


## Unraveling the Ambiguity of Hairpins in Music

Interpreting Western musical notation remains a largely subjective task. Yes, scores provide the notes and a schematic of how to play them. But the schematic that notation creates remains far from exact. To demonstrate the imperfections of Western musical notation, look no further than the hairpin .

Numerous piano pieces composed after the late 18th century defy the standard conventions of the hairpin. Rather than using hairpins to delineate an increase or decrease in volume, it functions both temporally as a notated rubato to push and pull the tempo and gesturally to prompt a physical response from the performer. By analyzing performers' interpretation of hairpins in Chopin, Liszt, Schoenberg, and Rachmaninoff, the standard definition of the hairpin morphs into one of not only dynamics, but also tempo and gesture.

The relationship between dynamics and tempo makes neurological sense. Young pianists especially struggle with keeping the two markings separate. Beginner pianists tend to slow down during soft passages and speed up during loud ones. But this is not some otherworldly phenomenon. In fact, studies analyzing pianists' motor skills supports this claim. The results indicate that playing fast and loud is physically easier than playing slow and loud. The numbers back it up, too.

Shinishi Furuya conducted a study where he recorded maximum rate of repetitive piano keystrokes (trills) in 24 pianists at four different volumes. Below are the results from one of his figures.<sup>1</sup> The mean increase of 0.1 extra keystrokes per second with each increase in dynamic demonstrates the notion that as dynamic increased, the speed at which the pianists could trill also

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<sup>1</sup> Furuya, Shinichi, Takanori Oku, Fumio Miyazaki, and Hiroshi Kinoshita. "Secrets of Virtuoso: Neuromuscular Attributes of Motor Virtuosity in Expert Musicians." Scientific reports. Nature Publishing Group, October 27, 2015. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4621510/>.

increased, and vice versa. Even a quick Google search supported this result. When I searched for “how to play piano fast and quiet” I found countless forums of frustrated pianists trying to learn the secrets to this technique. On the other hand, my search for “how to play piano fast and loud” yielded far fewer results.<sup>2</sup> Given this information, it’s not particularly surprising that the push and pull of the dynamics aligns with a push and pull of the tempo, too. And starting with the Romantic Era and beyond, composers began writing hairpins with a meaning associated more closely with tempo.



**Figure 1: Keystrokes per second at 4 different dynamic levels**





**Mean, SD, maximum, and minimum values of the variables evaluated across participants.**

	Max	Min	Mean	SD
Max. rate of piano keystrokes (Hz) p	7.8	6.0	7.0	0.5
Max. rate of piano keystrokes (Hz) mp	8.1	6.1	7.1	0.5
Max. rate of piano keystrokes (Hz) mf	8.6	6.1	7.2	0.6
Max. rate of piano keystrokes (Hz) f	8.6	5.9	7.3	0.6

Ambiguous dynamic markings also contributed to hairpins’ new meanings. The standard definition of a hairpin is simply a crescendo or decrescendo notated  or . For most composers before the Romantic Era, it was crucial to explicitly include the dynamic marking right before the hairpin, and right after the hairpin, too so that performers knew at what dynamic to start the hairpin, and at what dynamic to end it. The explicit dynamics facilitated a steady, logical transition during the hairpin. However, all of the examples I analyzed leave some part of the hairpin ambiguous. I think the composers were hinting less at dynamics and more at things like gesture or tempo rubato. We’ll hear these differences in a few different musical examples as well as how different performers interpreted the hairpins.

<sup>2</sup> “How to Play Fast and Very Quietly on Piano.” Music, July 1, 2015.  
<https://music.stackexchange.com/questions/33029/how-to-play-fast-and-very-quietly-on-piano>.

Fanny Mendelssohn provides one of the first explicit accounts of experimenting with hairpins as a means of tempo flexibility. She wrote in the autograph of her piano piece in F minor, *Allegro ma non troppo*, “This piece must be performed with many changes in tempo, but always gently, without jerking. The signs  and  stand for *accelerando* and *ritardando*.”<sup>3</sup> In 1882, German musicologist Hugo Riemann expanded on Fanny’s idea and coined the term *agogics* which he defined as,

The use of small modifications of tempo (also called *tempo rubato*) which is necessary for expressive playing. The *agogics* coexist with dynamics - a slight increasing of tempo is accompanied by *crescendo*; the lengthening of the note values that form the ‘dynamic peak’ within a phrase; and a slight slowing down is subsequently accompanied by *diminuendo*...the *agogic accent*, as indicated by the notation ^, means a slight prolongation of the note values, especially suspensions...The   is to be understood more as *agogic*:  increases shortening of the values,  decreases stress.<sup>4</sup>

By saying that *crescendo* hairpins increase shortening of values and *decrescendo* hairpins decrease stress, Riemann implies that *crescendo* hairpins indicate urging forward and *decrescendo* hairpins indicate lingering. Riemann’s analysis concurs with the way present day performers interpret hairpins in Romantic music.

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<sup>3</sup> Todd, R. Larry. *Fanny Hensel: the Other Mendelssohn*. Oxford: Oxford University Press, 2014.

<sup>4</sup> Riemann, Hugo. *Musikalische Dynamik und Agogik*. Hamburg: Raht

Performances of Frederic Chopin's Fantasy in F minor op. 49 highlight the relationship between hairpins and tempo. From measure 109 - 123, Chopin uses a series of hairpin patterns, but he only notates a single dynamic marking, fortissimo, at the very beginning of the passage. The rest of the hairpins in the passage are left ambiguous. I analyzed recordings of this passage by Seong-Jin Cho, Yulianna Avdeeva, James Rhodes, and Arthur Rubinstein to see how they dealt with the hairpins.

**Figure 2: Frédéric Chopin, Fantasy in F minor, Op. 49, m. 109 - 123**

Cho approaches the first open hairpin in measure 109 by subtly, yet noticeable accelerating during the duration of the open hairpin. In the following measure during the closed hairpin, he lingers ever-so slightly on the chord on the 4th beat of measure 110. (Cho 5:02 -

5:06) The video highlights Cho's accelerando at measure 113 by showing a close-up of Cho's hands. His hands visibly get more blurry as he accelerates through the hairpin. (Cho 5:09)

Similar to Cho, Avdeeva also accelerates during the open hairpin in measure 109 and lingers slightly on the same chord as Cho in measure 110. (Avdeeva 5:04 - 5:08) However, when the closed hairpin returns in measure 112, whereas Cho actually doesn't linger much at all, Avdeeva actually lingers even longer on the chord on beat 4 of measure 112, than she did during the first closed hairpin in measure 110. (Avdeeva 5:07 - 5:11)

British pianist James Rhodes performs the most extreme example of accelerando and ritardando during these hairpins. While Rhodes' accelerates more during the open hairpin than Cho and Avdeeva, his lingering during the half note chords that start every closed hairpin really sets his performance apart. (Rhodes 6:27 - 6:31) Instead of lingering on the 4th beat of measure 110 like Cho and Avdeeva do, Rhodes lingers on the half note chord on the 2nd and 3rd beats of the measure. By continually lingering on the half note chords, he stretches out the rhythmic direction of the line intensifying the melody.

Measures 120 - 123 emphasize the acceleration that occurs simultaneously with the crescendo hairpins. While the rhythms and markings in measure 120 and 122 are the same as those in 109, 111, 113, and 115, 6 eighth notes followed by a quarter note all with a crescendo hairpin, the accelerando in measures 120 and 122 are much more audible simply because the notes are easier to play. While the accelerando might not have been so clear in the more difficult passages, Cho, Avdeeva, and Rhodes make the acceleration very clear in measures 120 and 122. All three pianists play the open hairpins in measures 120 and 122 with an acceleration over the course of the 6 eighth notes (Cho 5:19 - 5:24, Avdeeva 5:22 - 5:28, Rhodes 6:45 - 6:52)

While Cho, Avdeeva, and Rhodes all play the open hairpins in measures 120 and 122 fairly similarly, each performer plays the closed hairpin in measure 121 differently. Whereas Cho doesn't really change tempo during the closed hairpin in measure 121, Avdeeva and Rhodes do. Avdeeva lets the half note chord on the 3rd beat of measure 121 ring and linger before moving on. (Avdeeva 5:25 - 5:26) Rhodes similarly slightly slows down during this measure. (Rhodes 6:50 - 6:51)

Avdeeva and Rhodes' lingering during the closing hairpins parallels the thoughts of American pianist and Chopin notation aficionado Seymour Bernstein. Commenting on Chopin's notational symbols, Bernstein writes, "Chopin's music is filled with short closing hairpins that are often confused with accents and longer hairpins... [and] denote the deepest sentiment, calling for a lingering where the hairpin begins."<sup>5</sup> Bernstein's analysis of closing hairpins in Chopin asserts that the lingering that Avdeeva and Rhodes execute on the beginning of the closing hairpin in measure 121 aligns with one interpretation of Chopin's intentions.

I compared these recordings to one by Arthur Rubinstein who often interpreted Chopin masculinely and steadily with pulse. In line with this description was his performance of this passage. Rubinstein plays the octaves in measure 109 emphasizing the rhythmic pulse. Unlike the other three pianists, Rubinstein doesn't accelerate at all during the open hairpin and doesn't ritard at all during the closed hairpin. (Rubinstein 4:46 - 4:49) Rubinstein played the triplet figure in measure 114 particularly distinctly. Cho, Avdeeva, and Rhodes all took extra time here not only because of the closed hairpin, but because it just sounds rushed to play all three of those chords in one beat. Rubinstein does play all three of those chords in one beat taking away some

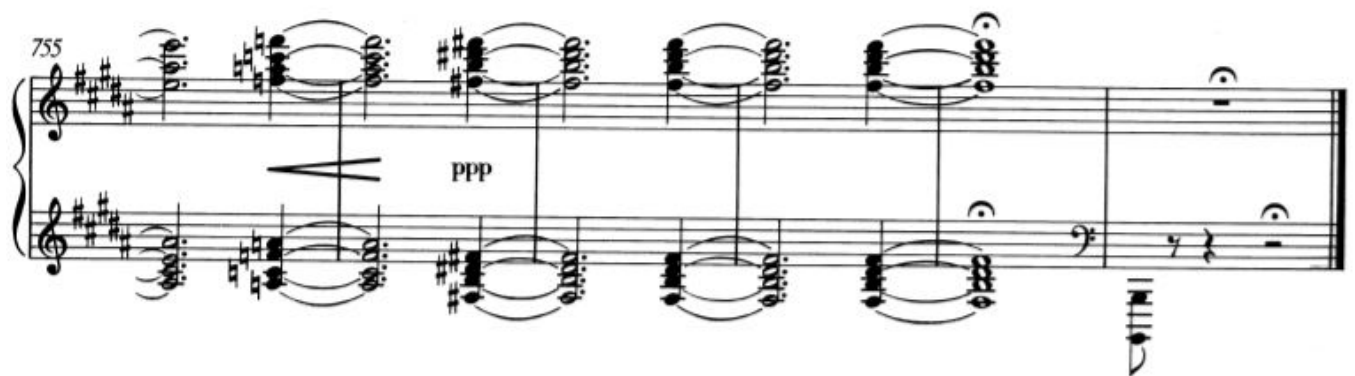
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<sup>5</sup> Bernstein, Seymour. *Chopin: Interpreting His Notational Symbols*. Milwaukee, WI: Distributed by Hal Leonard, 2005.

of the melodic intensity in favor of rhythmic accuracy. (Rubinstein 4:53 - 4:55) Rubinstein performs measures 120 and 122 not nearly as free as the other interpretations. Rubinstein plays the eighth notes in these measures nearly in time. (Rubinstein 5:01 - 5:06) By keeping such a strict time, the hairpin remained a marking of dynamic in Rubinstein's interpretation. However, given the way Cho, Avdeeva and Rhodes use the hairpins in this passage to manipulate tempo, hairpins in Chopin remain both a dynamic and temporal marking.

Hairpins not only deal with time, but also bleed into the realm of gesture, too. Composers in the 19th and 20th centuries called for impossible hairpins. That is, hairpins that literally could not be executed on the piano. Take for example, the ending of Liszt's B minor Sonata shown below in figure 2. Liszt writes an open hairpin between a tied chord in measure 755 - 756. However, after striking a key on the piano, the sound is always decaying. No mechanism exists to make the sound louder. Liszt expert Leslie Howard comments on this hairpin saying, "he writes the crescendo in a way that it's something you can feel but it's very hard to play. For my money it's better to play [the chord] slightly louder, then put the una corda on for the final three chords."<sup>6</sup> I analyzed performances by Yundi Li and Alfred Brendel to see how they approached this seemingly impossible marking.


**Figure 2: Franz Liszt, Piano Sonata in B Minor , m. 755 - 760**



<sup>6</sup> Howard, Leslie. Youtube. Youtube. Accessed December 9, 2019.  
<https://www.youtube.com/watch?v=nAel-mzSmts>

Li uses gesture in the form of his head to physically emulate the opening hairpin. As Li holds the tied chord at the beginning of measure 755, he looks skyward. Li's skyward gaze remains angled the same as he strikes the impossible hairpin F major chord in the fourth beat of measure 755. But just before the F major chord changes to the B major chord on the 4th beat of measure 756, Li extends his gaze upward even more (28:42). His head moves as he carries his gaze toward the ceiling. By moving his head upward only toward the end of this chord, he emphasizes the opening of the hairpin. As the sound begins to noticeably fade away toward the end of the chord, he realizes the opening hairpin by literally further opening his body.

Alfred Brendel also gestures the hairpin, but instead of using just his head, Brendel uses his entire body. As Brendel strikes the impossible chord in measure 755, he begins to push off of the keys in a movement that begins with lifting his wrists, then his forearms (28:40). The movement continues up his arm almost like a wave moving up through his body. Just like Li, toward the end of this chord as the sound fades and the hairpin opens further, his gesture amplifies. He leans backward almost like the force with which he's pushing into the keys resists. It looked like an attempt to lift himself off of the piano bench using just his fingertips. Both Li's and Brendel's opening of the body reflect a gesture of the open hairpin capturing the inexplicable "feeling" that Howard claimed could not be translated into sounds.

These impossible hairpins were not limited to Romantic music alone. In his 2nd of 3 Pieces Op. 11, Arnold Schoenberg writes four diamond hairpins (  ) each to be executed on a held chord seen below in measures 11 and 12 of figure 3. Schoenberg, aware of the impossibility of his notation, actually recounted his intentions for the hairpin markings explaining,



Obviously I did not imagine that one could make these chords [with signs < > over the chords] grow louder and softer. In these cases, I always mean a very expressive, but gentle Marcato sforzato. It can be compared to this portamento sign or something similar... the crescendo hairpin on held notes is of course not to be taken literally. It should simply be an indication of the direction of the line. Or of the degree of intensity. More an aid to the comprehension of the line than a marking for performance.<sup>7</sup>

While Schoenberg's only intentions for these diamond hairpins was a gentle marcato sforzato, performances by Di Wu and Filippo Gorini capture the gestural attributes of these diamond hairpins..

**Figure 3: Arnold Schoenberg 3 Pieces, Op. 11 No. 2**



Di Wu executes the hairpins by literally pushing herself off of the piano bench to show the direction of the line to the audience. At 4:30 she plays the first hairpin in tandem with a physical movement similar to that of a small electric pulse being cast through her body. As each subsequent chord is played, the crescendo stretching the entire line leads to more forceful pulses

<sup>7</sup> Bagan, Christopher. *PERFORMANCE PRACTICE CONSIDERATIONS IN SCHÖNBERG'S FÜNF KLAVIERSTÜCKE, OP. 23*. University of Toronto, 2012.

to the point where on the last hairpin, Wu looks like she's fighting with the piano. (Wu 4:30 - 4:37) While Schoenberg might not have necessarily thought these hairpins would have any effect during performance considering he thought of them more as an aid for comprehension of the line, Wu's gestures mimic the ups and downs of the diamond hairpins.

Similar to Wu, Filippo Gorini interpreted this passage with clear physical intent to demonstrate the hairpins. He has a similar electric shock kind of movement. However Gorini's movements are much more abrupt compared to Wu's. He jerks upward with so much force that when he comes back down he bounces back off of the bench with energy from the initial burst. (Gorini 5:36 - 5:46) On the first chord in measure 13, Gorini furrows his brow, he twitches his eye, and an almost pained expression overwhelms his face. (Gorini 5:44)

Schoenberg himself stated that the hairpins were not intended as dynamic markings. They were for *marcato sforzata* and line comprehension. While the performative interpretation may be difficult to execute given its notation over a held note, Wu and Gorini get the point across through using physical movement in lieu of sound.

Rachmaninoff's unusual combination of dynamic notation in his Etude Tableau Op. 39, No. 6 lends itself as a temporal hairpin. The first measure of the piece has an open hairpin on the second and third beats leading to a *sforzando*. By using a simple ascending chromatic scale with the open hairpin, this figure has similar rhythmic and melodic direction properties as the octaves in measure 109 of the Chopin Fantasy. Rachmaninoff's use of a *diminuendo* in measure 3 contradicts the hairpin. It's not possible to *diminuendo* while *crescendoing*. Performers generally interpret the *diminuendo* as meaning "softer than previously" rather than "dying away."<sup>8</sup>

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<sup>8</sup> Rahmer, Dominik. "'Smfz' – On Some Unconventional Dynamic Markings in Our Urtext Editions." G. Henle Verlag. Accessed December 9, 2019.  
<https://www.henle.de/blog/en/2015/09/28/unconventional-dynamic-markings/>.

According to the previous examples of open hairpins, a passage like this one would incorporate the same kind of acceleration that was heard in the open hairpins of the Chopin Fantasy. I analyzed recordings by Valentina Lisitsa and Yuja Wang to compare with a recording by Rachmaninoff himself to see how these performers approached this open hairpin.

**Figure 4: Sergei Rachmaninoff, Etude Tableau Op. 39, No. 6**



Valentina Lisitsa begins both measure 1 and 3 slowly and then accelerates through both hairpins with a ferocity akin to a cheetah hunting its prey. (Lisitsa 0:00 - 0:10) In measure 3 Lisitsa prioritizes the diminuendo over the open hairpin. In fact, instead of getting louder, she diminuendos throughout the entire measure. Her interpretation prioritized the diminuendo as the dynamic notation and the hairpin as the tempo notation.

While Wang follows the same general melodic shape as Lisitsa, Wang highlights the contrast in tempo and dynamic. Wang begins the first measure much quieter than Lisitsa but exaggerates the open hairpin by ending louder and accelerating faster than Lisitsa. (Wang 0:06 - 0:15) In measure 3, whereas Lisitsa diminuendos through the entire measure, Wang takes a more literal approach by diminuendoing for just the first triplet group, and then accelerating while crescendoing through the hairpin. Wang used the hairpin to increase dynamic and also

accelerate, too. Both Lisitsa and Wang's interpretation of the hairpin solidifies the hairpin as less of a dynamic marking and more of a temporal one.

Rachmaninoff's own recording differs drastically from that of Wang and Lisitsa. Rachmaninoff plays the first measure very steadily in time. He doesn't accelerate at all (Rachmaninoff 0:00 - 0:04). He interprets the open hairpin as a conventional hairpin and increases the dynamic level through the sforzando in measure 2. To deal with the contradicting diminuendo and open hairpin pairing in measure 3, Rachmaninoff prioritizes the diminuendo over the open hairpin and decreases the volume throughout the entirety of the measure. However, rather than keeping a steady tempo during the open hairpin, he actually slows down. Cheong Yew Choong posits that open hairpins "denote a pattern of intensification in two ways: (1) by building up rhythmic momentum through temporal acceleration, usually found in energetic and lively music, and (2) by shaping the melodic peaks, harmonic tension and structural points of arrival through a broadening of tempo and lengthening of rhythmic values."<sup>9</sup> Lisitsa and Wang follow Choong's first definition of the open hairpin. They both execute a temporal acceleration to build up rhythmic momentum. Rachmaninoff's interpretation falls in line with the second definition. By broadening the tempo and lengthening rhythmic values in measure 3, Rachmaninoff executes a different kind of intensification, but intensification nonetheless. Wang and Lisitsa are not incorrect even though their interpretation differs from that of the composer himself. Given the ambiguous meaning that hairpins assumed during this era, had Rachmaninoff wanted people to interpret the hairpin an exact way, he would have been explicit.

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<sup>9</sup> Choong, Cheong Yew. "Decoding Idiosyncratic Hairpins: Dynamic Changes or 'Notated' Rubato?" *Mahidol Music Journal*. Accessed December 9, 2019.  
<https://www.tci-thaijo.org/index.php/mmj/article/view/189241>.

From the notated rubato hairpins in Chopin, to the impossible hairpins in Liszt and Schoenberg, to the contradictory hairpin in Rachmaninoff, hairpins have clearly developed a new meaning. That is not to say that hairpins have lost their standard definition of dynamic changes. Rather, they've added new definitions on top of the original. The different meanings associated with hairpins equips performers with a new tool for interpretive freedom.

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