Introduction

The lateral line system is a sensory system that is essential for the detection of movement, vibration, and pressure gradients in surrounding water (Jiang, 2019). It consists of receptor organs that contain mechanosensory hair cells that connect to the surrounding water, called neuromasts, which are distributed across the entire body (Bleckmann, 2009).

Many past studies have observed how ýsh swimming mechanics may change when vision is disabled, leading to a heavier reliance on the lateral line system (Stinson et al., 2020). In one study, it was found that disabling the vision system reduces the ýshs distance from the þapper, and that manipulating the turbulence of the water also impacted the way the ýsh swims (Stinson et al., 2020). Previous research shows that turbulent þows create instabilities that can negatively impact the ýshs swimming abilities. This includes increased oxygen intake and reduced swimming speed, which can be detrimental to ýsh in predator-prey situations. However, through the use of their lateral line system, ýsh use turbulence to their advantage and save energy when their body movements are in accordance with turbulence (Liao, 2007).

When swimming, ýsh are able to move in three dimensions. One of these dimensions is pitch, which is the quantitative measurement of

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Figure 1. Screenshot of how Pitch was measured in Image J.

Figure 2. Screenshot of how Distance was measured in Image J.

Figure 3. Line Graph Comparing Distance from Flapper and Flow Tank Level. Note: Fish in Low Flow Move Further than Fish in High Flow, $p < .001$.

Figure 4.