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Table 6.1 Supporting and Counterevidence for Johnson's Diagnosogenic Theory

Supporting Evidence*	Counterevidence
1. Speech data for some stuttering children in the study and their matched nonstuttering controls revealed certain <i>overlap</i> in the overall frequency of disfluency.	1. Disfluencies of nonstuttering children are <i>far less frequent</i> than what Johnson thought, especially in certain critical types of disfluency (Ambrose & Yairi, 1999; Yairi, 1981, 1982).
2. Parents' descriptions of early stuttering were similar to descriptions of disfluent speech of control children.	2. Many parents have reported that they perceived abnormal speech in their child from the first day of stuttering (Yairi, 1983).
3. Parents overwhelmingly depicted a gradual onset with uneventful circumstances.	3. Sudden onsets of stuttering have been found to comprise nearly 40% of all cases (Yairi & Ambrose, 1992b, 2005).
4. Johnson's speech data showed that every disfluency type found in the speech of the stuttering children was also present in the speech of control children.	4. Critical types of disfluencies near the onset of stuttering are substantially different from normal not only in frequency, but in type, proportions, length, and speed (Ambrose & Yairi, 1999; Throneburg & Yairi, 1994; Yairi & Hall, 1993; Yairi & Lewis, 1984). In fact, Johnson and associates' (1959) own disfluency data do not support the assertions he made (see McDearmon, 1968).
5. Data for normally speaking preschool children revealed that disfluency is a normal phenomenon (Branscom, Hughes, & Oxtoby, 1955; Davis, 1939).	5. Disfluency in normally fluent children is a normal phenomenon but limited in frequency (Yairi, 1981).
6. Parents reported no statistically significant differences between children who stutter and normally fluent controls in many aspects of health and development.	6. Evidence for a strong <i>genetic component</i> to stuttering has been growing from several directions, including identification of several chromosomes as likely sites for genes underlying stuttering (Ambrose, Cox, & Yairi, 1997; Suresh, Ambrose, Roe et al., 2006).
7. Children who stutter are often sensitive to negative listener reactions to their disfluent or stuttered speech and seek to avoid reprisal.	7. Experimental studies and surveys revealed that parents' calling attention to their child's stuttering with instructions such as "slow down" and "take a breath and start over" may have contributed to his or her improvement (Martin, Kuhl, & Haroldson, 1972; Wingate, 1976). Although the child may have been destined developmentally to recover, parental instructions did not hinder recovery.

(continued)

Table 6.1 (Continued)

Supporting Evidence*	Counterevidence
8. Reports indicated there were societal/cultural variations in stuttering prevalence related to the extent of community emphasis on speaking skills. The Shoshone Indians, for example, were reported to have no word for stuttering and no cases of it (Snidecor, 1947). By not labeling or calling any attention to disfluencies, Johnson thought their tribe had successfully prevented stuttering altogether.	8. Revisiting the societal/cultural factor it was discovered Native Americans do have a word for stuttering and did know of individuals who stuttered (Zimmermann, Liljeblad, Frank et al., 1983). It appears that stuttering is found universally.
9. Data showed that listeners might vary greatly in their perceptual judgments of speech as normal or stuttered (Tuthill, 1946; Williams & Kent, 1958).	9. Studies showed that negative verbal responses, mild electrical shock, loud sounds, and other aversive stimuli, administered as the immediate consequence of stuttering moments, often result in substantial declines in stuttering (Costello & Ingham, 1984; Prins & Hubbard, 1988).

*Items without a reference are based on Johnson & associates, 1959.

Clinical Implications: For young children, treatment became largely indirect, keeping the child out of therapy so as to not call attention to his or her speech. Instead, therapy focused on parent counseling, advising them regarding better parent-child interaction. Parents were to reduce communicative pressure, be patient listeners, and accept stuttering without reacting. For adults, an important implication of the theory was a reorientation of the person's perspective on the problem, encouraging the person to view him- or herself as a speaker rather than a "stutterer," with particular emphasis on the use of descriptive language when thinking and talking about stuttering. In other words, assuming responsibility for the behaviors that bring about the stuttering allows the person to change and improve (Johnson, 1961a).

Stuttering as a Conditioned Anxiety Response

The learning-oriented diagenosogenic theory exerted strong and lasting influences but was not firmly linked to learning theory principles. Theoretical as well as clinical questions were left open. For example, why and how does stuttering continue or become reinforced in spite of being so painful? Why is the stuttering block eventually released? Therefore, other investigators stepped in to present stuttering within a more formal behavioral conditioning framework. In 1950 Wischner incorporated principles from the conditioning models of both Pavlov (1927) and Hull (1943) to construct his theory. He pointed out that the stuttering adaptation curve (pattern of decrease in frequency

upon successive readings of the same material) is similar to a behavioral extinction curve obtained in animal experiments, and that stuttering increases as the anticipation periods prior to talking get longer. Equating anticipation with anxiety, stuttering was seen to be similar to other behaviors evoked by the avoidance of unpleasant (noxious) stimuli. This is commonly seen in experiments with guinea pigs trapped in a cage, running around frantically to avoid electric shock that is terminated when a certain lever is pressed or floor grid is found.

Imagine learning to walk the tightrope during a circus performance. The rope is high above the ground, without safety nets below. The eyes of all the spectators are glued to your every movement, scrutinizing every bobble. The combination of the fear of falling and a hint of doubt in your ability to perform the task elevates your tension. All effort is concentrated on trying to maintain balance, but the level of mounting anxiety causes you to lose balance over and over again. Each time balance needs to be adjusted, you jerk around in a haphazard array of arm and leg movements until you finally regain composure and prepare to move forward again. You manage to stay on the high wire until reaching the safety of the opposite platform, but your journey there has been filled with a chaotic display of flailing limbs and unusual postures. Perhaps this experience parallels the nature of stuttering as an anxiety response.

Wischner asserted that expressions of parental disapproval of the child's normal disfluency constitute noxious stimuli that create anxiety. The anxiety (anticipation) concerning further painful parental reactions to disfluencies motivates the child to avoid them by changing his or her disfluent speaking behavior. Typically, these attempts end up with mounting tension to the point at which real stuttering ensues. Soon, in a classic Pavlovian manner, other stimuli, such as words, situations, and certain people, are conditioned to become anxiety-provoking stimuli that cause stuttering. Stuttering persists in spite of being painful due to the principle that learning takes place as a result of drive reduction (Hull, 1943). Stuttering is self-reinforcing because the anxiety that builds up prior to talking is greatly relieved when the stuttering finally occurs and is completed. The reinforcing power of the sharp fall in anxiety *immediately* after a stuttering event is greater than the adverse social reactions that follow. The physical behaviors (secondary characteristics) are also reinforced because the person who stutters is convinced that they actually helped "get the word out." Eventually, these tensions and movements become integrated into the stuttering pattern.

Weaknesses: One weakness of Wischner's theory is that many young children do not appear anxious at the time of stuttering onset. Additionally, many children present with sudden onset, which does not support the notion of a gradual learning of behavior.

Clinical Implications: Although extinction of responses set up by avoidance conditioning is difficult, it is still possible if an animal in a cage ignores the danger signal and the expected negative consequences do not materialize. Accordingly, stuttering should diminish if speech disfluency is experienced in the absence of noxious stimuli so that

the anxiety is deconfirmed. By inference, remediation for adults is possible through behavioral modification, particularly through the process of *desensitization* that lowers anxiety and sensitivity to listeners' reactions. Practicing easy voluntary disfluencies that, as we know, are not associated with anxiety and do not invite negative reactions, should be helpful. For young children, Wischner's ideas, like Johnson's, imply that parents must be counseled to accept their child's stuttering and stop reacting to it.

The Conflict Theory of Stuttering

Although Wischner's theory provided a better framework for the view that stuttering is an acquired behavior shaped from normal disfluency, additional aspects, such as the initial trigger (is it really normal disfluency?) and the nature of dynamics underlying the moment of stuttering leave room for additional contributions. Sheehan's (1953) conflict theory varies from Johnson's and Wischner's ideas in two respects. First, the underlying cause of stuttering is proposed to stem from various fears, such as fears of specific words or speaking situations, as well as unconscious fears of exposing the ego to the threat of failure, among others. These fears stimulate conflict between any of several pairs of opposing drives, such as the drive to speak and the drive to avoid stuttering, the drive for expression of self versus the drive to avoid exposing oneself, between conscious speech control versus automatic processes, and others. Convolutionally, then, subconscious psychoemotional elements are injected into this primarily psychobehavioral theory.

Second, regarding the dynamics that trigger moments of stuttering, Sheehan used studies of approach-avoidance conflict in animals as the model. In this experimental paradigm, a hunger drive motivates the animal to move toward the food, but when the food is approached, an electric shock is delivered and the animal retreats to avoid pain. Going back and forth, the animal eventually freezes in one place, where the strengths of the opposing drives are equal. This is comparable to the person who stutters who finds himself or herself in a conflict between the urge to speak and drive to avoid speaking and stuttering, regardless of the source of the fear and conflict. Freezing occurs when approach and avoidance drives reach equilibrium, resulting in a stuttering block. Repetition and prolongation would represent oscillating and stopping at the point where the two-drive gradients cross. Stuttering is learned and persists because it is being self-reinforced through reduction in anxiety during the block when the approach drive finally prevails and the word is uttered.

Sheehan (1970) later posited that the central problem with stuttering is another form of conflict: a self-role conflict. Because people who stutter speak fluently at times, they possess two roles: stutterer and fluent speaker. They constantly attempt to embrace the fluent role by hiding/minimizing the stuttering in social contacts, hoping to "pass" as a normal speaker. The guilt feelings about the pretense mount to tension, resulting in stuttered speech.

Weaknesses: Although Sheehan's ideas account well for variations in stuttering frequency with situational factors, such as audience size and identity of the listener, it fails to be exhaustive with respect to explaining the unknown fears underlying stuttering and

why singing, which also involves expression of emotion and specific words, is not also stuttered.

Clinical Implications: Accordingly, treatment should be primarily a matter of gaining mastery over fear, decreasing the tendencies for avoidance while increasing the approach drive. Sheehan strongly advocated that the person who stutters should actively accept, rather than hide, the role of the stutterer, by bringing stuttering out into the open. The inclination to hide stuttering creates fears that “it” will be exposed sooner or later. It strengthens the avoidance drive and the related psychoemotional conflicts that are expressed in stuttering moments. Clients should openly talk about their stuttering, even allow for some stuttering on purpose. By being open about stuttering, tension is reduced and stuttering is decreased.

Stuttering as an Operant Behavior

A further significant theoretical development is seen in Shames and Sherrick's (1963) application of a strict operant conditioning frame of reference to stuttering. It is similar to the Johnson and the Wischner notions in that stuttering is said to emerge from normal disfluency. The principal difference from these two, as well as from Sheehan's ideas, lies in their reliance only on observable behaviors and their consequences. There is no allowance for intermediating emotions, such as anxiety or guilt feelings that are prominent in the previous models. Thus, normal disfluencies, probably of physiological origins, are modified through complex interactions among four modes of behavioral learning: (1) positive reinforcement, (2) extinction (nonreinforcement), (3) punishment, and (4) negative reinforcement. Positive reinforcement is said to have taken place when introduction of a stimulus increases a response. Removal of positively reinforcing stimuli reduces the likelihood of the response (extinction). Punishment is said to have taken place when presentation of a stimulus decreases a response. Removal of punishing stimuli increases the likelihood of the response (negative reinforcement). Table 6.2 summarizes the four modes, or principles, of operant learning for purposes of behavior modification (conditioning).

For most children, disfluency is diminished through either extinction, being ignored by parents and others, or through verbal punishment, (e.g., “Stop it!”). In a smaller

Table 6.2 Description of Various Forms of Behavioral Modification

Term	Stimulus Manipulation	Behavioral Outcome
Positive reinforcement	<i>Presented</i> after behavior	Increase
Extinction	<i>Withheld</i> after behavior	Decrease
Punishment	<i>Presented</i> after behavior	Decrease
Negative reinforcement	<i>Withheld/removed</i> after behavior	Increase