area has been 'mastered'. Other activities may encourage the individual to show other skills and/or reinforce those they are currently working on.

You can also mix in skills or activities from other steps above or below the area you are currently in. In each activity you will see tips on when to move to the next step, but variety is key.

Each step will also give examples on how to set goals, keep data, and record progress. Good observation can be a great way to naturally collect data and assess.

Important reminders when working through the TD Eye Gaze Pathway

Set **realistic expectations** with the team and the individual.

Learning eye gaze requires time and practice.

The steps do not need to be addressed linearly. Move forward and backward as needed.

Make it **motivating**!

Interest and motivation are key to each step. Take the time to select activities and goals specific to the individual.

Have family and peers help you make a 'like and dislike' list you can use during practice tasks. An example is provided in the FAQ.

Keep sessions **short**!

This is hard work. Offer lots of breaks and let them tell you when they are done.

Find a space that allows for concentration.

For some, a quiet room is best. For others, having their favorite classmates nearby is better. Think about lighting: Does this person do better when it is brighter or darker?

Be aware if the individual has a startle reflex and **be sensitive** to individuals that do not want all the sounds and lights that come with some activities.

Respond to all communication and praise their hard work, but notice if you are giving too much verbal feedback. That may become distracting.

Troubleshoot challenges as they arise and think outside the box. You may need to get creative!

Remember that **performance will vary**. Every day can be a little different.

Play and learn.
Do not quiz and test.

Remind everyone that they are learning a new way to **play, communicate, and have fun**!

Send fun home practice and supplemental activities whenever possible.

FAQ and Additional Resources

As a therapist, how do I get started with evaluating someone for eye gaze?

Eye tracking, or gaze interaction, is a technology that allows someone to control their computer with their eyes. It also helps us to see where a person is looking on the screen.

- Most people who have at least some vision can use eye tracking.
- Individuals who struggle with other access methods are often good candidates for eye tracking.
- Some AAC users may prefer to use eye gaze in addition to another access method. Reassure them that they can switch between access methods and use what works for them (see TD Snap® action Change Access Method).

Eye Gaze Observation Form
Throughout the evaluation process use an intake form such as this one.

http://qrco.de/egobfm

If you are interested in learning a lot more about eye gaze as an access method, go the Tobii Dynavox Learning Hub for more in-depth resources.

Tobii Dynavox Learning Hub
Log into the Learning Hub to access courses.

http://learn.tobiidynavox.com

Eye Gaze Online Course

http://qrco.de/lhegam

Eye Gaze Course Summary

http://qrco.de/bfRYvY

Introduction to Eye Gaze: Steps to Success

http://qrco.de/bfOwLo

Are there prerequisites to starting or continuing through the Pathway or to using eye gaze AAC?

There are no prerequisites or necessary skills for using eye gaze. If you have questions about the individual's visual acuity, work closely with a neuro-ophthalmologist, their vision specialist, or their occupational therapist. You can modify settings and select activities based on their input.

Can individuals with CVI, Rett Syndrome, or Epilepsy use the TD Eye Gaze Pathway?

Yes! You may need to modify the activities for their specific visual needs, but there is no 'mandatory' order to go through this Pathway or specific requirements need to progress through it. Our eye trackers are safe for those with epilepsy.

CVI and AAC Guide

http://qrco.de/CVIguide

Epilepsy and TD Eye Trackers

http://qrco.de/epegtd

What are the main differences if I use a Windows-based system versus an iOS system?

The eye gaze cameras in the TD Pilot and TD TD Pilot are the same. However, due to the TD Pilot being an iPadOS device and the TD I-Series being Windows-based, the applications and settings will look different. In iPadOS, once you leave a TD app you will need to use Apple's AssistiveTouch for eye gaze access to other apps. Also, some apps are only available on either Windows or iPadOS, so we have created different activity sets based on which hardware you are using.

How do I learn more about positioning?

Positioning is one of the most important elements for successful eye gaze access. The following resources will help you understand proper positioning and optimize for the individual. If you feel their positioning may be impacting success with eye tracking, work closely with an OT, PT or seating specialist.

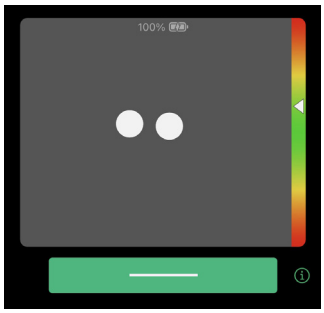
Mounting and Positioning Guide

http://qrco.de/SC2en

Tips for Mounting Video

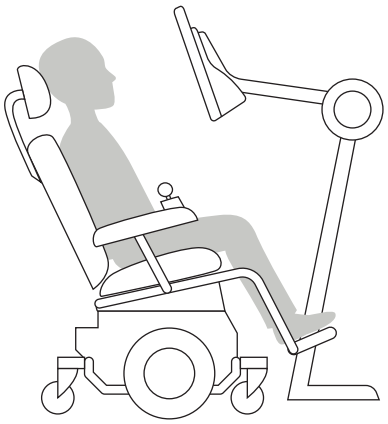
http://qrco.de/ismntV

What is Track Status and how can it help with positioning?



Open the TD CoPilot app on the TD Pilot to launch Track Status. Track Status helps us position the AAC user within this effective range of the eye tracker. First, the track status box gives us a visual of where the person's eyes are on the screen. Their eyes are represented by the white dots. If they blink or close one eye, one of the dots will disappear. Aim to have the person's eyes land about in the center of this box. And second, the color spectrum sidebar shows how close the person is to the screen. As the user's distance increases or decreases, the arrow will move up and down. As a starting point, it can be helpful to position the device so that the white triangle is in the green area of the distance meter.

If the AAC user is having eye tracking issues, use these steps to help:



- Start by positioning the individual comfortably. Adjust the mount and device to suit the user, not the other way around.
- If the user is most comfortable tilted, reclining, or laying down, those are all fine positions! Use the mounting solution to position the device appropriately.
- Make sure the user is wearing their glasses, if they need them, and that the lenses are clean.
- Orient the device so their eyes are within the Track Status box and they can easily see the device screen.
- If the user's head is tilted left or right, the device should also be tilted to match.
- Try to have their eyes in the green area of the Track Box if possible.

When is recalibration necessary?

You may want to recalibrate when you notice accuracy has decreased even when the user's position in Track Status looks good. It may be worth recalibrating after major position changes or significant lighting changes within the environment.

Note
If calibration is not possible or too stressful for the individual using eye gaze, you may not need to do it at all. In fact, in the first few steps of the TD Eye Gaze Pathway, we do not require calibration to participate in the suggested activities. Additionally, it is not necessary to calibrate in each app. TD apps all share the same calibration information.

For more in-depth information on calibration, use the links below:

TD Pilot Tips for Calibration
Watch this video for tips to help you get a good calibration.

https://qrco.de/bfjKRx

TD Pilot Eye Gaze Calibration
See this quick guide for more in-depth information on calibration.

http://qrco.de/pegcEN

What if we are struggling with the camera detecting the user's eyes?

Blinking or shifting dots in Track Status indicate that the eye tracker cannot consistently identify the reflections on the user's eyes. This can be caused by bright overhead lights, bright sunlight, reflective surfaces around or behind the user, and dry eyes. Consider positioning the user so that bright light is not hitting the screen directly. Wearing a cap can also improve the eye tracker's ability to capture reflections on the eyes.

Most glasses and contact lenses do not impact eye tracking. Ensure that the person calibrates with their glasses on, as the calibration will be different with and without glasses. Larger lenses and frameless or partly frameless styles of glasses are best as they are less likely to block the eye. Frames that are sparkly or extremely shiny should be avoided.

Some people naturally have droopy eyelids, which can interfere with eye tracking if the device is in a low position. Try raising the device so that the user is looking straight ahead or slightly up at the screen. This lifts the upper eyelid, so that the eye tracker can see the pupil more consistently.

Dry eyes can occur for a variety of reasons. Try having the AAC user take a break from eye tracking to blink several times or close the eyes for a while to redistribute their natural tears. Consult their physician to see if lubricating eye drops might help.

Contact a vision specialist or occupational therapist if you have specific questions or concerns.

How can the AAC user practice eye gaze skills at home?

Send home a list of activities to improve generalization of the skill in various environments.

1. If the eye gaze device is available, send a list of games, books, or activities you played on the system with instructions.
2. If the eye gaze device is not available, suggest putting on a favorite TV show, using a computer to show motivating photos or videos, and using light up/sound toys to practice finding them around the room.
3. Create paper-based systems, if applicable, to use for communication. See more about that in the FAQ below.

What if we do not have a high-tech eye gaze device? Are there paper-based options?

Yes, a high-tech system is not the only way to use eye gaze. You can hold up objects, pictures, or communication boards depending on the goals you are targeting for eye tracking. There are eye gaze frames that can be used to offer more choices. These frames can be paper or plastic and have the center area cut out so as the partner, you can see what option they are looking at around the frame. Even when an eye gaze device is available, it is important to have a no-tech option to use as a backup if needed. If you have access to Boardmaker, personalized paper-based systems can be created and printed.

ALS Printable Communication Board

http://qrco.de/alscb

Make and Use an E-Tran (Eye Transfer) Board Video

http://qrco.de/etrnvd

Where do I go for troubleshooting general eye gaze or hardware issues?

TD Support Articles (North America)

http://qrco.de/sprtclUS

TD Support Articles (Global)

http://qrco.de/sprtcl

Contact (North America)
Call or use the website chat.

http://qrco.de/cntctUS

Contact (Global)
Call or use the website chat.

http://qrco.de/cntctTD

Why can I not access apps that require Wifi?

Dedicated communication devices are often shipped 'locked' due to insurance guidelines. To unlock the device for access to apps and the internet, follow the steps on the Device Key Management page.

Device Key Management Page

http://qrco.de/bf3as3

How do the DAGG-3 goals interact with the TD Eye Gaze Pathway?

DAGG-3

http://qrco.de/daggPPEN

The DAGG-3 (Dynamic AAC Goals Grid revision 3) has operational goals that can be targeted using the TD Eye Gaze Pathway.

What is Sensory Eye FX2 on my TD Pilot?

There is a fee associated with this program, but on trial devices from Tobii Dynavox a trial version is provided for free. Sensory Eye FX2 allows for heat maps and other ways to collect recordings and data built into the activities.

Sensory Eye FX2 Quick Guide
Open the Self Service App on your TD Pilot to download Sensory Eye Fx2 if you do not see the app on your home screen.

http://qrco.de/sefx2qg

Note
To exit an Eye FX2 game, if the X in the upper corner is not present, look at the bottom right of the screen to exit or press ESC on a keyboard.

What settings are recommended in Sensory Eye FX2?

For those getting started with eye gaze (facilitator selects activities):
Apple Settings > Accessibility > Touch > AssistiveTouch

- Dwell Controll = ON
- Movement Tolerance = 0

Apple Settings > Accessibility > Touch > AssistiveTouch > Devices > Tobii Dynavox Pilot

- Smoothing = 0%
- Auto Hide = ON, 0.50 sec
- Visibility = 0%

Apple Settings > Accessibility > Pointer Control

- Color = None
- Size = Minimum (slider all the way to the left)

For general eye gaze users (user selects activities themselves):
Apple Settings > Accessibility > Touch > AssistiveTouch

- Dwell Control = ON
- Dwell Time = 1.50 sec
- Movement Tolerance = 25%+

Apple Settings > Accessibility > Touch > AssistiveTouch > Devices > Tobii Dynavox Pilot

- Smoothing = 0%
- Auto Hide = ON, 0.50 sec
- Visibility = 5%

Apple Settings > Accessibility > Pointer Control

- Color = choose preference
- Size = adjust to user preference

How do I determine what is motivating to the AAC user?

As you read earlier, motivation and interest are key. We are targeting eye gaze skills in play situations that need to be engaging and personally relevant for the individual. It should be a fun challenge to them, like a good game, but we are working on learning a skill through play. Check in on preferences regularly as people's interests may change over time or they may get tired of a particular activity. Use a likes/dislikes chart to help build a personally motivating repertoire of targets and games. An example is provided below.

Interest area	Most liked	Least liked
TV show		
Movie		
Character or person		
Music		
Colors		
Sounds		
Toys/Games		

Setup for AssistiveTouch on TD Pilot

Use AssistiveTouch to access apps and websites on the TD Pilot

To access apps or your desktop outside of TD Snap, you will use a feature of iPadOS called AssistiveTouch. AssistiveTouch can be used to do everything your keyboard and mouse can do but, today, you are setting it up to just tap. This is what the eye gaze user needs right now to learn.

If you do not see the AssistiveTouch icon on your TD Pilot home screen, follow the directions on pages 4-6 of the TD Pilot Getting Started Guide.

https://qrco.de/bfijVt

Tip

This setup guide is going to set up eye gaze on the TD Pilot in the simplest way possible. See the TD Pilot guides for more in-depth setup when needed.

Accessibility features in iPadOS

In the iPadOS settings menu, there are additional options under Accessibility and AssistiveTouch that may improve the individual's eye gaze experience.

1. Go to **Settings > Accessibility > Touch > AssistiveTouch**. Ensure that AssistiveTouch is ON and the Fall-Back Action is set to Tap.
2. In the Accessibility menu you can also edit the following:
   - To reach and activate on-screen items more easily, turn on **Snap to Item**
   - **Text Size** can be increased, which will make buttons bigger as well
   - **Pointer Control** options can change the appearance of the Pointer
   - **Dwell Time** (although not necessary for early steps) can be set to less than 1 second
   - To fade the pointer away, turn on **Auto-Hide**

Check out this Quick Guide for more information on selecting Apps for the TD Pilot.

qrco.de/bf3YLS

Tour and try tapping with AssistiveTouch

It's important to understand how eye gaze on apps works.

Tip
Try it with your own eyes first!

1. Open the TD CoPilot app on your home screen and check the Track Status Box to ensure the TD Pilot sees your eyes.
2. Open the app or website you want to try.
3. Practice tapping with eye tracking by looking at items on the screen. Adjust settings as needed.

Using tapping in activities outside TD Snap

1. Open the TD CoPilot app on your home screen and check Track Status to be sure the TD Pilot is seeing the person's eyes.
2. Open the app or website you will use in the lesson using touch on the screen (e.g., YouTube Kids, Baby Piano, eyegazegames.com).
3. Start the activity.
4. Pause and resume dwell as needed using the AssistiveTouch Menu.
5. You will need to use touch to get back into the communication software once the activity is complete.

Note
By Step 5 you will want to expand beyond tapping. At that point, you can add customized functions to the AssistiveTouch Menu.

References

Barnello, G. et al. (2020). Visual Function Classification System for children with cerebral palsy: development and validation. Developmental Medicine & Child Neurology, 62(1), 104-110. https://onlinelibrary.wiley.com/doi/epdf/10.1111/dmcn.14270

Bekteshi, S., et al. (2021). Eye movements and stress during eye-tracking gaming performance in children with dyskinetic cerebral palsy. Developmental Medicine & Child Neurology, 64(11). 1309-1424. https://onlinelibrary.wiley.com/doi/epdf/10.1111/dmcn.15237

Clarke, M., et al. (2022). Development and testing of the eye-pointing classification scale for children with cerebral palsy. https://discovery.ucl.ac.uk/id/eprint/10106013/3/Clarke_Eye-pointing%20classification%20scale%20-%20Disb%20%26%20Rehab%20-%20Submitted%20R1%20FINAL%20Ver_2.0-2.pdf

Donmez (2023). A systematic literature review for the use of eye-tracking in special education - https://dl.acm.org/doi/abs/10.1007/s10639-022-11456-z .

Farnsworth, B. (updated 2023) Most used eye tracking metrics. https://imotions.com/blog/learning/10-terms-metrics-eye-tracking/#:~:text=1.-,Fixations%20and%20gaze%20points,the%20eyes%20are%20looking%20at

Griffiths, T., Clarke, M., & Swettenham, J. (2023). The ability of typically developing 2-3 year olds to infer the control mechanism for eye-gaze technology and the impact of causal language instruction. Disability and Rehabilitation Assistive Technology. https://doi.org/10.1080/17483107.2023.2293874

Hsieh, Y. (2022). Eye-gaze assistive technology for play, communication and learning. [Doctoral Dissertation] https://su.diva-portal.org/smash/get/diva2:1688403/FULLTEXT03.pdf

Karlsson, P., et al. (2021). Stakeholder consensus for decision making in eye-gaze control technology for children, adolescents and adults with cerebral palsy service provision: Findings from a Delphi study. BMC Neurology, 21. https://bmcneurol.biomedcentral.com/articles/10.1186/s12883-021-02077-z

Sowers, D. (2022).The effects of intermediary feedback on eye tracking as an access method for AAC. [Doctoral Dissertation] https://etda.libraries.psu.edu/files/final_submissions/26559

Vessoyan, K., et al. (2023). A scoping review of eye tracking technology for communication: Current progress and next steps. Current Developmental Disorders Report, 10, 20-39.

Wilkinson, K., Gilmore, R., & Qian, Y. (2022). Judicious arrangement of symbols on simulated augmentative and alternative communication display optimizes visual attention by individuals with Down Syndrome. Journal of Speech, Language, and Hearing Research, 66, 710-726.

Wilkinson, K., O'Neill Zimmerman, T. & Light, J. (2021). Visual attention to cues targets in simulated aided augmentative and alternative communication displays for individuals with intellectual and developmental disabilities. Journal of Speech, Language, and Hearing Research, 64(5), 1726-1738. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8608184/