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REBONDS BY IANNIS XENAKIS:

PEDAGOGICAL STUDY AND PERFORMANCE ANALYSIS

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BRIAN CHRISTOPHER TINKEL
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REBONDS BY IANNIS XENAKIS:
PEDAGOGICAL STUDY AND PERFORMANCE ANALYSIS

A DOCUMENT APPROVED FOR THE
SCHOOL OF MUSIC

BY

Dr. Lance Drege, Co-Chair

Dr. William Wakefield, Co-Chair

Dr. Roland Barrett

Dr. Michael Lee

Dr. John Fagan

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This work is dedicated to my family, friends, and students.

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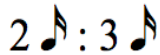
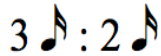
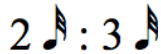
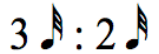
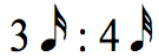
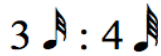
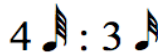
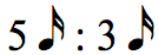
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ABSTRACT

REBONDS BY IANNIS XENAKIS:
PEDAGOGICAL STUDY AND PERFORMANCE ANALYSIS

This document provides a pedagogical study and performance analysis of *Rebonds*, a solo percussion work by Iannis Xenakis. Educators and performers of contemporary solo percussion literature can use this document as a reference work to prepare *Rebonds* for performance.

The document begins with a brief discussion on the history of solo percussion music and its increased popularity as a genre. A detailed explanation of the problem, purpose, and design of the study follows. A biographical sketch of Xenakis includes an overview of the composer's all-percussion works. Based on a survey of related literature, the document emphasizes the pedagogical study and performance analysis of *Rebonds.* The analysis begins with a discussion on instrumentation and set-up. An errata was prepared and included that indentifies five publisher editorial errors found during a comparative review of Xenakis's 1988 manuscript and the 1991 score edition. A practice guide was created as an educational tool for performers of *Rebonds.* The practice guide is divided into three parts: 1) identification of technical challenges; 2) directions to overcome each identified technical challenge; and 3) specific exercises written to develop and improve advanced techniques necessary for performing *Rebonds*. Performance questions were written and included to aid performers in preparing

Rebonds for performance. Lastly, a summary and conclusion were prepared and recommendations are included for further research.

REBONDS BY IANNIS XENAKIS:
PEDAGOGICAL STUDY AND PERFORMANCE ANALYSIS

CHAPTER I

THE PROBLEM, PURPOSE, AND DESIGN OF THE STUDY

Introduction

Solo percussion[1] "is a growing and vital part of the larger percussion world."[2] Historical works including Igor Stravinsky's *L'histoire du soldat* (1918),[3] Darius Milhaud's *La création du monde* (1924)[4] and *Concerto pour batterie et petit orchestre* (1929),[5] required multiple percussion, "the simultaneous or sequential performance of more than one percussion instrument."[6] These important works were predecessors to today's solo percussion music.

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[1] Solo percussion music is written for a single percussionist playing one percussion instrument or more than one percussion instrument.

[2] Steven Schick, *The Percussionist's Art: Same Bed, Different Dreams* (Rochester, NY: University of Rochester Press, 2006), xv.

[3] Igor Stravinsky, *L'histoire du soldat* (London: J. and W. Chester, Ltd., 1924).

[4] Darius Milhaud, *La création du monde* (Paris: Editions Max Eschig, 1929).

[5] Darius Milhaud, *Concerto pour batterie et petit orchestre* (Wien: Universal Edition, 1931).

[6] James William Lambert, "Multiple Percussion Performance Problem as Illustrated In Five Different Works Composed by Stockhausen, Smith Brindle, Colgrass, Dahl, and Kraft Between 1959 and 1967" (D.M.A. diss., The University of Oklahoma, 1983), 1. In *Dissertations & Theses @ University of Oklahoma* [database on-line], http://www.proquest.com.ezproxy1.lib.ou.edu/ (publication number AAT 8324890; accessed October 30, 2008).

In Steven Schick's book on solo percussion music *The Percussionist's Art: Same Bed, Different Dreams*, the author states:

> Not long ago the very notion of a percussion soloist would have seemed ludicrous. Imagine a soloist taking the stage. However, instead of tuning a Stradivarius or dusting off the keyboard of a Steinway, a percussionist takes a bow and sits amid a junk heap of instruments often bought (or found) at the auto salvage yard, kitchen supply and hardware stores, garden shops, and (a few) specialty percussion stores.[7]

Written in 1918, *L'histoire du soldat* premiered that year in Lausanne, Switzerland under the direction of conductor Ernest Ansermet.[8] In a research document on notation in selected repertoire for multiple percussion, Alyssa Smith states: "The 1918 work *L'histoire du soldat* is particularly significant to the genre of multiple percussion. This is due to the fact that it is the first percussion part utilizing a multiple percussion set-up."[9] Milhaud's ballet *La création du monde*, scored for an orchestra of seventeen performers, includes "a challenging multiple percussion part written for one player."[10] During the first half of the twentieth century, music for multiple-percussion existed among small instrumental

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[7] Ibid, xv.

[8] William Kraft, "On Performance: *Histoire du soldat* – A Music Review of Chester's Publication," *Percussive Notes* 30, no. 5 (June 1992): 47.

[9] Alyssa Gretchen Smith, "An examination of notation in selected repertoire for multiple percussion" (D.M.A. diss., The Ohio State University, 2005), 23-49. In *Dissertations & Theses: Full Text* [database on-line], http://www.proquest.com.ezproxy1.lib.ou.edu/ (publication number AAT 3182725; accessed September 8, 2008).

[10] Warren Howe, "The Percussionist's Guide to Darius Milhaud's *La création du monde*," *Percussionist* 17, no. 1 (Fall 1979): 38-48.

ensembles. This repertoire required advanced techniques from percussionists that laid the groundwork for further innovation and development of solo percussion music throughout the second half of the twentieth century and beyond.[11]

Other works of historical significance to the solo percussion genre are Amadeo Roldán's *Rítmicas No. 5* and *No .6* (1930)[12] and Edgard Varèse's *Ionisation* (1931).[13] The *Rítmicas* were experimental pieces and represented the first compositions written for percussion ensemble. John Richard Hall, who wrote significantly about the importance of the *Rítmicas*, argues: "No known works prior to the *Rítmicas* are so clearly stand-alone, percussion-only compositions."[14] Written one year later and scored for thirteen players, *Ionisation* is "a landmark composition"[15] utilizing forty percussion instruments. Similar to aforementioned compositions by Stravinsky and Milhaud, the *Rítmicas* and *Ionisation* employ multiple-percussion techniques.

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[11] Ibid.

[12] Amadeo Roldán, *Rítmicas No. 5: for Percussion Instruments* (New York City: Southern Music, 1967).

[13] Edgard Varèse, *Ionisation: for Percussion Ensemble of 13 Players* (Milano, Ricordi, 2000).

[14] John Richard Hall, "Development of the percussion ensemble through the contributions of the Latin American composers Amadeo Roldán, José Ardévol, Carlos Chávez, and Alberto Ginastera" (D.M.A. diss., The Ohio State University, 2008), 14-22. In *Dissertations & Theses: Full Text* [database on-line], http://www.proquest.com.ezproxy1.lib.ou.edu/ (publication number AAT 3312979; accessed November 6, 2008).

[15] Thomas Siwe, "Edgard Varèse's *Ionisation*: Analysis and Performance Problems," *Percussive Notes* 32, no. 5 (October 1994): 73.

From 1935 to 1943, John Cage wrote several compositions for percussion ensemble. Cage's contributions profoundly influenced development of contemporary music and compositions written for percussion.[16] In a dissertation on John Cage's early percussion music, Barry Michael Williams states: "It is partially due to Cage's efforts within the percussion medium that the repertoire for percussion ensembles has expanded and the percussion medium itself has gained acceptance as a genuine musical art form."[17] With the objective of discussing the percussion revolution formulated by John Cage, Steven Schick has written:

> Percussion music as we know it today is truly a child of the twentieth century. It took flight in a culture where velocity and cacophony were mirrored in a music founded upon striking and friction. But the twentieth century did not invent percussion. Percussion playing was alive and well at the time of Haydn and Mozart and indeed well before that. What separates that music from today's percussion music is not the amount of noise it made, but how that noise was used.[18]

To further support accomplishments of John Cage and the composer's contributions to the percussion genre, Steven Schick states: "Cage's ragtag percussion revolution punctuated the end of a decade of volatile change in

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[16] Barry Michael Williams, "The early percussion music of John Cage, 1935-1943" (Ph.D. diss., Michigan State University, 1990), 1. In *Dissertations & Theses: Full Text* [database on-line], http://www.proquest.com.ezproxy1.lib.ou.edu/ (publication number AAT 9117879; accessed September 10, 2008).

[17] Ibid.

[18] Steven Schick, *The Percussionist's Art: Same Bed, Different Dreams* (Rochester, NY: University of Rochester Press, 2006), 1.

contemporary music. Classical composers who had once written string quartets and piano sonatas now marched under the banner of brake drums, pod rattles, conch shells, and tin cans."[19]

In the mid-1950s, John Cage composed *27'10.554" for a Percussionist* (1956).[20] As the first composition of its kind for solo percussion, Cage scored this pioneering work for unspecified instruments.[21] Three years later, Karlheinz Stockhausen composed *Zyklus* (1959). *Zyklus* represents "the first major percussion solo for a prescribed collection of instruments in the history of Western Music."[22] In 1964, Morton Feldman composed *The King of Denmark* for solo percussion. "In fact, *The King of Denmark* was born as an antipiece-as a rebuttal to Karlheinz Stockhausen's *Zyklus* composed five years earlier."[23]

The number of compositions for solo percussion increased during the mid-1970s. "It was a period that saw rapid growth in solo percussion repertoire with

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[19] Ibid.

[20] James Pritchett, *The Music of John Cage* (New York, NY: Cambridge University Press, 1993), 102.

[21] Morris S. Palter, "The solidification of performance practice issues in solo percussion performance" (D.M.A. diss., University of California, San Diego, 2005), 1. In *Dissertations & Theses: Full Text* [database on-line], http://www.proquest.com.ezproxy1.lib.ou.edu/ (publication number AAT 3171113; accessed October 24, 2008).

[22] Stuart W. Gerber, "Karlheinz Stockhausen's solo percussion music: A comprehensive study" (D.M.A. diss., University of Cincinnati, 2003), 4. In *Dissertations & Theses: Full Text* [database on-line], http://www.proquest.com.ezproxy1.lib.ou.edu/ (publication number AAT 3121080; accessed November 9, 2008).

[23] Steven Schick, *The Percussionist's Art: Same Bed, Different Dreams* (Rochester, NY: University of Rochester Press, 2006), 170.

new major works by Vinko Globokar, Frederic Rzewski, and James Wood among many other composers."[24] Emerging from this rapid growth in solo percussion repertoire was *Rebonds*, a composition written by Iannis Xenakis from 1987 to 1989.

Rebonds consists of two movements: *Rebonds A* and *Rebonds B*. The movements can be played in either order and without interruption as indicated on the composer's 1988 manuscript.[25] Sylvio Gualda premiered *Rebonds* in July 1988 at the Villa Medici in Rome.[26] The French music critic Jacques Lonchampt described the work as "an immense abstract ritual, a suite of movements and of hammerings without any folkloristic 'contamination,' pure music full of marvelously efflorescent rhythms, going beyond drama and tempest."[27]

Statement of the Problem

The rhythmic complexities and technically challenging drumming passages in *Rebonds* make this composition one of the most difficult works in solo percussion music. The literary search performed for this document revealed that interest in studying and performing solo percussion music expanded

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[24] Ibid., 203.

[25] Iannis Xenakis, *Rebonds: Pour Percussion Solo* (Paris: Éditions Salabert, 1988).

[26] James Harley, *Xenakis: His life in music* (New York: Routledge, 2004), 192.

[27] Iannis Xenakis, *Rebonds: Pour Percussion Solo* (Paris: Éditions Salabert, 1988).

significantly during the last decade. But, few scholarly documents were found that specifically discuss pedagogy for solo percussion music. The search also identified many scholarly documents and articles about Xenakis and his methods of music composition. But, none were found that primarily emphasize percussion pedagogy for learning *Rebonds*.

Need for the Study

The rhythmic complexities and technically challenging drumming passages in *Rebonds* stand apart from those found in other solo percussion compositions. Consequently**,** percussionists need to acquire advanced techniques to successfully perform *Rebonds*. To address these advanced techniques, a practice guide was created as an educational tool for performers of *Rebonds.*

Purpose of the Study

This document provides a pedagogical study and performance analysis of *Rebonds*, a solo percussion work by Iannis Xenakis. *Rebonds* was chosen for a pedagogical study and performance analysis because the composition contains rhythmic complexities and technically challenging drumming passages. Furthermore, the work is currently in print and available for study and performance. Due to the standard instrumentation of *Rebonds*, instruments are more likely to be available for the percussionist's use. A practice guide was

created as an educational tool for performers of *Rebonds.* The practice guide identifies inherent technical challenges in *Rebonds* and provides solutions for addressing these advanced techniques through efficient practice.

Limitations of the Study

While several compositions for solo percussion were reviewed, research was confined to a single example of contemporary solo percussion music. Since existing resources related to *Rebonds* discuss the theoretical analysis, no attempt was made to discuss this aspect of the composition.

The review of Xenakis's percussion works was limited to the composer's all-percussion compositions. In regards to related literature on solo percussion music, the review was limited to published, original compositions for solo percussion. The practice guide created for this document is an educational tool for learning and performing *Rebonds*.

The bibliography includes other works of historical importance in addition to Xenakis's percussion works. Biographical references are limited to those relating to specific compositions mentioned in this document.

Design of the Study

This document provides a pedagogical study and performance analysis as a reference work to prepare *Rebonds* for performance. Information regarding the

general description of the composition was examined, including instrumentation and suggested instrument set-up. An errata was prepared and included that indentifies five publisher editorial errors found during a comparative review of Xenakis's 1988 manuscript and the 1991 score edition.

A practice guide was created and includes the identification of technical challenges that arise during the learning process for *Rebonds*. The practice guide includes directions and exercises to address each identified technical challenge. These exercises were written to develop and improve advanced techniques necessary for performing *Rebonds*. Performance questions were written and included to aid performers in preparing *Rebonds* for performance.

Organization of the Study

Chapter II consists of a brief biographical sketch of Iannis Xenakis including an overview of the composer's all-percussion works. Significant emphasis was placed on a review of related literature pertaining to solo percussion music. Chapter III discusses instrumentation and set-up of *Rebonds* followed by an errata that indentifies five publisher editorial errors found during a comparative review of Xenakis's 1988 manuscript and the 1991 score edition. A practice guide was created as an educational tool for performers of *Rebonds.* The practice guide is divided into three parts: 1) identification of technical challenges; 2) directions to overcome each identified technical challenge; and 3) specific exercises written

to develop and improve advanced techniques necessary for performing *Rebonds*. Performance questions were written and included to aid performers in preparing *Rebonds* for performance. Lastly, a summary and conclusion were prepared and recommendations are included for further research.

CHAPTER II

SURVEY OF RELATED LITERATURE

Biography

Iannis Xenakis (1922-2001), a Romanian-born Greek composer, engineer, architect, and music theorist, is known for a prolific compositional output that includes over one hundred thirty musical works for all sound media.[28] Early in life Xenakis fled his home country because of his involvement with the resistance of the communist-led National Liberation Front against the German occupation.[29] As a result, Xenakis spent most of his life in France where he worked as an architect in Le Corbusier's electronic music studio and studied music composition with Darius Milhaud and Olivier Messiaen.[30] Xenakis is among "the pioneering generation of composers who revolutionized 20th Century music after World War II."[31] In addition, he was one of the first composers "to replace traditional musical thinking with radical new concepts of sound composition."[32] Consequently, Xenakis profoundly influenced many young composers. His theories subscribe to the ancient Pythagorean doctrine that numbers (or the principles thereof) are the

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[28] Iannis Xenakis, *Formalized Music: Thought and Mathematics in Music Revised Edition* (Hillsdale, NY: Pendragon Press, 1992).

[29] Peter Hoffmann, "Xenakis, Iannis," in *The New Grove Dictionary of Music and Musicians*, ed. S. Sadie and J. Tyrrell (London: Macmillan, 2001), xxvii, 606.

[30] Ibid.

[31] Ibid., 605.

[32] Ibid.

root of all things.[33] Stochastic music,[34] computer music, and mathematical and architectural methods inform Xenakis's music composition processes. Composing for orchestras enabled Xenakis to realize his conception of sound masses.[35]

Xenakis's Percussion Works

As a pioneer of the post-war avante-garde movement, Xenakis wrote several percussion works. His first percussion composition, *Persephassa* (1969)[36], is scored for percussion sextet. *Les Percussions de Strasbourg* commissioned *Persephassa* for the first-ever Shiraz Festival (organized by the Empress of Iran) held at the historic desert site of Persepolis.[37] Each percussion part contains an array of skin, wood, metal, and stone instruments. The spatial relationship for each of the six percussion set-ups is very important to the aesthetic and "critical to

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[33] Ellen Rennie Flint, "An Investigation of Real Time as Evidenced by the Structural and Formal Multiplicities in Iannis Xenakis' *Psappha*" (PhD diss., The University of Maryland, 1989), 1.

[34] A term implying an approach to composing music, based on sonic entities and compositional procedures, adapted from probability functions. James Harley, *His life in music* (New York: Routledge, 2004), 21.

[35] Peter Hoffmann, "Xenakis, Iannis," in *The New Grove Dictionary of Music and Musicians*, ed. S. Sadie and J. Tyrrell (London: Macmillan, 2001), xxvii, 605-613.

[36] Iannis Xenakis, *Persephassa: pour Six Percussionistes* (Paris: Edition Salabert, 1969).

[37] Robert Gluck, "The Shiraz Arts Festival: Western Avante-Garde Arts in 1970s Iran," *Leonardo Music Journal* 40, no. 1 (February 2007), http://www.mitpressjournals.org/doi/pdf/10.1162/leon.2007.40.1.20 (accessed November 12, 2008).

the ultimate success of any performance."[38] As an example, Xenakis specifies that percussion players should perform in a hexagonal ring surrounding the audience. As a result, performers and their instruments encapsulate the audience. During a performance of *Persephassa,* both audience members and performers can perceive they are amid a warzone, caught in the crossfire of gunshots, explosions, and air raid sirens. In 1987, well-known performer and educator Jan Williams introduced *Persephassa* in his article published in *Percussive Notes* stating:

> *Persephassa* is a 'massive' work. This is obvious to anyone who has heard a live performance. By massive, I mean that its impact is both visceral and dramatic. Ambivalent listening is out of the question. From the opening tremolos, audiences are put on notice that they are in for an incredible journey. This work unfurls in a continuous yet apparently unsymmetrical way in its formal elements. The use of silence is particularly effective in delineating the formal structure. Energy builds unrelentingly until the masterfully composed, mercilessly slow accelerando which ends the piece.[39]

Xenakis's first composition for solo percussion is entitled ψ α π φ α: *Psappha: Percussion Solo*[40] and was written in 1975. This work was written for unspecified percussion instruments. In an interview with Simon Emmerson published in *Music and Musicians*, May 1976, Xenakis describes the sounds within *Psappha*. "The new piece is for percussion solo. It is a purely

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[38] Jan Williams, "Iannis Xenakis, *Persephassa*: An Introduction," *Percussive Notes* 25, no. 4 (Spring 1987): 11.

[39] Ibid., 9.

[40] Iannis Xenakis, ψ α π φ α: *Psappha: Percussion Solo* (Paris: Éditions Salabert, 1976).

rhythmical composition, which means that colour is used only to render more clearly the polyrhythmic construction."[41] Based on the composer's explanation within the score, *Psappha* is scored for six groups of instruments, A through F. Each group consists of three instruments except group E that contains a single instrument. Instruments for group A through C are chosen from skin or wooden instruments and groups D through F are chosen from metallic instruments.[42] Consequently, this allows performers to choose specific instruments.

On May 2, 1976, Sylvio Gualda premiered *Psappha* in London. *Psappha* had a profound effect on solo percussion music. As stated by Steven Schick:

> *Psappha*, as we now know, is savage and frightening. The sheer loudness of it, the naked rhythms, the brutal mechanics of composition-the implications were staggering. It has been so widely played, taught, and discussed that it is very nearly a piece of classical music. There are even schools of thought about interpretative approaches. *Psappha* has become a principal model with which to compare all other percussion solos. It changed everything about how we listened to and played percussion music from *Zyklus* onward. In spite of differences among interpretive approaches and teaching strategies, understanding the material of *Psappha* remains a simple (if not easy) matter.[43]

In 1978, Xenakis composed *Pléïades (Pluralities)* for *Les Percussions de Strasbourg*. This work is scored for six performers who play a variety of drums,

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[41] Simon Emmerson, "Xenakis Talks to Simon Emmerson," *Music and Musicians* 24, no. 9 (May 1976): 24-26.

[42] Iannis Xenakis, ψ α π φ α: *Psappha: Percussion Solo* (Paris: Éditions Salabert, 1976).

[43] Steven Schick, *The Percussionist's Art: Same Bed, Different Dreams* (Rochester, NY: University of Rochester Press, 2006), 193.

metals, and keyboards. "In this work, the percussionists are asked to build a sixxen, named for both the number of instruments required (six) and the composer's last name (xen)."[44] These sixxens are specially constructed metallic instruments, each having nineteen bars, or "pitches," not tuned to common equal temperament. Xenakis uses the sixxens in the *Metaux* and *Mélange* movements of the work. In Wilma Salisbury's review of the United States premiere performance of *Pléïades* by the Oberlin Percussion Group, the writer states: "Precisely notated, the complex four-movement work builds in cumulative power through the intricate layering of rhythmic textures and the continuous shifting of subtle timbres."[45]

In 1989, Xenakis composed *Okho* for *Trio Le Cercle* scoring this work for three djembes (African hand drums). This work was premiered in Paris on October 20, 1989.[46] *Okho* was commissioned by the Festival d'Automne and was one of many commissions awarded in France that year to recognize the French Revolution bicentennial.[47] *Okho*, similar to *Pléïades*, is more rhythmically driven

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[44] Brett Reed, "Building a Set of Sixxen," *Percussive Notes* 41, no. 3 (June 2003): 48.

[45] Wilma Salisbury, "New Percussion Ensemble Work Premiered," *Percussive Notes* 20, no. 2 (February 1982): 15.

[46] Peter Hoffmann, "Xenakis, Iannis," in *The New Grove Dictionary of Music and Musicians*, ed. S. Sadie and J. Tyrrell (London: Macmillan, 2001), xxvii, 611.

[47] James Harley, *Xenakis: His life in music* (New York: Routledge, 2004), 193.

than Xenakis's earlier percussion works. Over the twenty-year interval from the creation of *Persephassa* to *Okho*,

> Xenakis himself had also changed considerably. His early ideas about composition for percussion – the often brutal opposition of blocks of sound and psychologically shattering silences of *Psappha* and *Persephassa* – had given way to the more continuous, rhythmically driven music of *Pléïades*, *Okho*, and finally *Rebonds*.[48]

Related Literature on Solo Percussion Music

John Cage composed the first work written for solo percussion. His 1956 opus *27'10.554" for a Percussionist* was composed for a soloist performing on four categories of percussion instruments: wood idiophones, metal idiophones, skin membranophones, and others. While the decision on instrumentation is left to the performer, Cage suggests that the "other" category consist of electronic devices, mechanical apparatuses, radios, and similar instruments. In addition, Cage encourages performers to use a wide variety of playing techniques and implements.[49]

Douglas H. Nottingham's document on *27'10.554" for a Percussionist* is primarily dedicated to a chronology of the recording process of Cage's work that

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[48] Steven Schick, *The Percussionist's Art: Same Bed, Different Dreams* (Rochester, NY: University of Rochester Press, 2006), 203.

[49] Douglas H. Nottingham, "A digital recording of two realizations of John Cage's "27'10.554" for a Percussionist"" (DMA diss., Arizona State University, 2001), 2. In *Dissertations & Theses: Full Text* [database on-line], http://www.proquest.com.ezproxy1.lib.ou.edu/ (publication number AAT 3031471; accessed October 26, 2008).

culminated in a live performance. This study addresses aesthetic and musical considerations that Nottingham discovered while interpreting Cage's graphically-notated score. Nottingham also discusses the importance of similar works of that time period including but not limited to *Zyklus Nr. 9* (1959) and *The King of Denmark* (1964).

Stuart W. Gerber's document is a comprehensive study on Karlheinz Stockhausen's solo percussion music including *Zyklus*, *Nasenflügeltanz* (1983), and *Komet* (1999).[50] Gerber's study created an interpretive guide to the aesthetic and technical demands required of the performer. In addition, Gerber indicates how performers can address these demands to create the best possible interpretation of Stockhausen's solo percussion music.

Patti J. Cudd's document consists of an analysis of four works for solo percussion. The following works, *The King of Denmark* by Morton Feldman, *27'10.554" for a Percussionist* by John Cage, *The Red Shoes* by Pamela Madsen, and *Four Passions* by Nathaniel Phillips are discussed. The compositions by Madsen and Phillips were commissioned for Cudd's dissertation recital while

[50] Stuart W. Gerber, "Karlheinz Stockhausen's solo percussion music: A comprehensive study" (D.M.A. diss., University of Cincinnati, 2003) . In *Dissertations & Theses: Full Text* [database on-line], http://www.proquest.com.ezproxy1.lib.ou.edu/ (publication number AAT 3121080; accessed November 9, 2008).

works by Feldman and Cage represent musical compositions of classic percussion repertoire.

With respect to *The King of Denmark*, Cudd addresses Feldman's inspiration for writing the composition. In addition, Cudd discusses instrument selection process, importance of varying playing techniques, and interpreting different symbols throughout the score. Cudd further explains the need for "experimentation on the part of the performer to discover the 'sonic world' of each instrument"[51] and the need to "discover striking techniques which bring out more of the timbres of the instruments."[52]

James Lambert's document on multiple percussion discusses the identification and cross-relationship of three categories of performance problems related to multiple-percussion performance: notation, instrument placement, and movement.[53] These problems are found in the works of Karlheinz Stockhausen (*Nr. 9 Zyklus*), Reginald Smith Brindle (*Orion M. 42*), Michael Colgrass (*Fantasy*

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[51] Patti J. Cudd, "A percussion module" (D.M.A. diss., University of California, San Diego, 1998), 7. In *Dissertations & Theses: Full Text* [database on-line], http://www.proquest.com.ezproxy1.lib.ou.edu/ (publication number AAT 9839493; accessed October 28, 2008).

[52] Ibid.

[53] James William Lambert, "Multiple Percussion Performance Problem as Illustrated In Five Different Works Composed by Stockhausen, Smith Brindle, Colgrass, Dahl, and Kraft Between 1959 and 1967" (D.M.A. diss., The University of Oklahoma, 1983). In *Dissertations & Theses @ University of Oklahoma* [database on-line], http://www.proquest.com.ezproxy1.lib.ou.edu/ (publication number AAT 8324890; accessed October 30, 2008).

Variations), Ingolf Dahl (*Duettino Concertante*), and William Kraft (*Suite for Percussion*) that were collectively written between 1959 and 1967.

David P. Shively's document discusses works for solo percussion by Morton Feldman (*The King of Denmark*), Iannis Xenakis (*Psappha*), and John Cage (*Composed Improvisation for Snare Drum Alone*) in terms of their approaches to material indeterminacy. Shively further discusses the interpretive processes relevant to the realization of these three works for performance.[54]

Other Resources on *Rebonds*

The survey performed for this document revealed numerous published scholarly articles written about *Rebonds*. William Longshore's document, "Reflections on the Preparation and Performance of Three Works for Contemporary Percussion", includes one chapter dedicated to *Rebonds*. This chapter details how *Rebonds* was introduced to Longshore including a discussion on his enthusiasm for learning the piece, as well as outlining instrumentation and the implement selection process. With respect to analysis, Longshore makes a

[54] David P. Shively, "Indeterminacy and interpretation: Three realizations" (D.M.A. diss., University of California, San Diego, 2001), 12-61. In *Dissertations & Theses: Full Text* [database on-line], http://www.proquest.com.ezproxy1.lib.ou.edu/ (publication number AAT 3077797; accessed November 7, 2008).

brief observation in regards to the five-note cycle in *Rebonds B* and the use of polyrhythms in *Rebonds A*.[55]

James Harley's book, "Xenakis: His Life in Music", gives an overview of Xenakis's complete output. The book proceeds chronologically and presents the scope of Xenakis's compositional styles. Focus is given to the formal organization and structural outline of each work. Harley's formal analysis of *Rebonds* is specific but limited to only a portion of each movement.[56]

Alyssa Smith's document, "An Examination of Notation in Selected Repertoire for Multiple Percussion", includes one chapter specifically dedicated to *Rebonds*. Smith lists instrumentation for each movement as listed in the 1991 score edition. Additionally, Smith juxtaposes the notational system Xenakis used for writing both *Psappha* and *Rebonds*.[57]

Greg Beyer's article in *Percussive Notes*, "All is Number: Golden section in Xenakis' *Rebonds*", begins with a contention that Xenakis used the Golden

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[55] William Terrell Longshore, "Reflections on the preparation and performance of three works for contemporary percussion" (D.M.A. diss., University of California, San Diego, 1999), 16-20. In *Dissertations & Theses: Full Text* [database on-line], http://www.proquest.com.ezproxy1.lib.ou.edu/ (publication number AAT 3001265; accessed November 8, 2008).

[56] James Harley, *Xenakis: His life in music* (New York: Routledge, 2004), 192-193.

[57] Alyssa Gretchen Smith, "An examination of notation in selected repertoire for multiple percussion" (D.M.A. diss., The Ohio State University, 2005), 23-49. In *Dissertations & Theses: Full Text* [database on-line], http://www.proquest.com.ezproxy1.lib.ou.edu/ (publication number AAT 3182725; accessed September 8, 2008).

Section concept as a device to determine formal organization. Beyer continues with a brief biography discussing how Xenakis was introduced to the classical Greek concept of Golden Section and how Xenakis used the Golden Section in both movements of *Rebonds*.[58]

Lee Ferguson's *duo Contour* website <http://www.duocontour.org> contains a single page of information pertaining to some performance practice issues in *Rebonds*, mostly in regards to material in *Rebonds B*. Specifically, Ferguson addresses a logistical issue pertaining to set-up of wood sounds (woodblocks) and offers suggestions on how to execute some music written for woodblocks. Ferguson provides a brief insight for grace-note figures that occur on the high bongo drum throughout *Rebonds B*. The website includes a picture of each issue addressed with respect to woodblocks.[59]

Steven Schick's book, *The Percussionist's Art: Same Bed, Different Dreams*, includes a section dedicated to *Rebonds*. In addition to discussing compositional differences between *Psappha* and *Rebonds*, Schick draws a compositional comparison to Xenakis's *Okho*, a work written for three djembes. Schick reiterates *Rebonds* instrumentation and references a discrepancy between the 1988 manuscript legend and the 1991 score edition. Schick continues by

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[58] Greg Beyer, "All is Number: Golden section in Xenakis' 'Rebonds'" *Percussive Notes* 43, no. 1 (February 2005): 40-50.

[59] Lee Ferguson, "Duo contour," http://www.duocontour.org.

discussing the formal arc of each movement and identifies specific moments in the movements to support his conclusions.[60]

[60] Steven Schick, *The Percussionist's Art: Same Bed, Different Dreams* (Rochester, NY: University of Rochester Press, 2006), 203-213.

CHAPTER III

REBONDS: PEDAGOGICAL STUDY AND PERFORMANCE ANALYSIS

Introduction

Rebonds pour percussion solo by Iannis Xenakis was composed from 1987 to 1989 and was premiered by Sylvio Gualda in July 1988 at the Villa Medici in Rome.[61] Xenakis wrote two works for solo percussion. *Rebonds* represents the second and final work written for solo percussion by the composer. *Rebonds* is a work in two movements, called *Rebonds A* and *Rebonds B*. The order in which the movements are to be played is free and can be decided by performers; either *A/B* or *B/A*. *Rebonds A* is centered around rhythm and unfolds through a gradual increase in density. *Rebonds B* is built upon repetition and variation. *Rebonds B* consists of a driving sixteenth-note pulse on the high bongo and an underlying five-note cycle articulated on the remaining drums.

Rebonds was written using the conventional five-line stave. Each instrument appearing in the work is mapped to a corresponding stave by Xenakis. In *Rebonds A*, one system of conventional notation is used to identify instruments and their placement on the staff. In *Rebonds B*, two systems of conventional notation are used to identify instruments and their placement on the staff. The additional staff in *Rebonds B* is used to notate woodblocks.

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[61] James Harley, *Xenakis: His life in music* (New York: Routledge, 2004), 192.

Rebonds is written for thirteen percussion instruments divided between two basic timbral groups – skins and woods. Instruments in the skin group are further divided among four instrument types: two bongos, one tumba, three tom-toms, and two large bass drums. Instruments in the wood group are divided into five registers of woodblocks. In the 1988 manuscript legend, Xenakis states that the scale represented by skin instruments and woodblocks extend over a very wide range.

Rebonds A is scored for skins instruments alone. The instrumentation of *Rebonds A* consists of two bongos, three tom-toms, and two large bass drums. In the 1988 manuscript legend, Xenakis lists only two tom-toms. This appears to be an oversight in the legend as Xenakis clearly writes music for three tom-toms in addition to bongos and bass drums.[62] In the 1991 score edition, editor Patrick Butin clearly states proper instrumentation.

Rebonds B is scored for a combination of skins and woods. The instrumentation of *Rebonds B* consists of two bongos, one tumba (a large, single-headed, Afro-Cuban barrel drum), one tom-tom, one bass drum, and five woodblocks.

[62] Steven Schick, *The Percussionist's Art: Same Bed, Different Dreams* (Rochester, NY: University of Rochester Press, 2006), 203.

The practice guide in this document was prepared and based on a specific instrumental set-up. The instrumental set-up used for the practice guide is given in figure 3.0. While several instrumental set-ups are possible, it is important to be aware of which instrumental set-up was used in creating this practice guide (see figure 3.0).



Figure 3.0 *Rebonds*: Instrumental set-up

Errata

Several errors were found in the written notation of the latest 1991 score edition. The following table lists each error found during a comparative review of the 1988 manuscript and the 1991 edition. The correct notation in the 1988 manuscript is juxtaposed with the incorrect notation in the 1991 score edition. Each error is accompanied by a brief description (see Table 3.0).

Measure Number	Beat & Partial	1988 Manuscript	1991 Edition	Description of error
16	2 e	tom 2	tom 3	Wrong drum notated
18	3			Inclusion of note on center line instead of rest
49	1 +	"et"	omitted	Missing information
59	4 e		omitted	Missing grace note
63	4			Inclusion of note on center line instead of rest

Table 3.0 *Rebonds B*: Errata

Practice Guide

The practice guide is the primary focus and product of the research effort in this document. Special attention was given to the process of learning *Rebonds*. Specifically, several technical challenges are identified that arise during the

learning process. The practice guide includes directions and exercises to address each identified technical challenge. These exercises were written to develop and improve advanced techniques necessary for performing *Rebonds*. These exercises were written using Sibelius (music notation software).

Rebonds B : Single marcato accent vs. double marcato accent

Two types of articulations are present in *Rebonds B*: single marcato accent [>] and double marcato accent [⩾]. Careful attention must be given to these contrasting articulations. As information pertaining to interpretations of articulations is omitted from the *Rebonds* score, a reference to *Psappha*, Xenakis's prior work for solo percussion, was examined. In *Psappha*, Xenakis clearly states how accents can be interpreted within a certain sequence or musical passage as follows:

1. louder, greater intensity
2. abrupt change in timbre
3. abrupt change of weight
4. addition of another sound played simultaneously
5. simultaneous combination of all preceding suggestions

Rebonds A : Single staccatissimo accent vs. double staccatissimo accent

Two types of articulations are present in *Rebonds A*: single staccatissimo accent [∨] and double staccatissimo accent [⩛]. Careful attention must be given to these contrasting articulations. As information pertaining to interpretations of articulations is omitted from the *Rebonds* score, a reference to *Psappha*, Xenakis's prior work for solo percussion, was examined. In *Psappha*, Xenakis clearly states how accents can be interpreted within a certain sequence or musical passage as follows:

1. louder, greater intensity
2. abrupt change in timbre
3. abrupt change of weight
4. addition of another sound played simultaneously
5. simultaneous combination of all preceding suggestions

The single staccatissimo accent [∨] and double staccatissimo accent [⩛] indicates that notes are to be played in a detached, separated, and distinct manner that affects the notated duration. This stylistic approach, achieved through increased stroke velocity and height, delineates the articulation, thus allowing more space between stroke preparations. This is especially effective at the

beginning of *Rebonds A* and will assist the performer in creating contrast to the single marcato accent [>] and double marcato accent [>>].

Rebonds B : High bongo pulse vs. five-note cycle

In *Rebonds B*, a few global decisions must be made before, or in conjunction with, determining an approach to high bongo grace-note figures. This movement consists primarily of a high bongo pulse juxtaposed by a slightly varied, melodic five-note cycle on the remaining drums. Performers need to consider and establish if one hand will primarily deliver the high bongo pulse while the other hand articulates the five-note cycle. In order to communicate these two contrasting ideas, the decision to dedicate each hand respectively is clear. Therefore, the right hand is dedicated to the high bongo pulse and the left hand is dedicated to the melodic five-note cycle. This global decision will inherently affect performers approach to high bongo grace-note figures.

Rebonds B : High bongo grace-note figures: Identification and Approach

In *Rebonds B*, technical challenges arise with approaching high bongo grace-note figures. These high bongo grace-note figures include: *divided drum* and *simultaneous drum*. *Divided drum* refers to high bongo grace-note figures occurring on sixteenth-note partials separately from a drum in the five-note cycle.

Simultaneous drum refers to high bongo grace-note figures occurring on sixteenth-note partials that correspond with a drum in the five-note cycle.

Several sticking methods are available to performers when addressing difficulties associated with *divided drum* and *simultaneous drum* high bongo grace-note figures. These sticking methods include: *right-hand drag*, *left-hand drag, consecutive right-hand*, and *alternate-hand*. Performers may implement only one sticking method, or may implement all sticking methods.

The author recommends using the *right-hand drag* (RD) and *left-hand drag* (LD) sticking methods when approaching *divided drum* high bongo grace-note figures. These two methods are technically less challenging and will aid performers in approaching *divided drum* high bongo grace-note figures. Consequently, both the *consecutive right-hand* (CRD) and *alternate-hand* (AD) sticking methods have benefits for approaching *simultaneous drum* high bongo grace-note figures. The inherent sticking of these two methods allows faster left-hand stroke preparation towards the simultaneous drum in the five-note cycle.

The following *High Bongo Grace-note Figures Table* organizes high bongo grace-note figures according to their location in the music (measure number and beat placement within a measure) of *Rebonds B*. The table lists recommended sticking methods for specific occurrences of the *divided drum* and *simultaneous drum* high bongo grace-note figures. In addition, corresponding page numbers are included for each suggested exercise.

Table 3.1 ***REBONDS B*: HIGH BONGO GRACE-NOTE FIGURES TABLE (p. 1 of 5)**

Location in the music		Sticking Methods							
		Divided drum				Simultaneous drum			
		Right-hand		Left-hand		Consecutive right		Alternate-hand	
Measure Number	Beat	Exercise	Page #	Exercise	Page #	Exercise	Page #	Exercise	Page #
1	1					CRD5a	88	AD5a	95
1	3					CRD3a	86	AD3a	93
2	1	RD2a	39	LD2a	62				
2	3	RD4a	41	LD4a	64				
		RD6c	43	LD6c	66				
3	1	RD6a	43	LD6a	66				
3	3	RD6a	43	LD6a	66				
		RD5b	42	LD5b	65				
4	1					CRD6a	89	AD6a	96
4	3					CRD5a	88	AD5a	95
5	1					CRD4a	87	AD4a	94
5	3					CRD6a	89	AD6a	96
6	1	RD6c	43	LD6c	66				
6	2					CRD4d	87	AD4d	94
6	4					CRD6d	89	AD6d	96
7	2					CRD5d	88	AD5d	95
7	4					CRD4d	87	AD4d	94
9	3					CRD6b	89	AD6b	96
10	1	RD7b	44	LD7b	67				
10	3	RD2b	39	LD2b	62				
11	1					CRD3a	86	AD3a	93
11	3	RD6c	43	LD6c	66				
12	1	RD6b	43	LD6b	66				
		RD5c	42	LD5c	65				
12	2	RD2d	39	LD2d	62				
12	4	RD11a	48	LD11a	71				
		RD12c	49	LD12c	72				
13	2	RD2c	39	LD2c	62				
13	4	RD16c	53	LD16c	76				
14	2	RD14b	51	LD14b	74				
		RD11c	48	LD11c	71				
14	4	RD14a	51	LD14a	74				
		RD13b	50	LD13b	73				
15	2	RD16b	53	LD16b	76				
15	4	RD18a	55	LD18a	78				
		RD15c	52	LD15c	75				
16	2	RD17b	54	LD17b	77				

Table 3.2 ***REBONDS B*: HIGH BONGO GRACE-NOTE FIGURES TABLE (p. 2 of 5)**

Location in the music		Sticking Methods							
		Divided drum				Simultaneous drum			
		Right-hand		Left-hand		Consecutive right		Alternate-hand	
Measure Number	Beat	Exercise	Page #	Exercise	Page #	Exercise	Page #	Exercise	Page #
18	3	RD4a	41	LD4a	67				
19	1	RD6a	43	LD6a	69				
19	2					CRD4d	87	AD4d	94
20	1					CRD3a	86	AD3a	93
20	3					CRD5b	88	AD5b	95
21	1	RD16a	53	LD16a	76				
		RD18c	55	LD18c	78				
21	3	RD15b	52	LD15b	75				
22	1	RD17a	54	LD17a	77				
		RD18b	55	LD18b	78				
22	4	RD10a	47	LD10a	70				
		RD7c	44	LD7c	67				
23	2	RD18a	55	LD18a	78				
		RD17b	54	LD17b	77				
		RD18c	55	LD18c	78				
24	1	RD6a	43	LD6a	66				
24	3	RD6a	43	LD6a	66				
		RD5b	42	LD5b	65				
25	1	RD4a	41	LD4a	64				
25	3	RD3b	40	LD3b	63				
26	1	RD9a	46	LD9a	69				
		RD10b	57	LD10b	70				
26	4	RD6a	43	LD6a	66				
27	2	RD6a	43	LD6a	66				
		RD5b	42	LD5b	65				
27	4	RD3a	40	LD3a	63				
28	2	RD2a	39	LD2a	62				
28	3	RD10b	47	LD10b	70				
28	4	RD11a	48	LD11a	71				
		RD13c	50	LD13c	73				
29	1	RD18b	55	LD18b	78				
		RD17c	54	LD17c	77				
29	3	RD10a	47	LD10a	70				
		RD7b	44	LD7b	67				
29	4	RD12b	49	LD12b	72				
		RD14c	51	LD14c	74				
30	2	RD6b	43	LD6b	66				

Table 3.3 ***REBONDS B*: HIGH BONGO GRACE-NOTE FIGURES TABLE (p. 3 of 5)**

Location in the music		Sticking Methods							
		Divided drum				Simultaneous drum			
		Right-hand		Left-hand		Consecutive right		Alternate-hand	
Measure Number	Beat	Exercise	Page #	Exercise	Page #	Exercise	Page #	Exercise	Page #
30	4	RD6a	43	LD6a	66				
		RD5b	42	LD5b	65				
35	2					CRD5c	88	AD5c	95
35	4	RD14a	51	LD14a	74				
36	2					CRD3c	86	AD3c	93
36	4	RD7c	44	LD7c	67				
37	2	RD13a	50	LD13a	73				
		RD11b	48	LD11b	71				
37	4	RD11c*	48	LD11c*	71				
38	2	RD12a	49	LD12a	72				
		RD14b	51	LD14b	74				
		RD12c	49	LD12c	72				
38	4	RD11a	48	LD11a	71				
39	2	RD2a	39	LD2a	62				
39	3	RD15b	52	LD15b	75				
		RD18c	55	LD18c	78				
40	1	RD13b	50	LD13b	73				
		RD14c	51	LD14c	74				
40	3	RD7b	44	LD7b	67				
		RD8c	45	LD8c	68				
41	1	RD3b	40	LD3b	63				
41	2	RD11c	48	LD11c	71				
41	3					CRD4b	87	AD4b	94
41	4	RD7c	44	LD7c	67				
42	1	RD3b	40	LD3b	63				
42	2	RD10b	47	LD10b	70				
		RD9c	46	LD9c	69				
42	3	RD8a	45	LD8a	68				
		RD7c	44	LD7c	67				
42	4	RD3b	40	LD3b	63				
43	1	RD2a	39	LD2a	62				
		RD2d	39	LD2d	62				
43	2	RD14a	51	LD14a	74				
		RD13b	50	LD13b	73				
		RD11c	48	LD11c	71				
43	3	RD10a	47	LD10a	70				
		RD2d	39	LD2d	62				

Table 3.4 ***REBONDS B*: HIGH BONGO GRACE-NOTE FIGURES TABLE (p. 4 of 5)**

Location in the music		Sticking Methods							
		Divided drum				Simultaneous drum			
		Right-hand		Left-hand		Consecutive right		Alternate-hand	
Measure Number	Beat	Exercise	Page #	Exercise	Page #	Exercise	Page #	Exercise	Page #
43	4	RD7a	44	LD7a	67				
48	2	RD14a	51	LD14a	74				
		RD13c	50	LD13c	73				
48	3	RD16b	53	LD16b	76				
		RD18c	55	LD18c	78				
49	1	RD3a	40	LD3a	63				
49	2	RD6a	43	LD6a	66				
		RD5b	42	LD5b	65				
49	3	RD10b*	47	LD10b*	70				
49	4					CRD4c	87	AD4c	94
50	1	RD15b	52	LD15b	75				
50	2	RD18a	55	LD18a	78				
		RD17b	54	LD17b	77				
50	4	RD5a	42	LD5a	65				
		RD4c	41	LD4c	64				
51	1	RD7a	44	LD7a	67				
		RD9b	46	LD9b	69				
		RD10c	47	LD10c	70				
51	2	RD14c	51	LD14c	74				
51	3	RD11b	48	LD11b	71				
		RD13c	50	LD13c	73				
51	4	RD12a	49	LD12a	72				
		RD11b	48	LD11b	71				
		RD13c	50	LD13c	73				
52	1	RD12b	49	LD12b	72				
		RD14c	51	LD14c	74				
52	2	RD15b	52	LD15b	75				
		RD18c	55	LD18c	78				
52	3	RD17b	54	LD17b	77				
		RD15c	52	LD15c	75				
53	1	RD6a	43	LD6a	66				
		RD4b	41	LD4b	64				
		RD3c	40	LD3c	63				
53	2	RD5a	42	LD5a	65				
		RD6b	43	LD6b	66				
		RD17b	54	LD17b	77				
		RD18c	55	LD18c	78				

Table 3.5 ***REBONDS B*: HIGH BONGO GRACE-NOTE FIGURES TABLE (p. 5 of 5)**

Location in the music		Sticking Methods							
		Divided drum				Simultaneous drum			
		Right-hand		Left-hand		Consecutive right		Alternate-hand	
Measure Number	Beat	Exercise	Page #	Exercise	Page #	Exercise	Page #	Exercise	Page #
53	3	RD15a	52	LD15a	75				
		RD17b	54	LD17b	77				
53	4	RD2c	39	LD2c	62				
58	1	RD1d	37	LD1d	60				
58	4	RD1b	37	LD1b	60				
59	1	RD1b	37	LD1b	60				
59	2	RD1a	37	LD1a	60				
		RD1d	37	LD1d	60				
59	4	RD7a*	44	LD7a*	67				
		RD9b	46	LD9b	69				
60	1	RD8b	45	LD8b	68				
60	2	RD6a	43	LD6a	66				
		RD4b	41	LD4b	64				
		RD3c	40	LD3c	63				
60	4	RD5a	42	LD5a	65				
		RD17b	54	LD17b	77				
61	1	RD16a	53	LD16a	76				
		RD18c	55	LD18c	78				
61	3	RD1a	37	LD1a	60				
		RD1d	37	LD1d	60				
62	1	RD1a	37	LD1a	60				
62	2	RD1a	37	LD1a	60				
		RD1d	37	LD1d	60				
62	3	RD1d	37	LD1d	60				
62	4	RD1c	37	LD1c	60				
63	1	RD1d	37	LD1d	60				
63	3	RD1a	37	LD1a	60				
		RD1d	37	LD1d	60				
64	1	RD2a	39	LD2a	62				
		RD2d	39	LD2d	62				
64	3	RD2a	39	LD2a	62				
		RD2c	39	LD2c	62				
64	4	RD2a	39	LD2a	62				
		RD2d	39	LD2d	62				
65	1	RD2b	39	LD2b	62				
65	2	RD1a	37	LD1a	60				

* - Denotes slight variation from exercise to musical passage

Several exercises were written for each of the four sticking methods. Exercises are presented pedagogically to develop and improve advanced techniques associated with the different sticking methods. Each exercise should be repeated until the required advanced technique is achieved consistently and effortlessly. Rest measures have been inserted allowing performers to synthesize the passage perfectly in the mind. In addition, articulations are purposely omitted. Performers should apply these learned advanced techniques to corresponding musical passages in *Rebonds B*.

Right-hand drag sticking method (RD):

The *right-hand drag* sticking method requires performers to play two consecutive left-hand grace-note strokes. The primary note, or release immediately following the grace-note figure, is played using the right hand. This is similar to playing a right-hand "drag" rudiment (originally called "ruffs"). Use the *right-hand drag* (RD) sticking method for approaching *divided drum* high bongo grace-note figures.

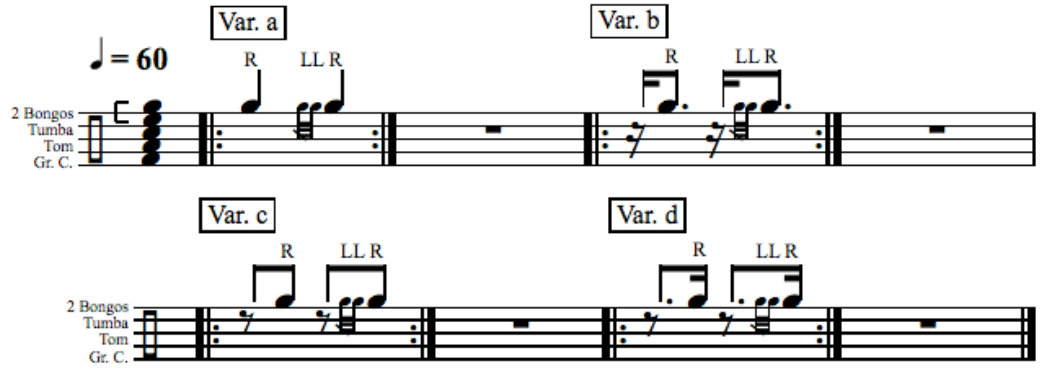
Exercise RD1 isolates the high bongo grace-note figure on each sixteenth-note partial. Measure one of the first variation (Var. a) isolates a single stroke on beat one followed by the grace-note figure on beat two. This ordering allows performers to determine an approach to single strokes prior to playing grace-note figures. This process is repeated for three remaining variations while occurring on subsequent sixteenth-note partials of the beat.

Exercise RD1.5 isolates the high bongo grace-note figure preceded by a divided drum instance. Measure one of the first variation (Var. a) isolates a two-hand stroke on beat one followed by the grace-note figure on beat two. This ordering allows performers to determine an approach to two-hand strokes prior to playing grace-note figures. This process is repeated for three remaining variations while occurring on each possible divided drum.

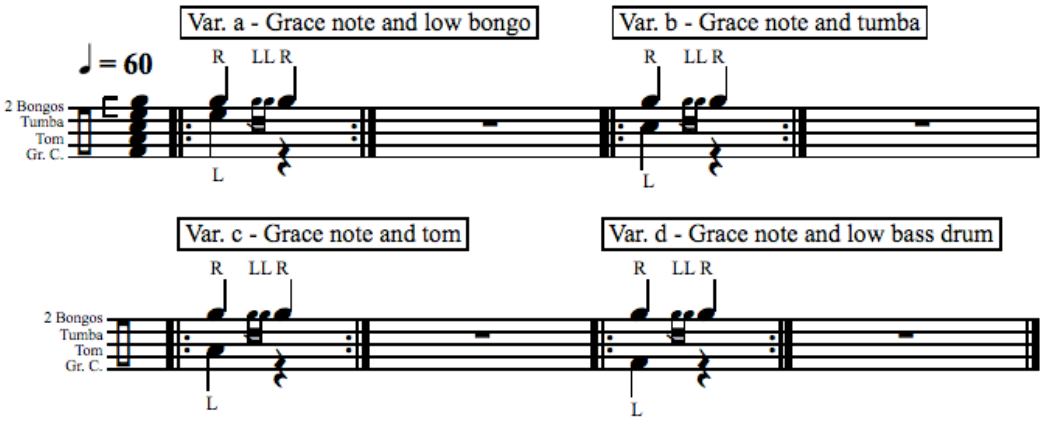
For both exercises below (Ex. RD1 and Ex. RD1.5), careful attention should be given to the interpretation of grace-note figures while maintaining a

constant internal sixteenth-note pulse. Performers should strive for consistent interpretation, specifically with respect to a refined clarity of diction.

Exercise RD1:

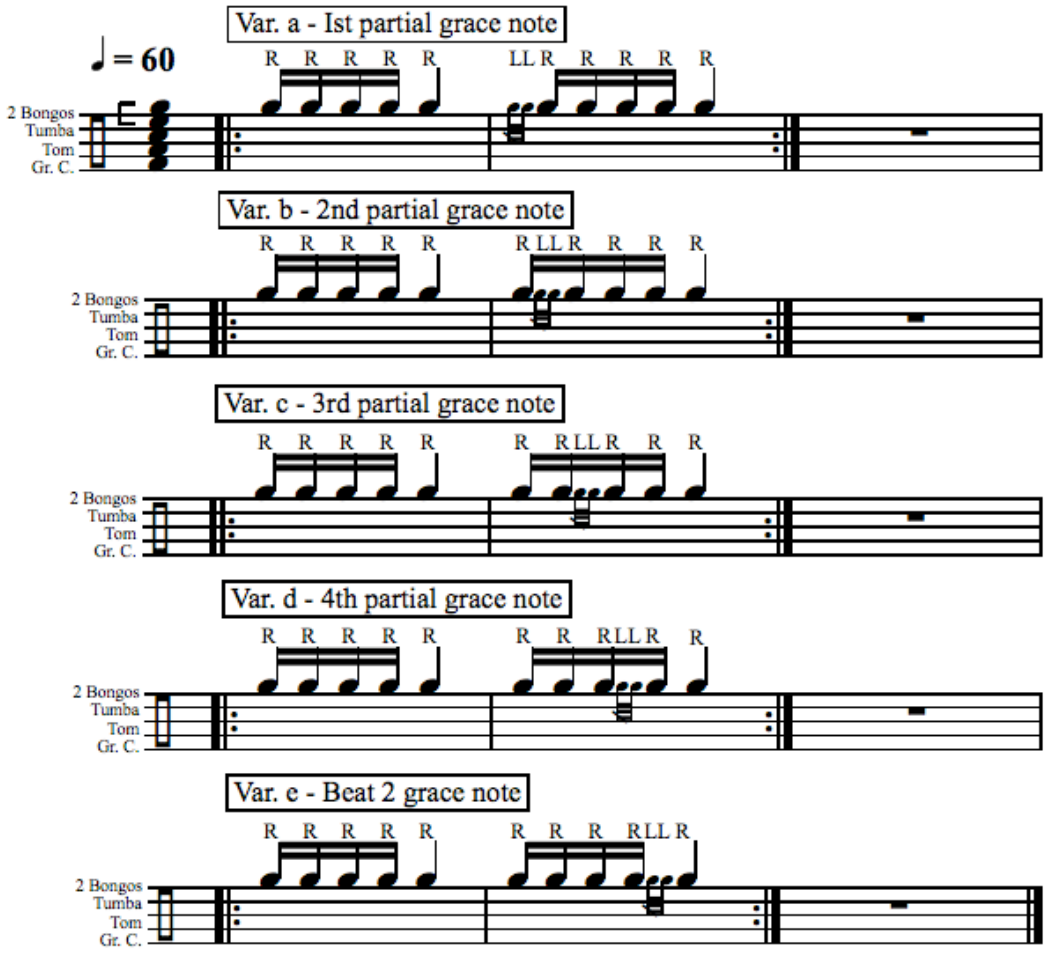


Exercise RD1.5:



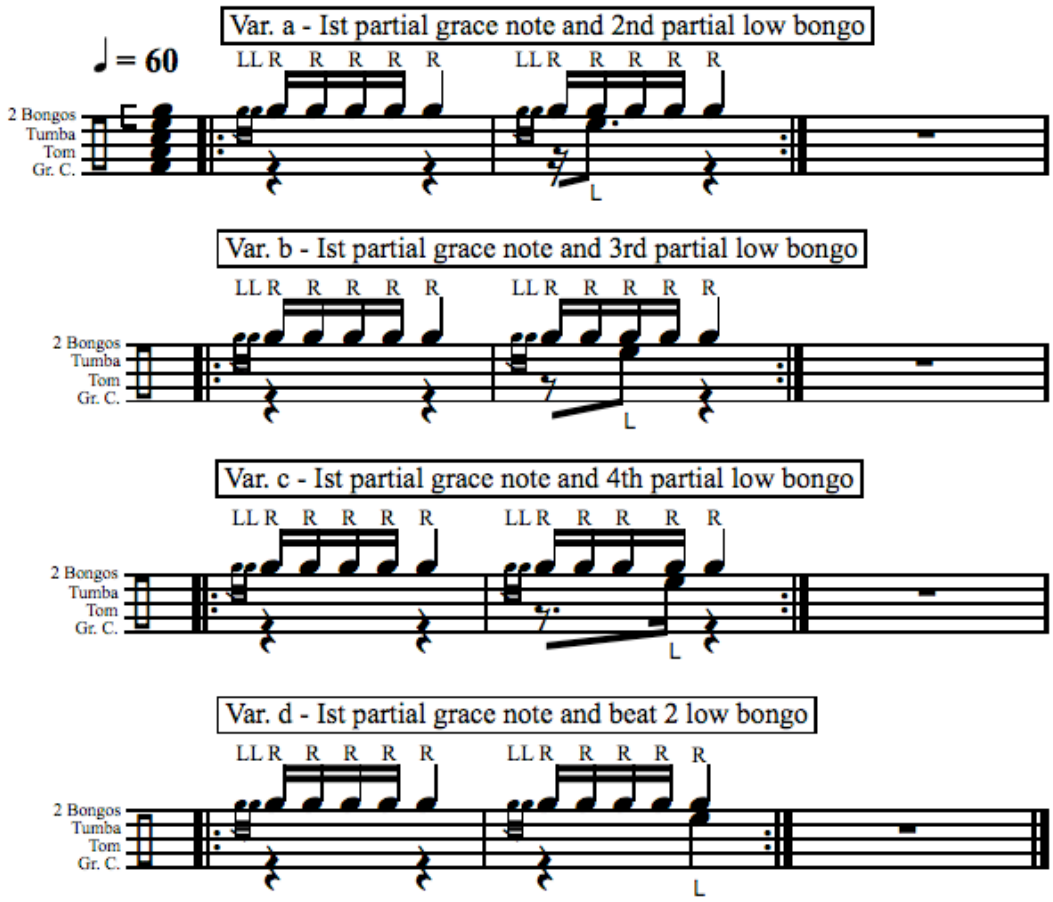
Exercise RD2 isolates the high bongo grace-note figure on each sixteenth-note partial. The first measure of each variation (a-e) presents the sixteenth-note pulse by subdividing beat one into four sixteenth notes. The second measure of each variation presents grace-note figures on each sixteenth-note partial. This ordering allows performers to establish a sixteenth-note pulse prior to playing grace-note figures on each sixteenth-note partial.

Exercise RD2:



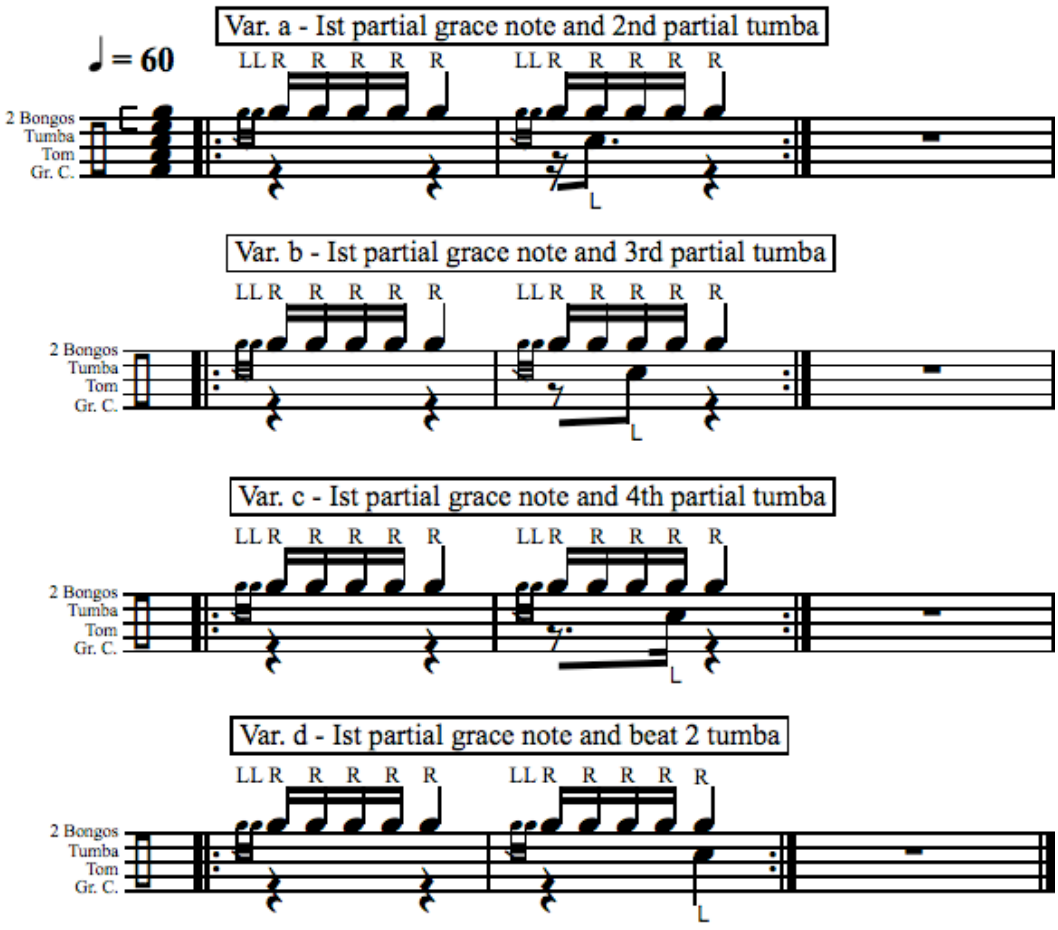
Exercise RD3 combines a high bongo grace-note figure occurring on the first sixteenth-note partial with a divided low bongo. The second measure of each variation presents the divided low bongo on each sixteenth-note partial within a divided drum musical passage. This ordering allows performers to establish a sixteenth-note pulse with a grace-note figure on beat one prior to playing the varied pattern of the divided low bongo.

Exercise RD3:



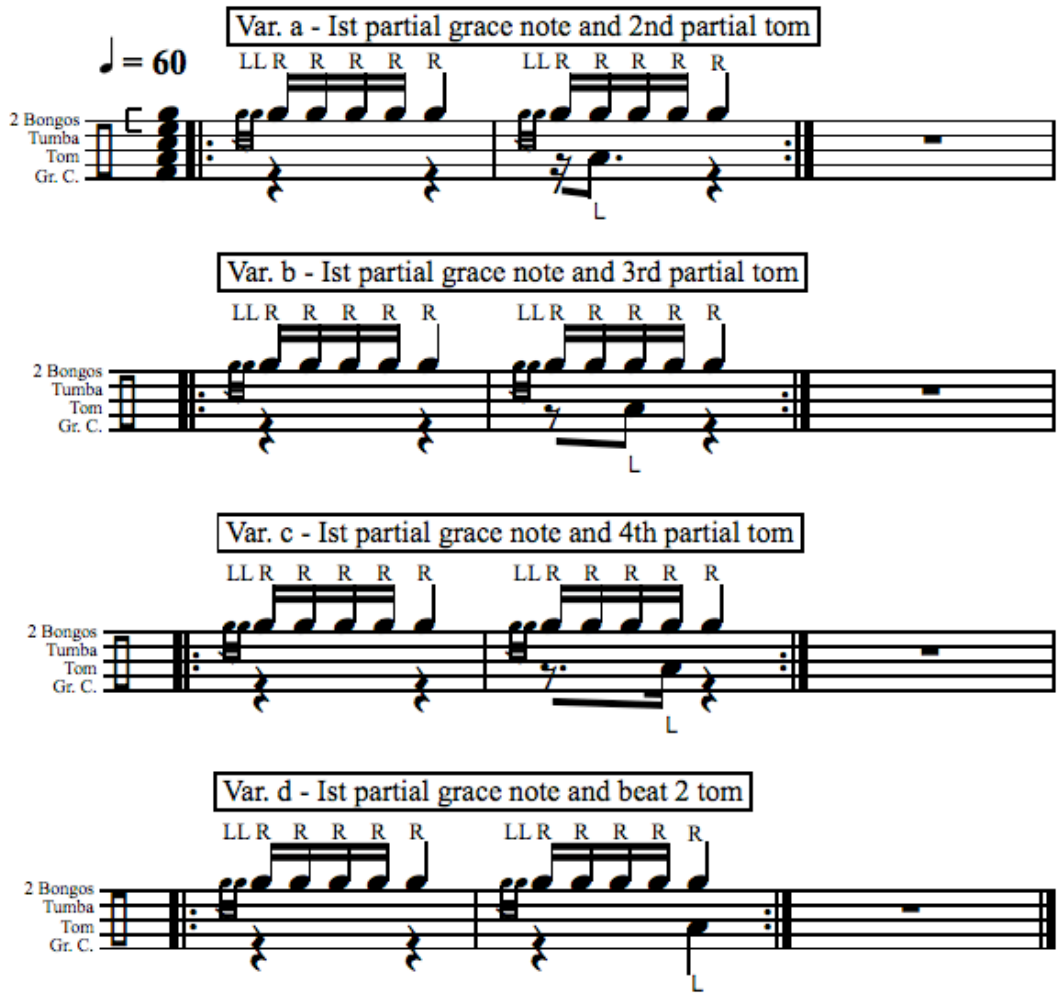
Exercise RD4 combines a high bongo grace-note figure occurring on the first sixteenth-note partial with a divided tumba. The second measure of each variation presents the divided tumba on each sixteenth-note partial within a divided drum musical passage. This ordering allows performers to establish a sixteenth-note pulse with a grace-note figure on beat one prior to playing the varied pattern of the divided tumba.

Exercise RD4:



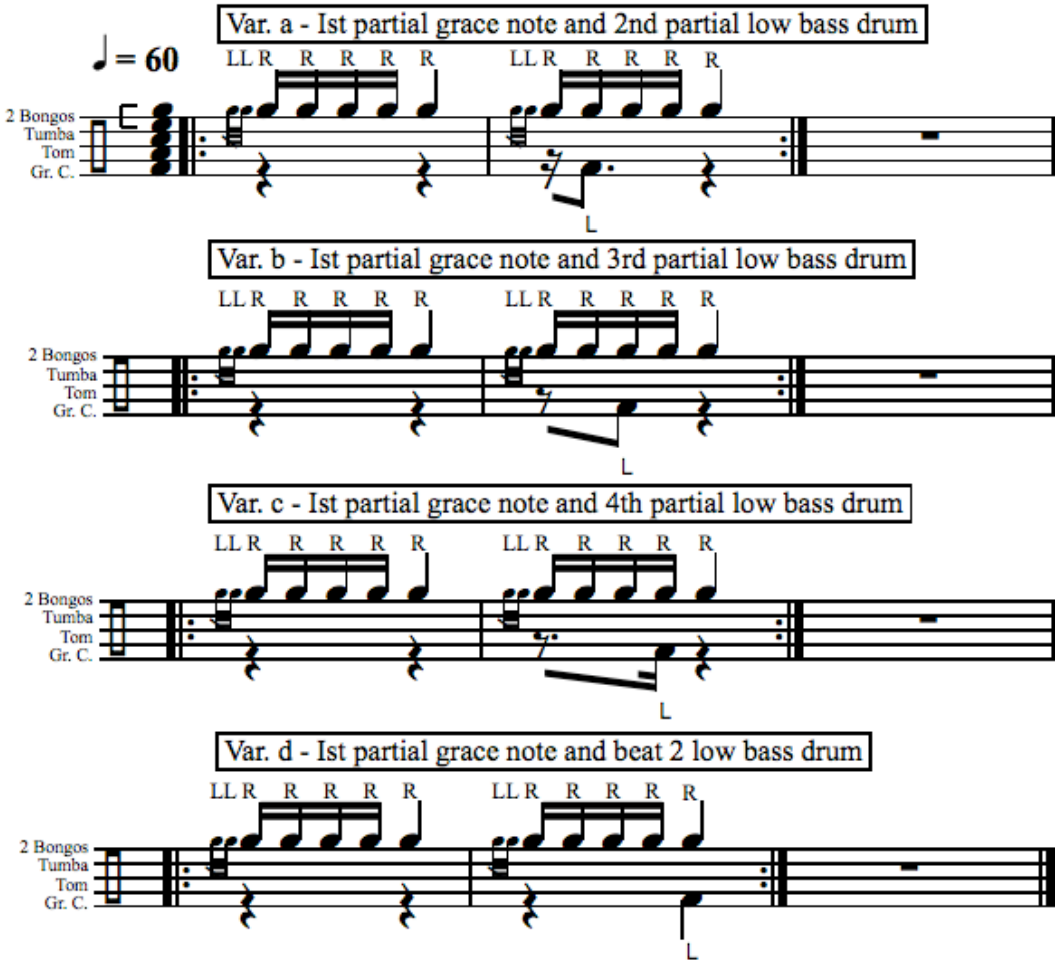
Exercise RD5 combines a high bongo grace-note figure occurring on the first sixteenth-note partial with a divided tom. The second measure of each variation presents the divided tom on each sixteenth-note partial within a divided drum musical passage. This ordering allows performers to establish a sixteenth-note pulse with a grace-note figure on beat one prior to playing the varied pattern of the divided tom.

Exercise RD5:



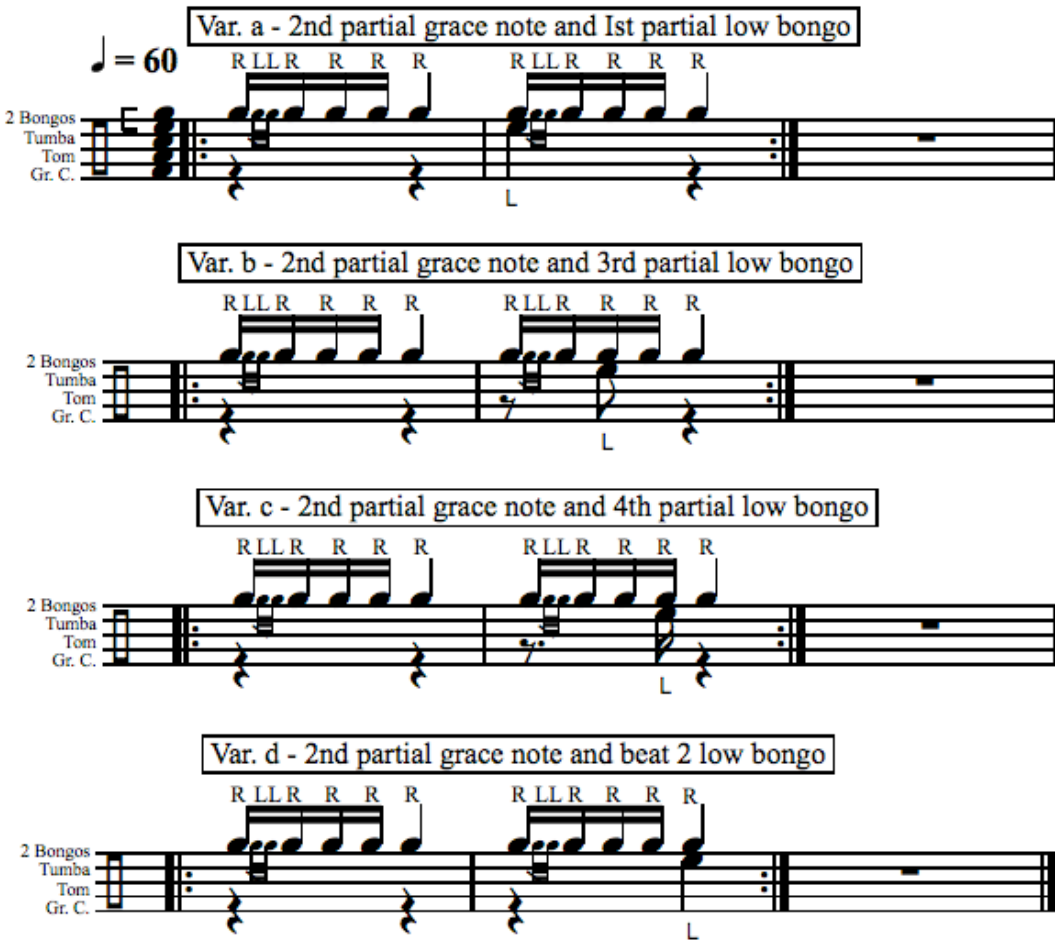
Exercise RD6 combines a high bongo grace-note figure occurring on the first sixteenth-note partial with a divided low bass drum. The second measure of each variation presents the divided low bass drum on each sixteenth-note partial within a divided drum musical passage. This ordering allows performers to establish a sixteenth-note pulse with a grace-note figure on beat one prior to playing the varied pattern of the divided low bass drum.

Exercise RD6:



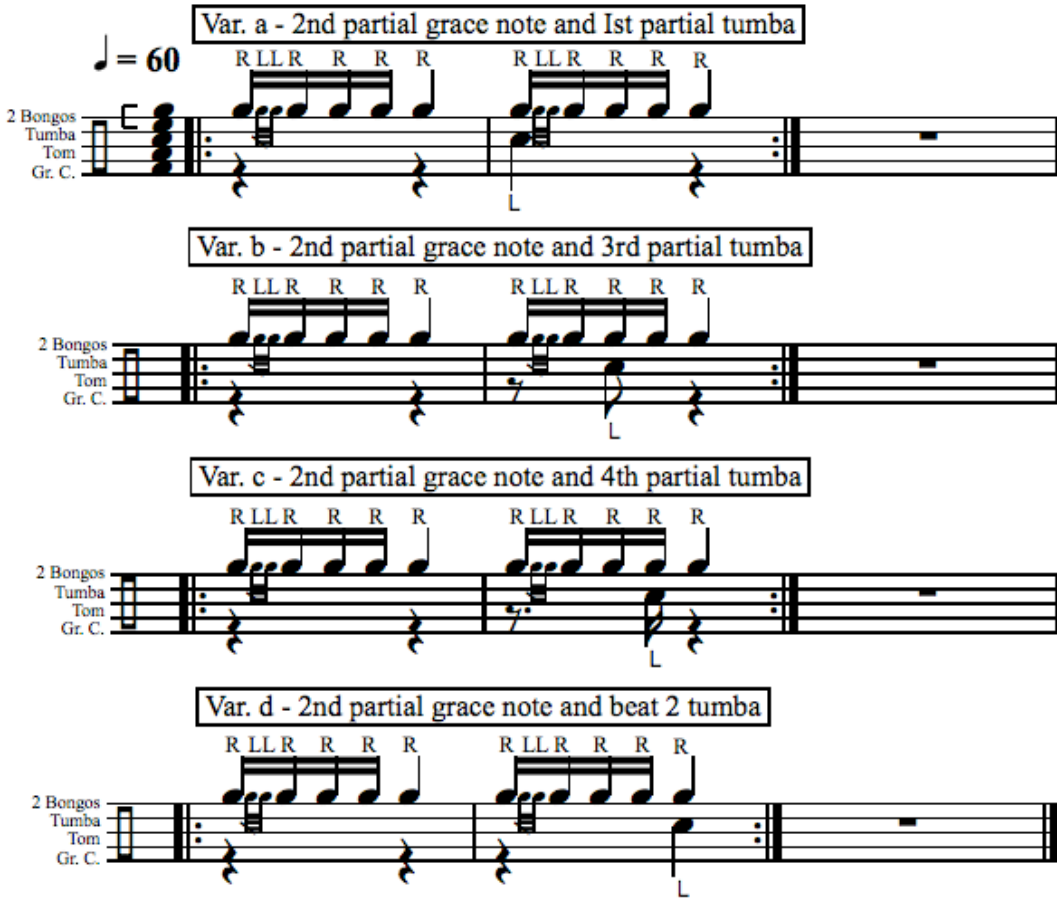
Exercise RD7 combines a high bongo grace-note figure occurring on the second sixteenth-note partial with a divided low bongo. The second measure of each variation presents the divided low bongo on each sixteenth-note partial within a divided drum musical passage. This ordering allows performers to establish a sixteenth-note pulse with a grace-note figure on the second sixteenth-note partial prior to playing the varied pattern of the divided low bongo.

Exercise RD7:



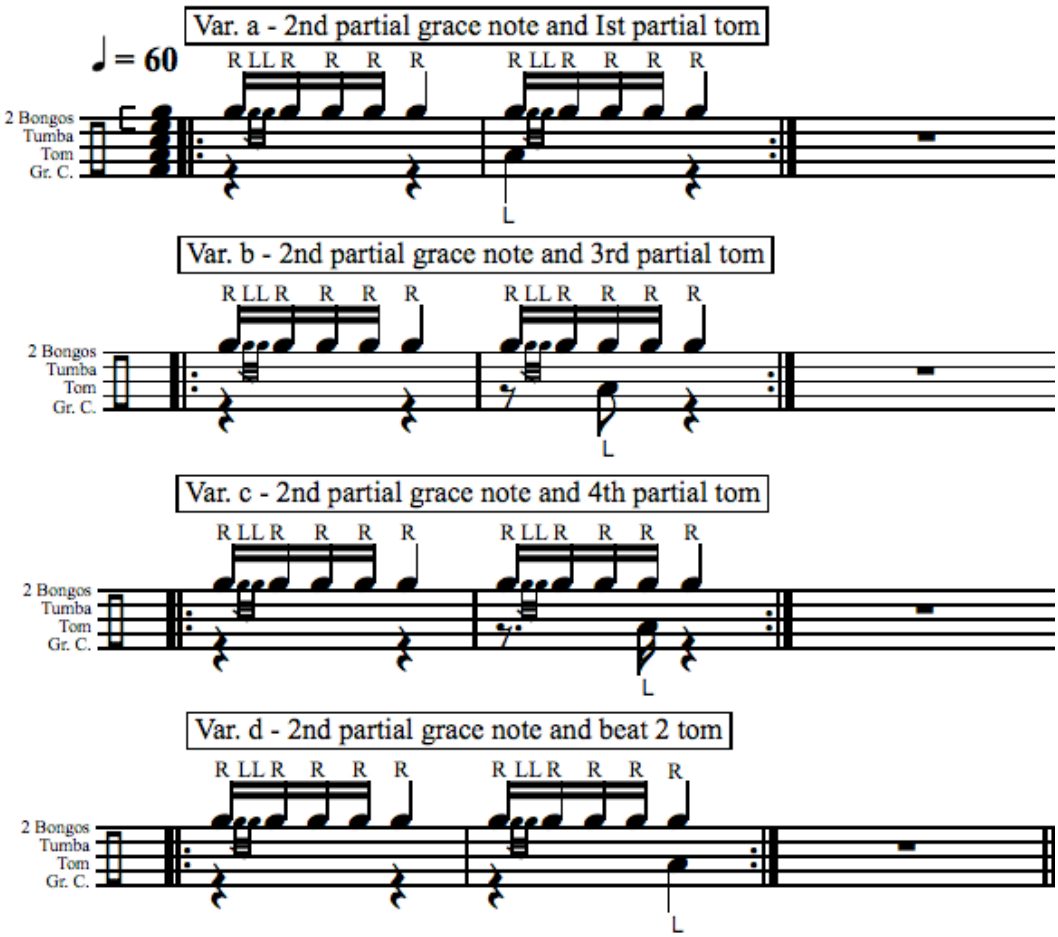
Exercise RD8 combines a high bongo grace-note figure occurring on the second sixteenth-note partial with a divided tumba. The second measure of each variation presents the divided tumba on each sixteenth-note partial within a divided drum musical passage. This ordering allows performers to establish a sixteenth-note pulse with a grace-note figure on the second sixteenth-note partial prior to playing the varied pattern of the divided tumba.

Exercise RD8:



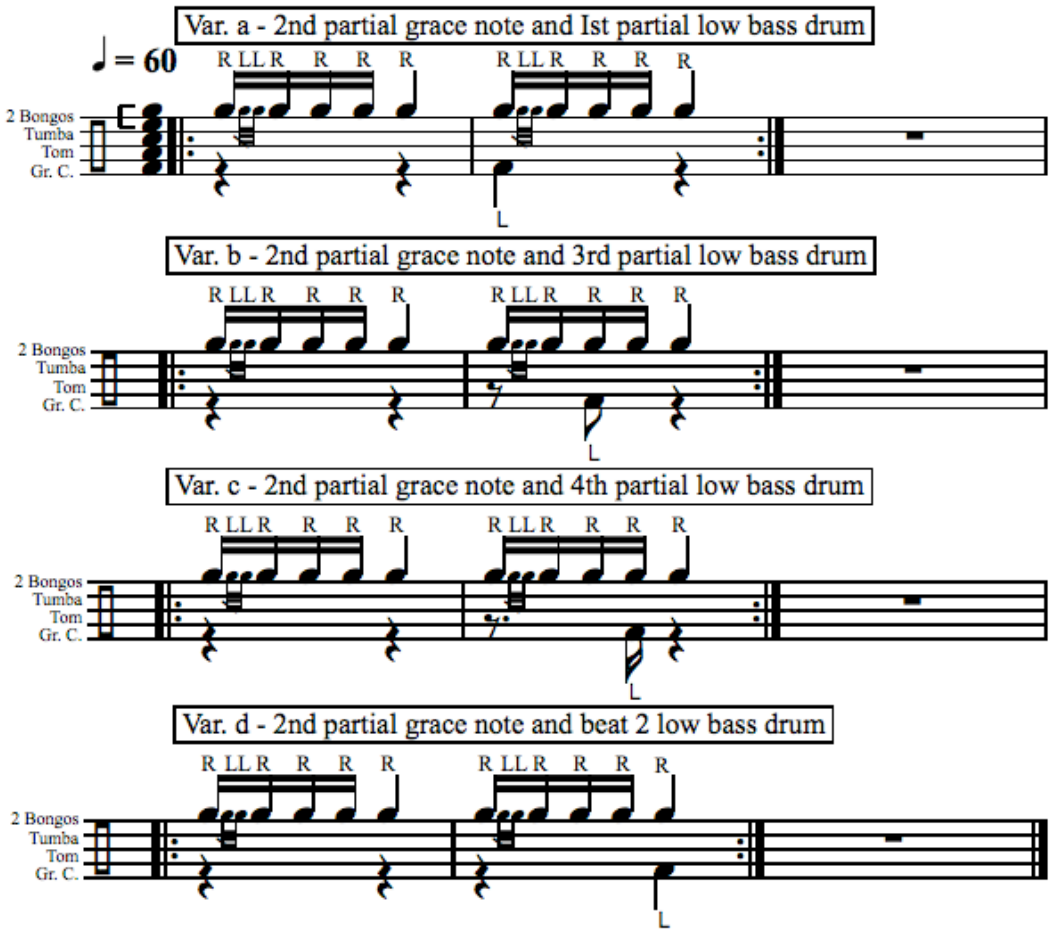
Exercise RD9 combines a high bongo grace-note figure occurring on the second sixteenth-note partial with a divided tom. The second measure of each variation presents the divided tom on each sixteenth-note partial within a divided drum musical passage. This ordering allows performers to establish a sixteenth-note pulse with a grace-note figure on the second sixteenth-note partial prior to playing the varied pattern of the divided tom.

Exercise RD9:



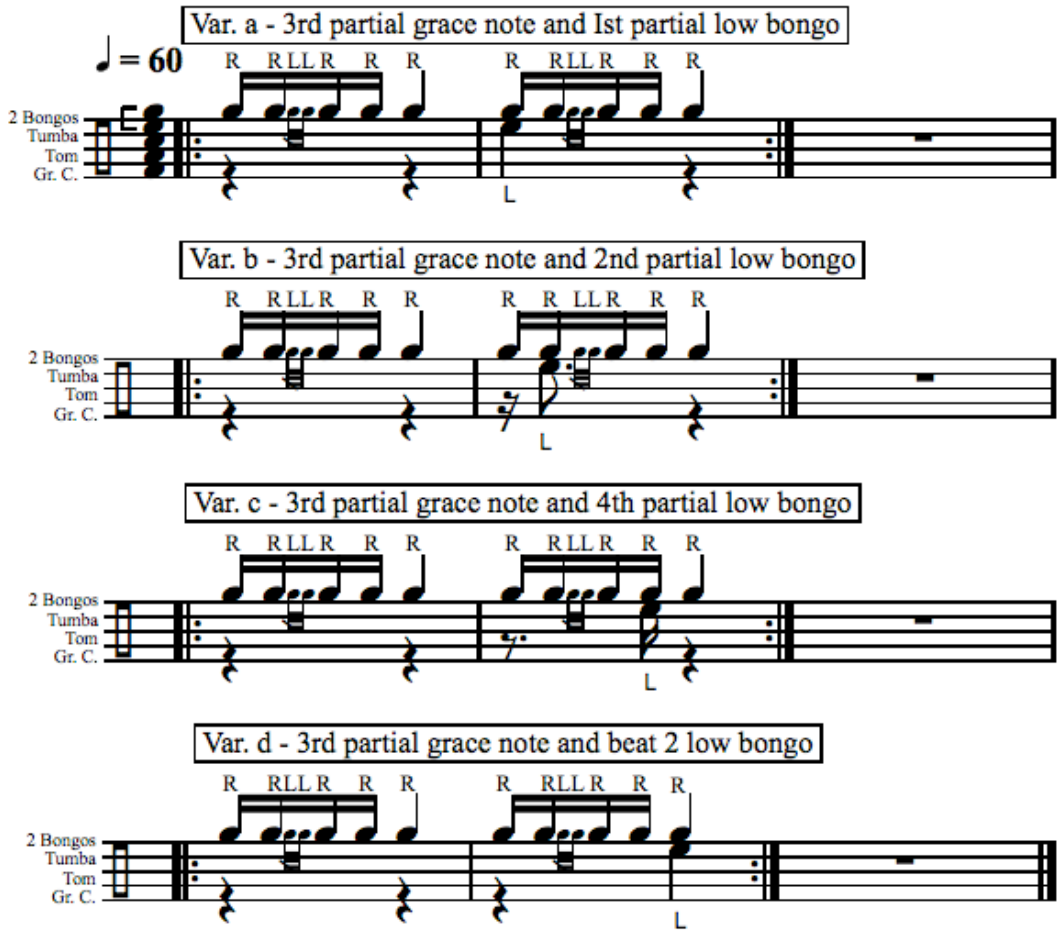
Exercise RD10 combines a high bongo grace-note figure occurring on the second sixteenth-note partial with a divided low bass drum. The second measure of each variation presents the divided low bass drum on each sixteenth-note partial within a divided drum musical passage. This ordering allows performers to establish a sixteenth-note pulse with a grace-note figure on the second sixteenth-note partial prior to playing the varied pattern of the divided low bass drum.

Exercise RD10:



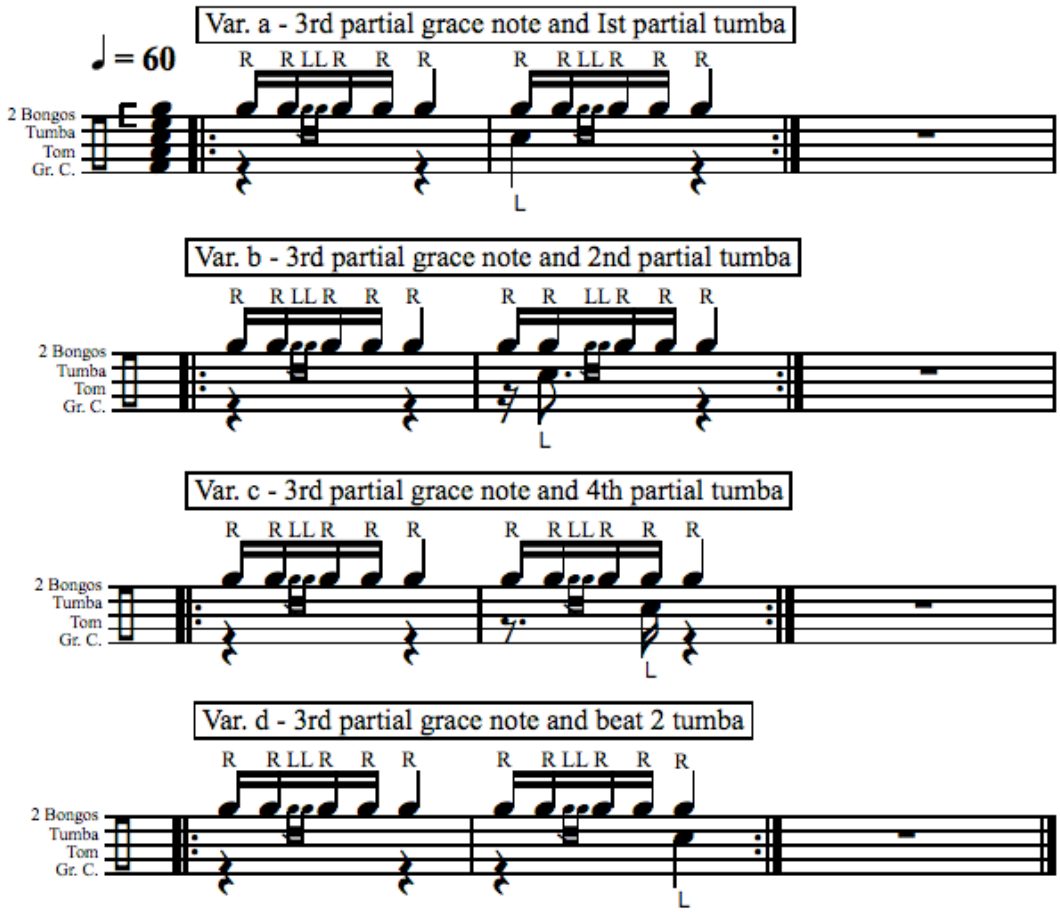
Exercise RD11 combines a high bongo grace-note figure occurring on the third sixteenth-note partial with a divided low bongo. The second measure of each variation presents the divided low bongo on each sixteenth-note partial within a divided drum musical passage. This ordering allows performers to establish a sixteenth-note pulse with a grace-note figure on the third sixteenth-note partial prior to playing the varied pattern of the divided low bongo.

Exercise RD11:



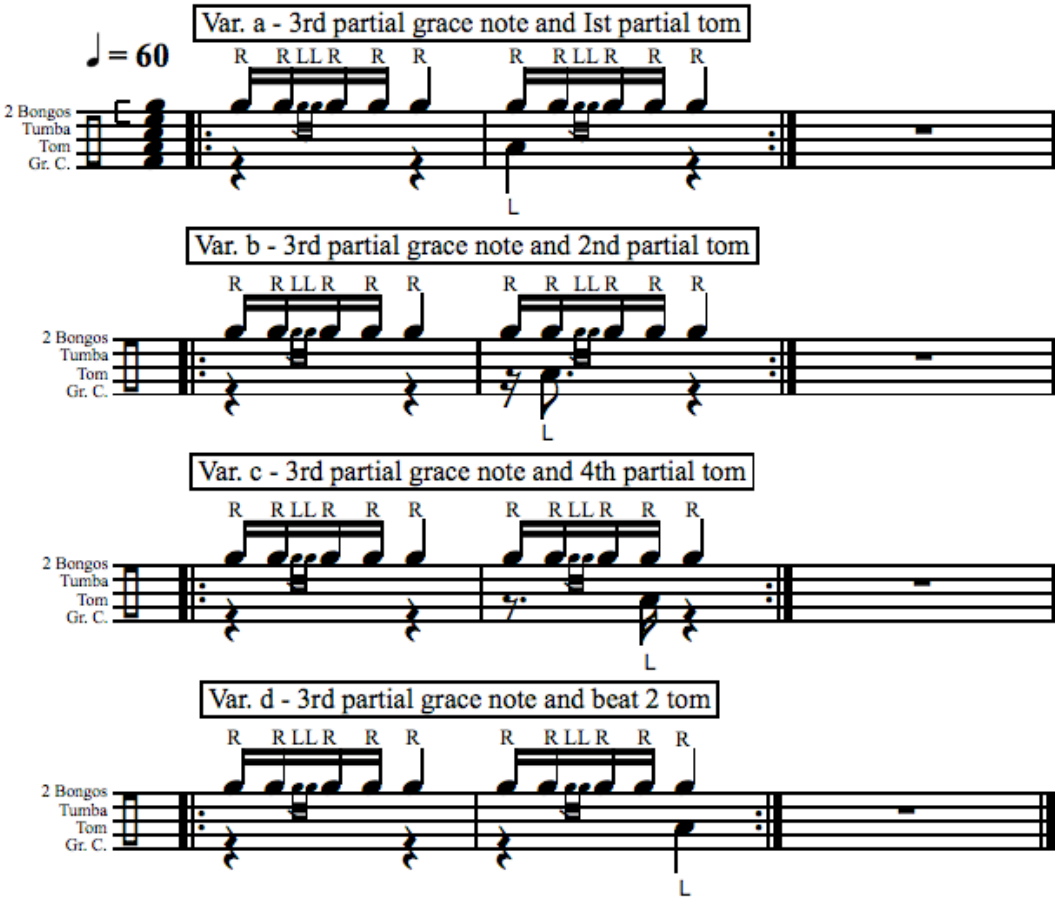
Exercise RD12 combines a high bongo grace-note figure occurring on the third sixteenth-note partial with a divided tumba. The second measure of each variation presents the divided tumba on each sixteenth-note partial within a divided drum musical passage. This ordering allows performers to establish a sixteenth-note pulse with a grace-note figure on the third sixteenth-note partial prior to playing the varied pattern of the divided tumba.

Exercise RD12:



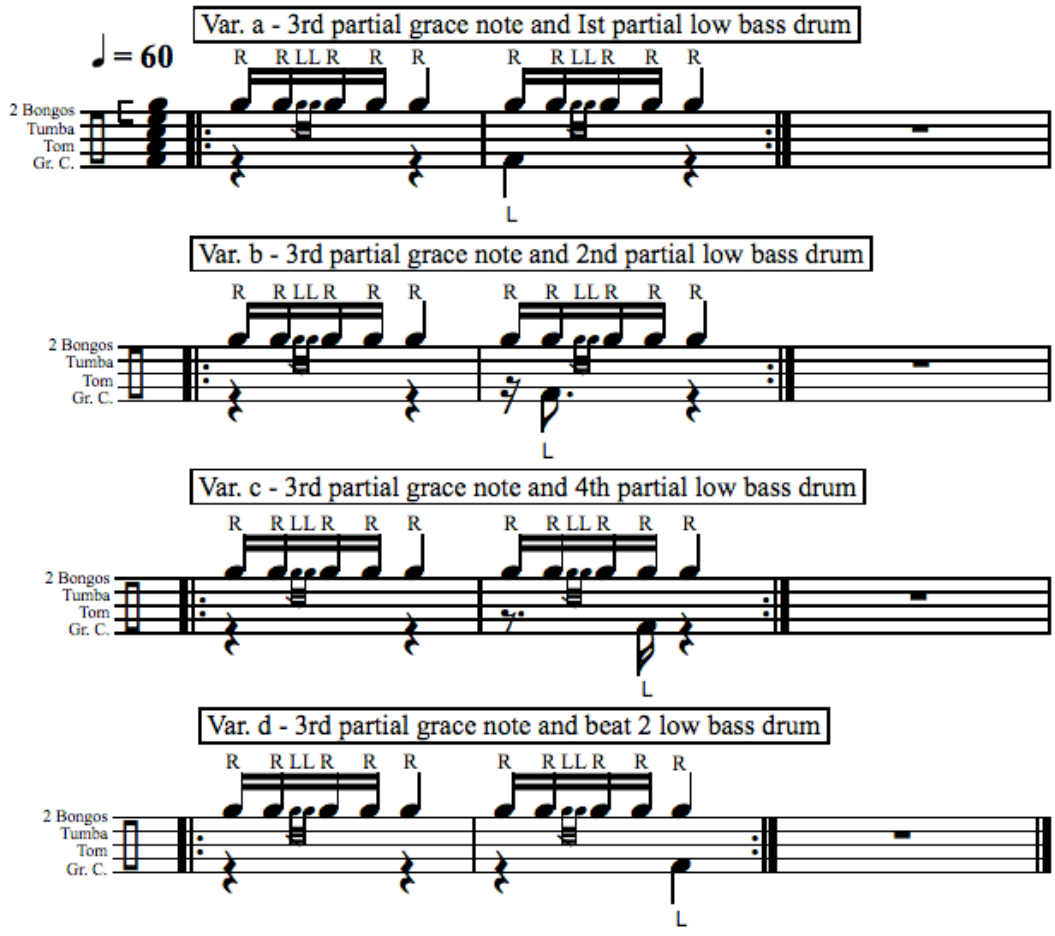
Exercise RD13 combines a high bongo grace-note figure occurring on the third sixteenth-note partial with a divided tom. The second measure of each variation presents the divided tom on each sixteenth-note partial within a divided drum musical passage. This ordering allows performers to establish a sixteenth-note pulse with a grace-note figure on the third sixteenth-note partial prior to playing the varied pattern of the divided tom.

Exercise RD13:



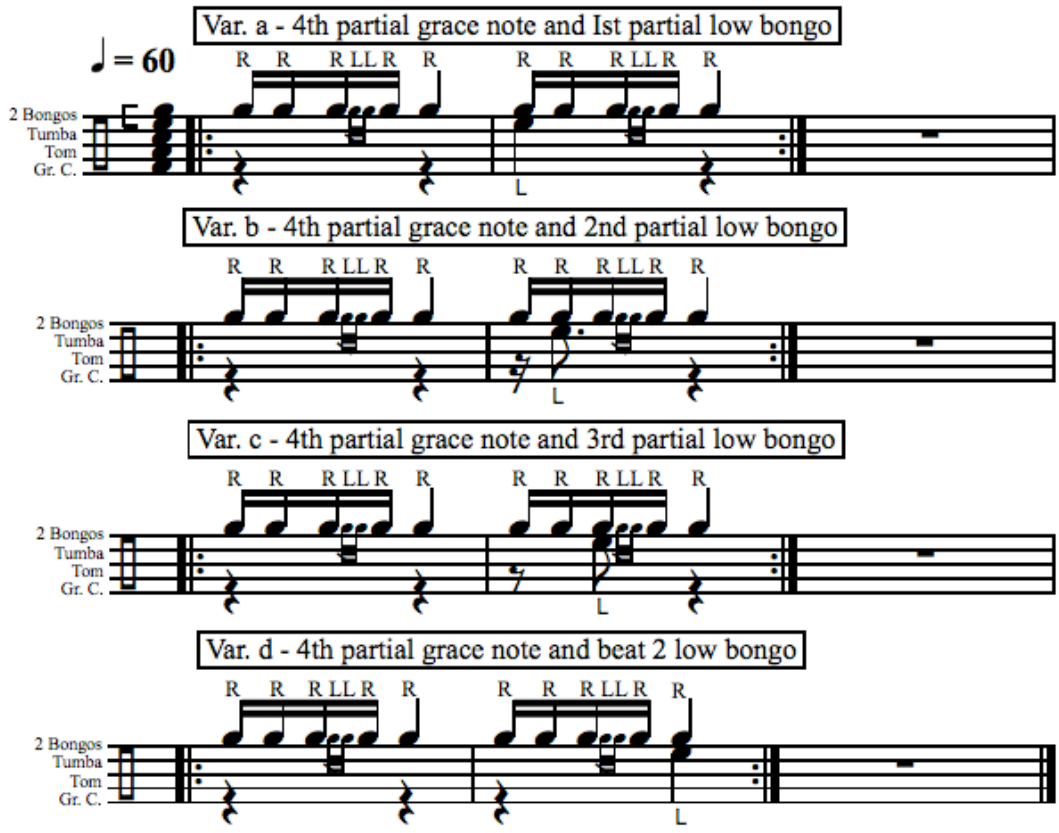
Exercise RD14 combines a high bongo grace-note figure occurring on the third sixteenth-note partial with a divided low bass drum. The second measure of each variation presents the divided low bass drum on each sixteenth-note partial within a divided drum musical passage. This ordering allows performers to establish a sixteenth-note pulse with a grace-note figure on the third sixteenth-note partial prior to playing the varied pattern of the divided bass drum.

Exercise RD14:



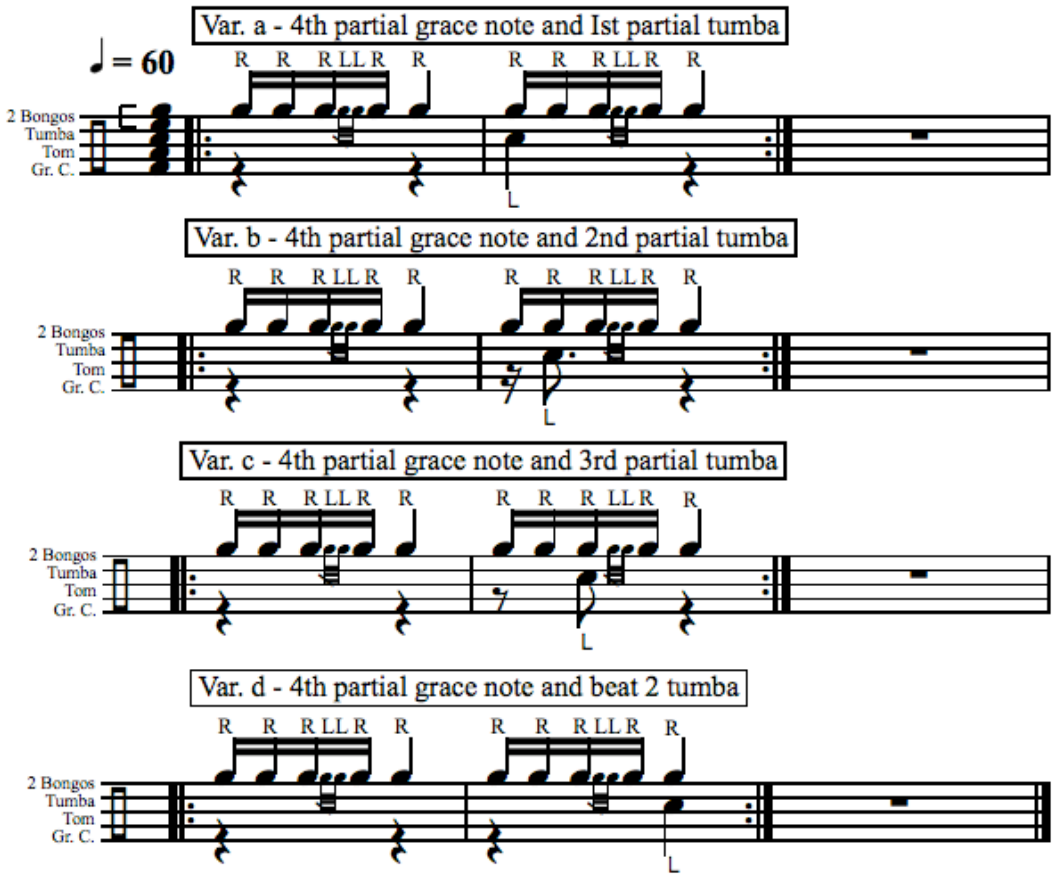
Exercise RD15 combines a high bongo grace-note figure occurring on the fourth sixteenth-note partial with a divided low bongo. The second measure of each variation presents the divided low bongo on each sixteenth-note partial within a divided drum musical passage. This ordering allows performers to establish a sixteenth-note pulse with a grace-note figure on the fourth sixteenth-note partial prior to playing the varied pattern of the divided low bongo.

Exercise RD15:



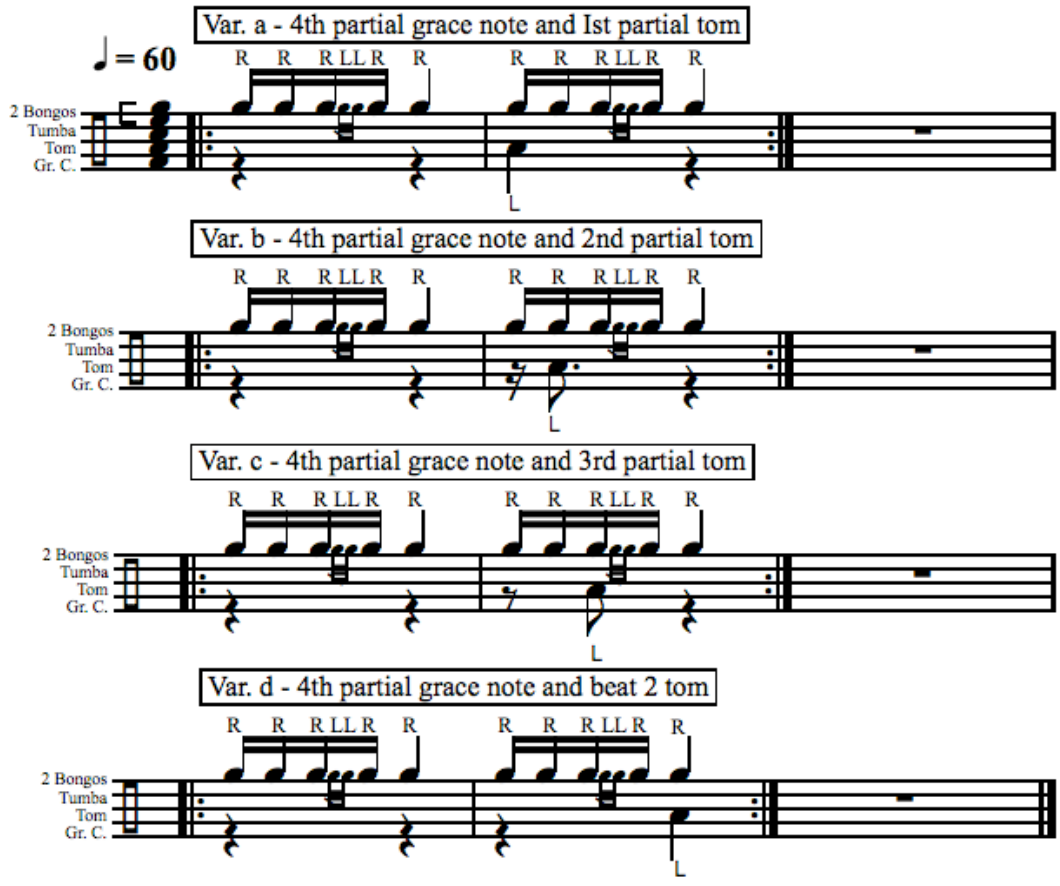
Exercise RD16 combines a high bongo grace-note figure occurring on the fourth sixteenth-note partial with a divided tumba. The second measure of each variation presents the divided tumba on each sixteenth-note partial within a divided drum musical passage. This ordering allows performers to establish a sixteenth-note pulse with a grace-note figure on the fourth sixteenth-note partial prior to playing the varied pattern of the divided tumba.

Exercise RD16:



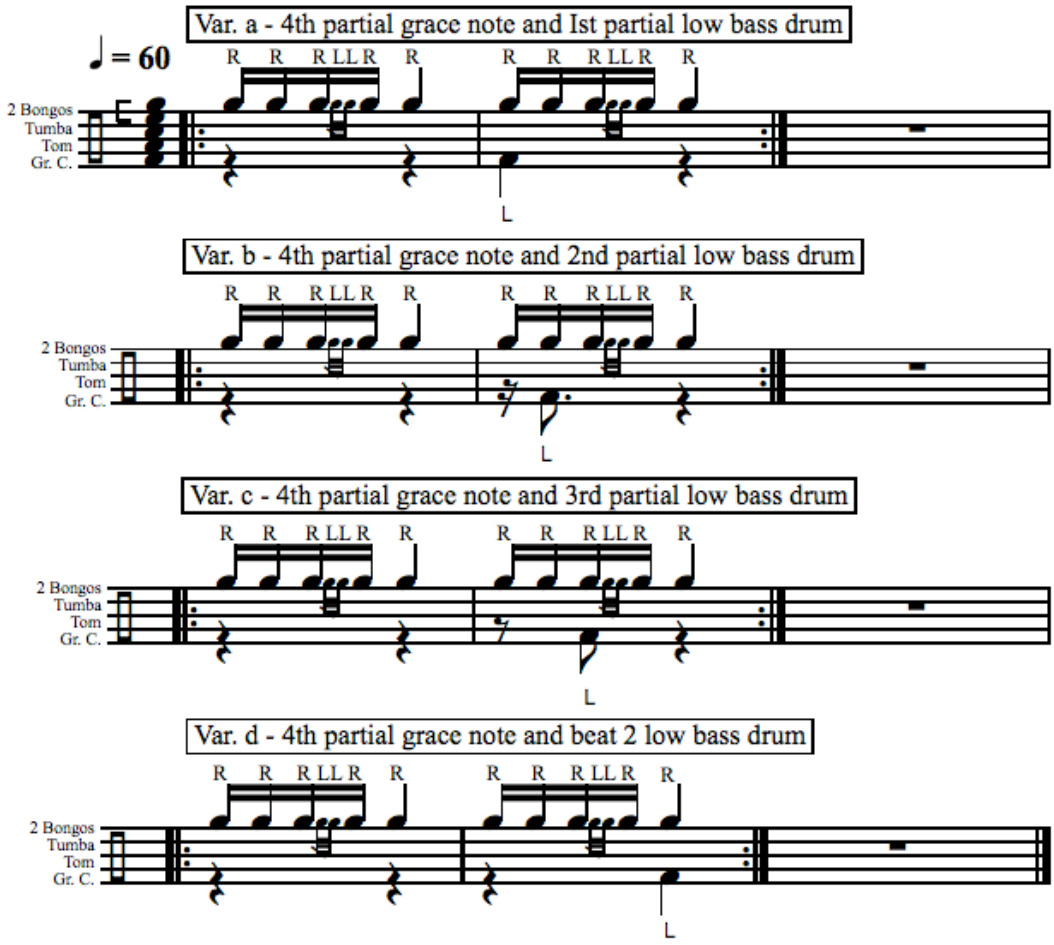
Exercise RD17 combines a high bongo grace-note figure occurring on the fourth sixteenth-note partial with a divided tom. The second measure of each variation presents the divided tom on each sixteenth-note partial within a divided drum musical passage. This ordering allows performers to establish a sixteenth-note pulse with a grace-note figure on the fourth sixteenth-note partial prior to playing the varied pattern of the divided tom.

Exercise RD17:



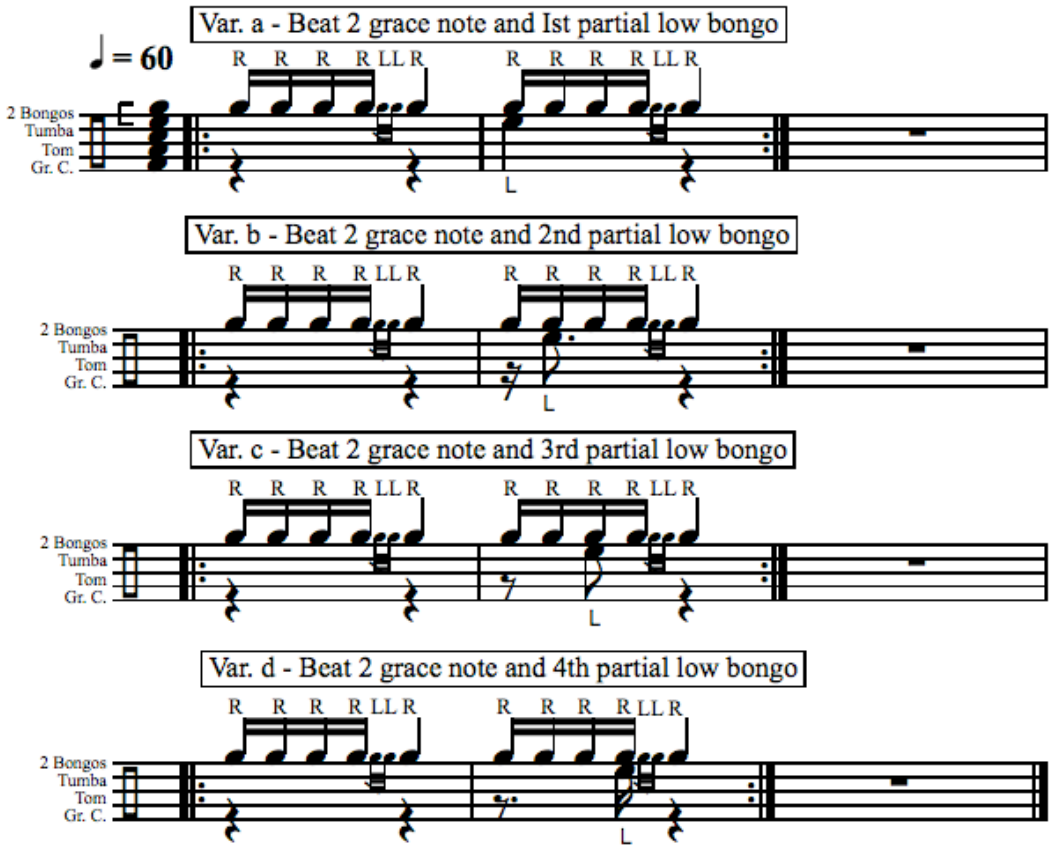
Exercise RD18 combines a high bongo grace-note figure occurring on the fourth sixteenth-note partial with a divided low bass drum. The second measure of each variation presents the divided low bass drum on each sixteenth-note partial within a divided drum musical passage. This ordering allows performers to establish a sixteenth-note pulse with a grace-note figure on the fourth sixteenth-note partial prior to playing the varied pattern of the divided low bass drum.

Exercise RD18:



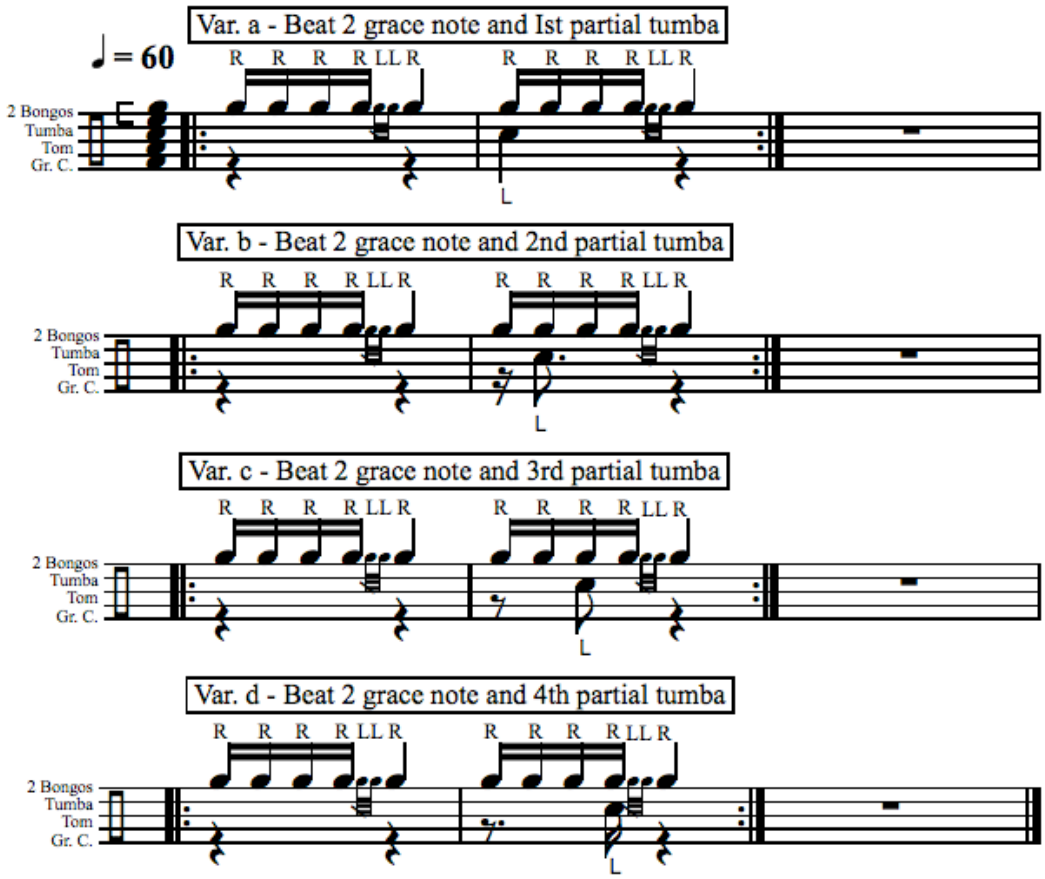
Exercise RD19 combines a high bongo grace-note figure occurring on beat two with a divided low bongo. The second measure of each variation presents the divided low bongo on each sixteenth-note partial within a divided drum musical passage. This ordering allows performers to establish a sixteenth-note pulse with a grace-note figure on beat two prior to playing the varied pattern of the divided low bongo.

Exercise RD19:



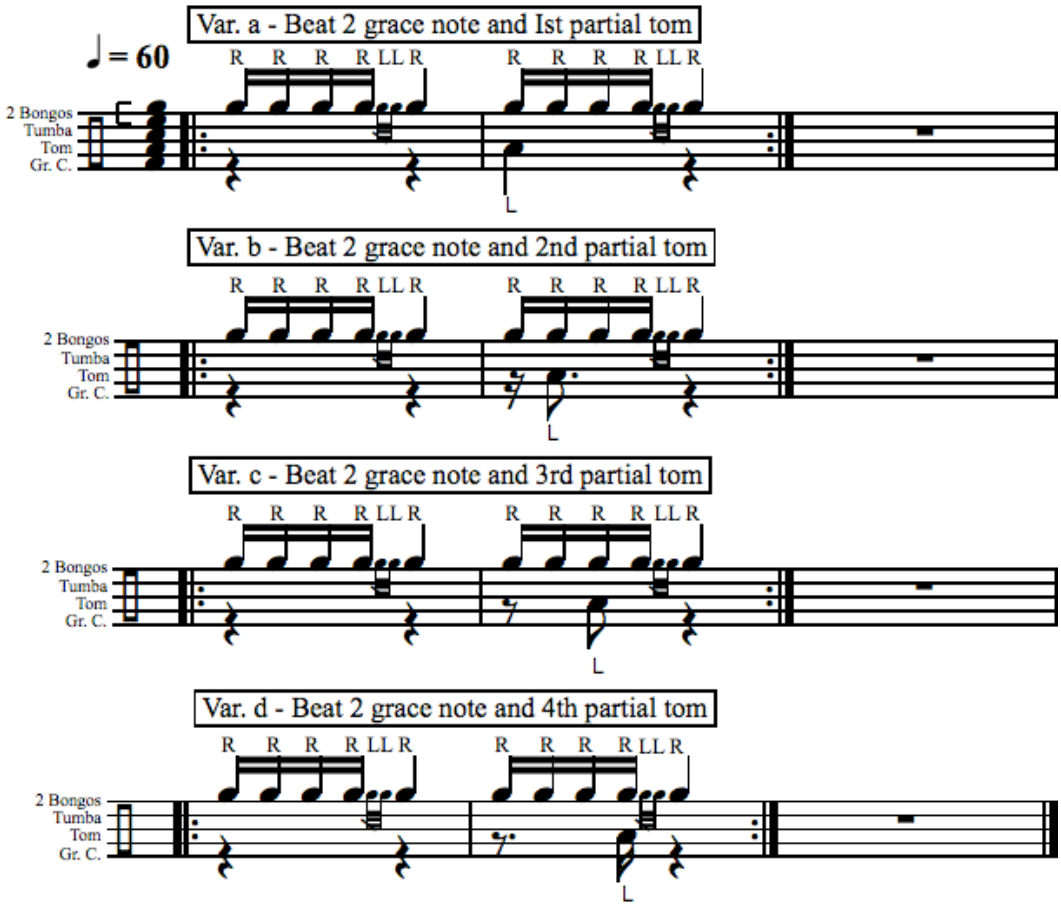
Exercise RD20 combines a high bongo grace-note figure occurring on beat two with a divided tumba. The second measure of each variation presents the divided tumba on each sixteenth-note partial within a divided drum musical passage. This ordering allows performers to establish a sixteenth-note pulse with a grace-note figure on beat two prior to playing the varied pattern of the divided tumba.

Exercise RD20:



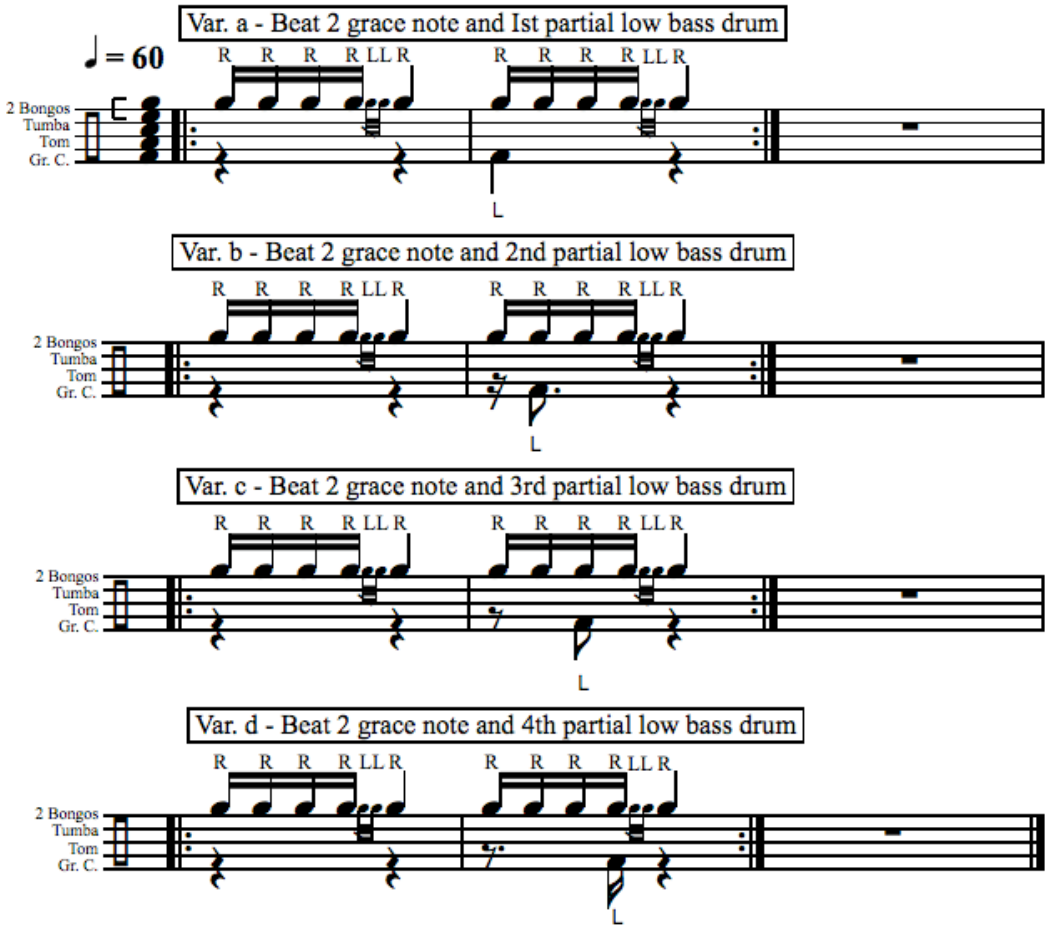
Exercise RD21 combines a high bongo grace-note figure occurring on beat two with a divided tom. The second measure of each variation presents the divided tom on each sixteenth-note partial within a divided drum musical passage. This ordering allows performers to establish a sixteenth-note pulse with a grace-note figure on beat two prior to playing the varied pattern of the divided tom.

Exercise RD21:



Exercise RD22 combines a high bongo grace-note figure occurring on beat two with a divided low bass drum. The second measure of each variation presents the divided low bass drum on each sixteenth-note partial within a divided drum musical passage. This ordering allows performers to establish a sixteenth-note pulse with a grace-note figure on beat two prior to playing the varied pattern of the divided low bass drum.

Exercise RD22:



Left-hand drag sticking method (LD):

The *left-hand drag* sticking method requires performers to play two consecutive grace-note strokes on the right hand. The primary note, or the release immediately following the grace-note figure, is played using the left hand. This is similar to playing a left-hand "drag" rudiment (originally called "ruffs"). Use the *left-hand drag* (LD) sticking method for approaching *simultaneous drum* high bongo grace-note figures.

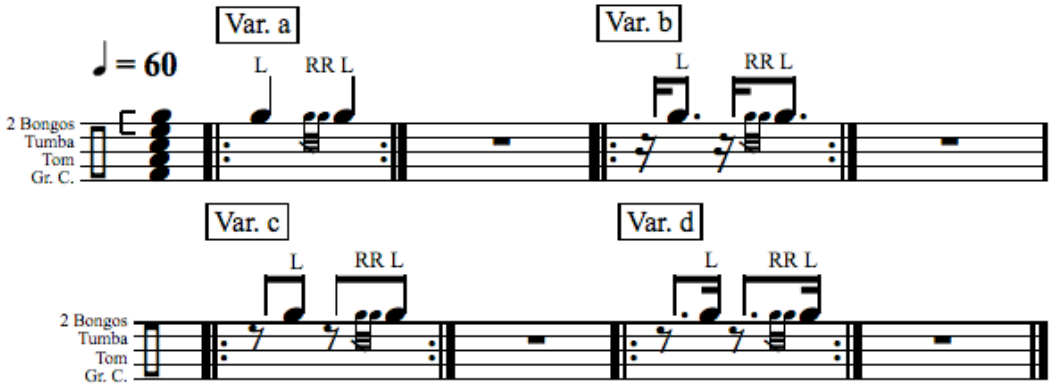
Exercise LD1 isolates the high bongo grace-note figure on each sixteenth-note partial. Measure one of the first variation (Var. a) isolates a single stroke on beat one followed by the grace-note figure on beat two. This ordering allows performers to determine an approach to single strokes prior to playing grace-note figures. This process is repeated for three remaining variations while occurring on subsequent sixteenth-note partials of the beat.

Exercise LD1.5 isolates the high bongo grace-note figure preceded by a divided drum instance. Measure one of the first variation (Var. a) isolates a two-hand stroke on beat one followed by the grace-note figure on beat two. This ordering allows performers to determine an approach to two-hand strokes prior to playing grace-note figures. This process is repeated for three remaining variations while occurring on each possible divided drum.

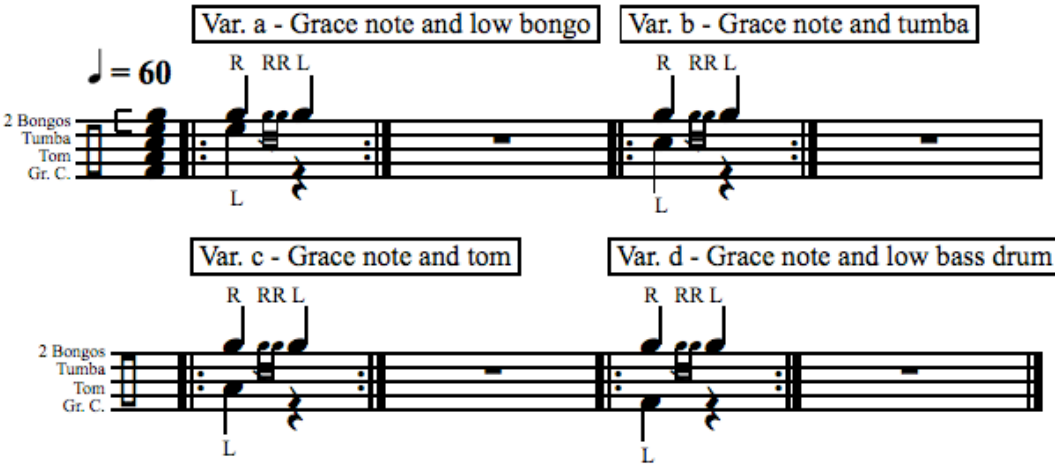
For both exercises below (Ex. LD1 and Ex. LD1.5), careful attention should be given to the interpretation of grace-note figures while maintaining a

constant internal sixteenth-note pulse. Performers should strive for consistent interpretation, specifically with respect to a refined clarity of diction.

Exercise LD1:

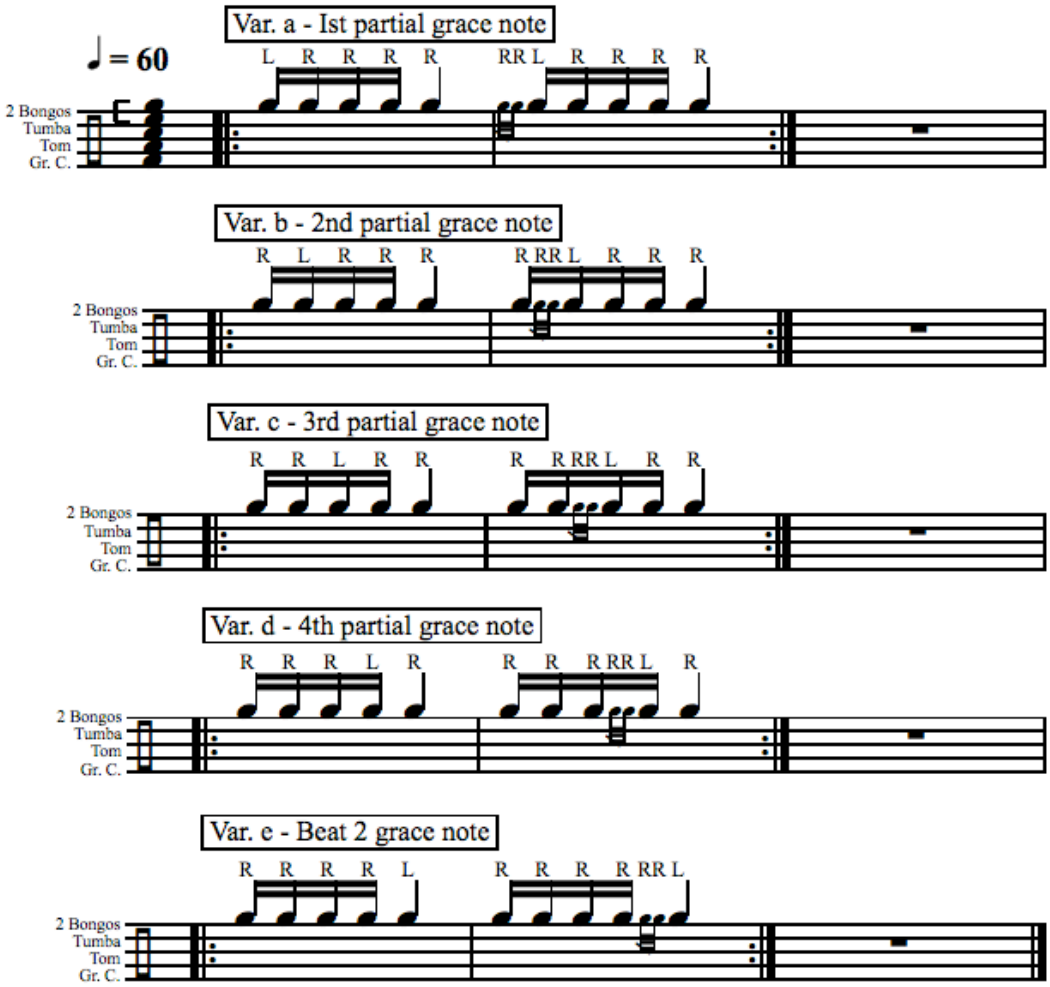


Exercise LD1.5:



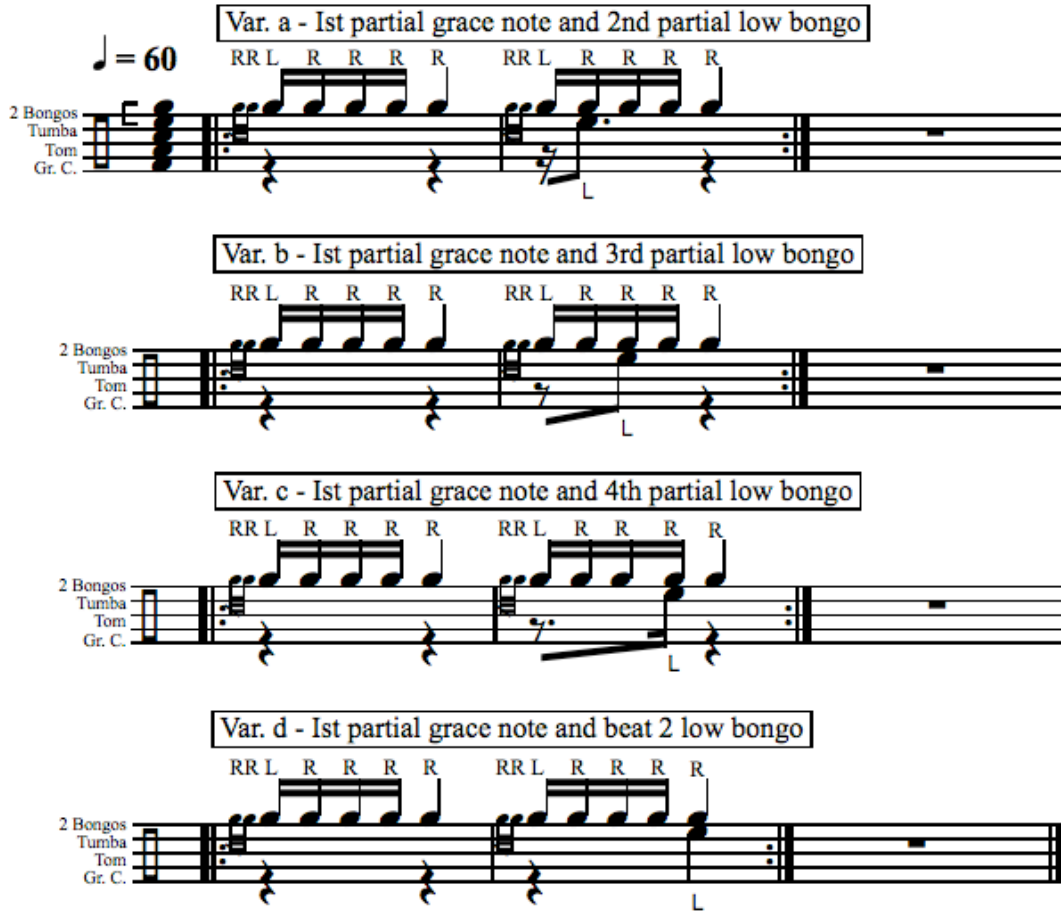
Exercise LD2 isolates the high bongo grace-note figure on each sixteenth-note partial. The first measure of each variation (a-e) presents the sixteenth-note pulse by subdividing beat one into four sixteenth notes. The second measure of each variation presents grace-note figures on each sixteenth-note partial. This ordering allows performers to establish a sixteenth-note pulse prior to playing grace-note figures on each sixteenth-note partial.

Exercise LD2:



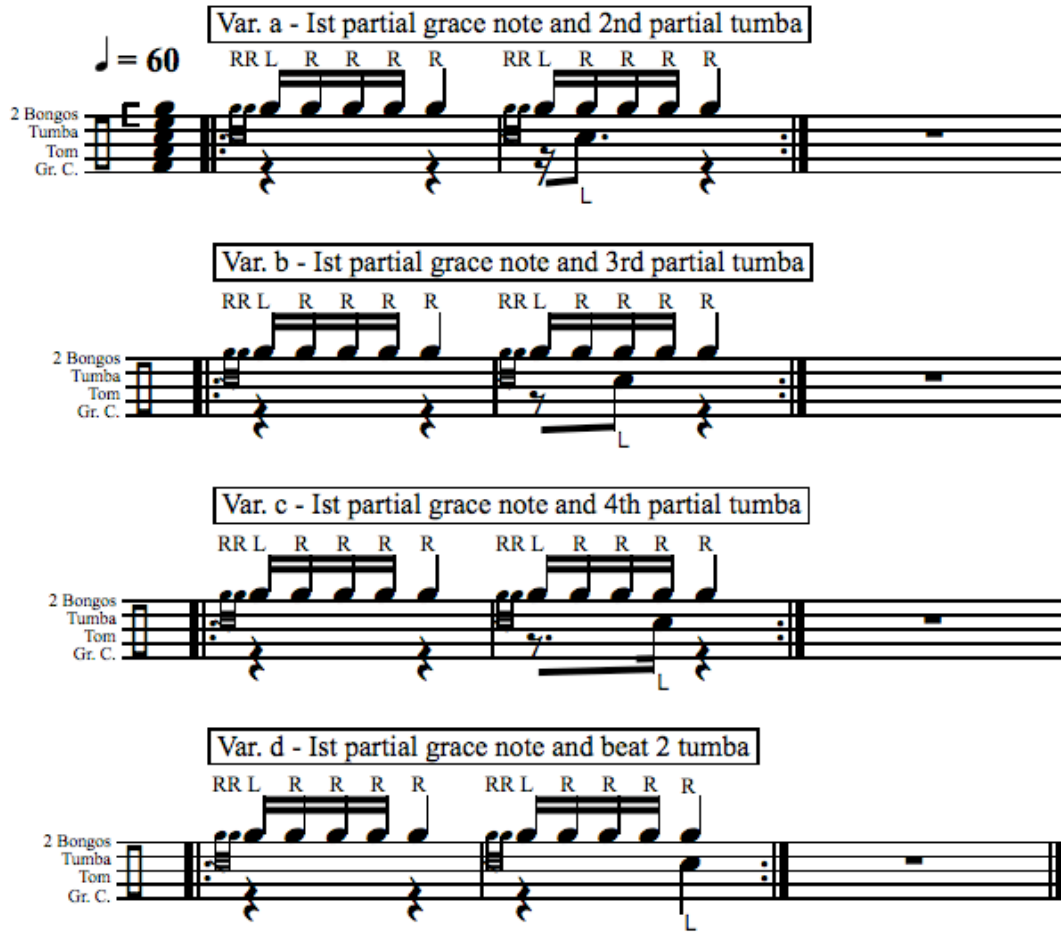
Exercise LD3 combines a high bongo grace-note figure occurring on the first sixteenth-note partial with a divided low bongo. The second measure of each variation presents the divided low bongo on each sixteenth-note partial within a divided drum musical passage. This ordering allows performers to establish a sixteenth-note pulse with a grace-note figure on beat one prior to playing the varied pattern of the divided low bongo.

Exercise LD3:



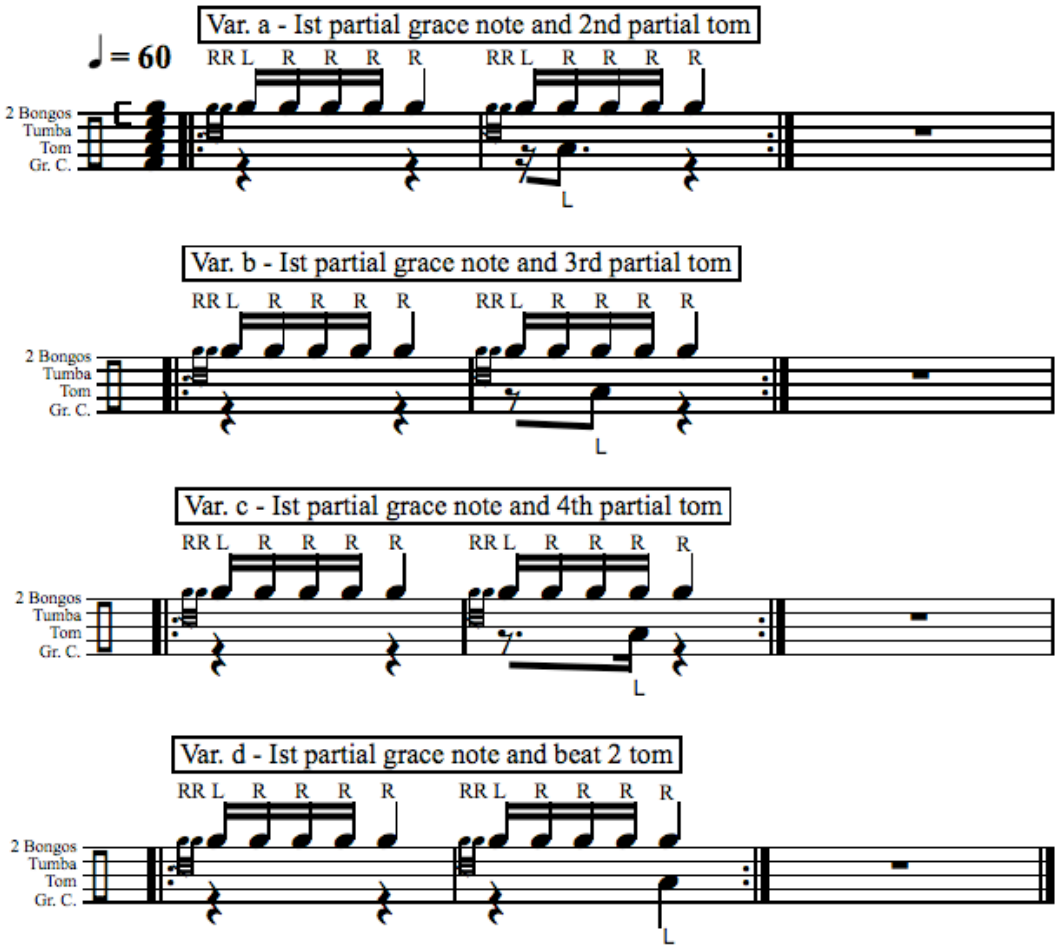
Exercise LD4 combines a high bongo grace-note figure occurring on the first sixteenth-note partial with a divided tumba. The second measure of each variation presents the divided tumba on each sixteenth-note partial within a divided drum musical passage. This ordering allows performers to establish a sixteenth-note pulse with a grace-note figure on beat one prior to playing the varied pattern of the divided tumba.

Exercise LD4:



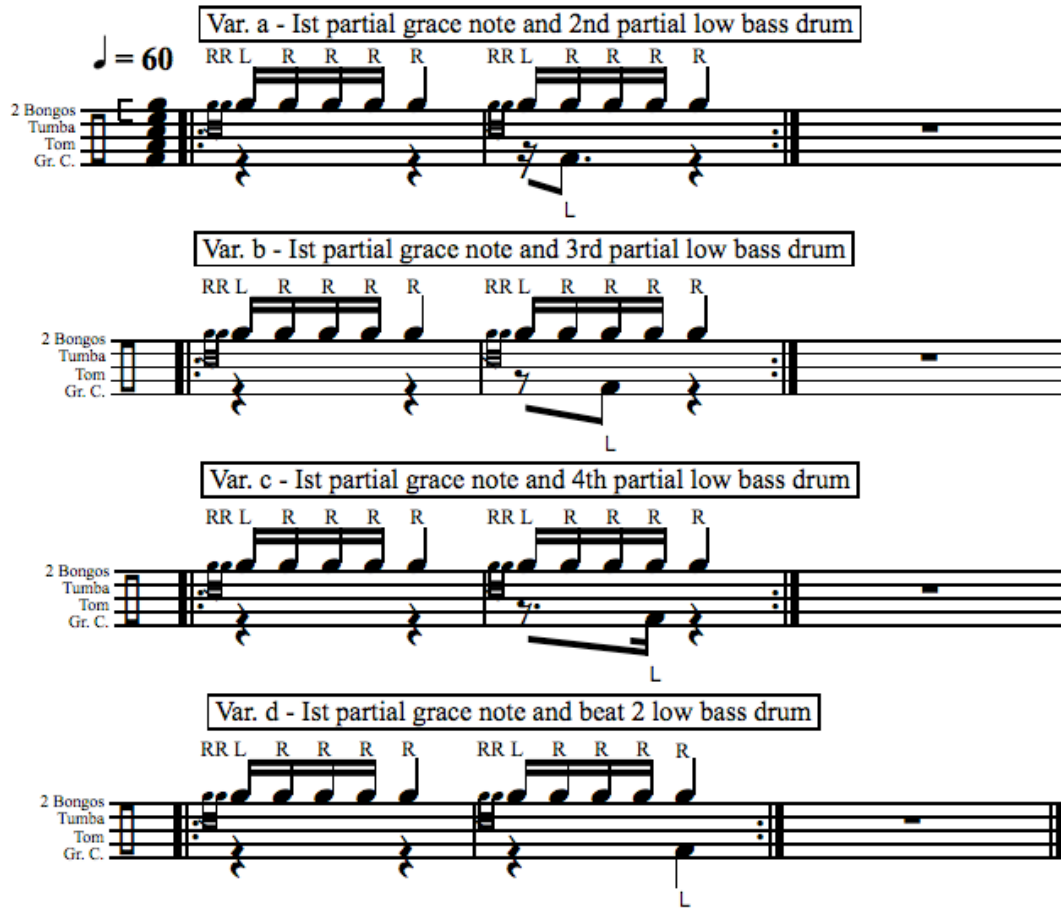
Exercise LD5 combines a high bongo grace-note figure occurring on the first sixteenth-note partial with a divided tom. The second measure of each variation presents the divided tom on each sixteenth-note partial within a divided drum musical passage. This ordering allows performers to establish a sixteenth-note pulse with a grace-note figure on beat one prior to playing the varied pattern of the divided tom.

Exercise LD5:



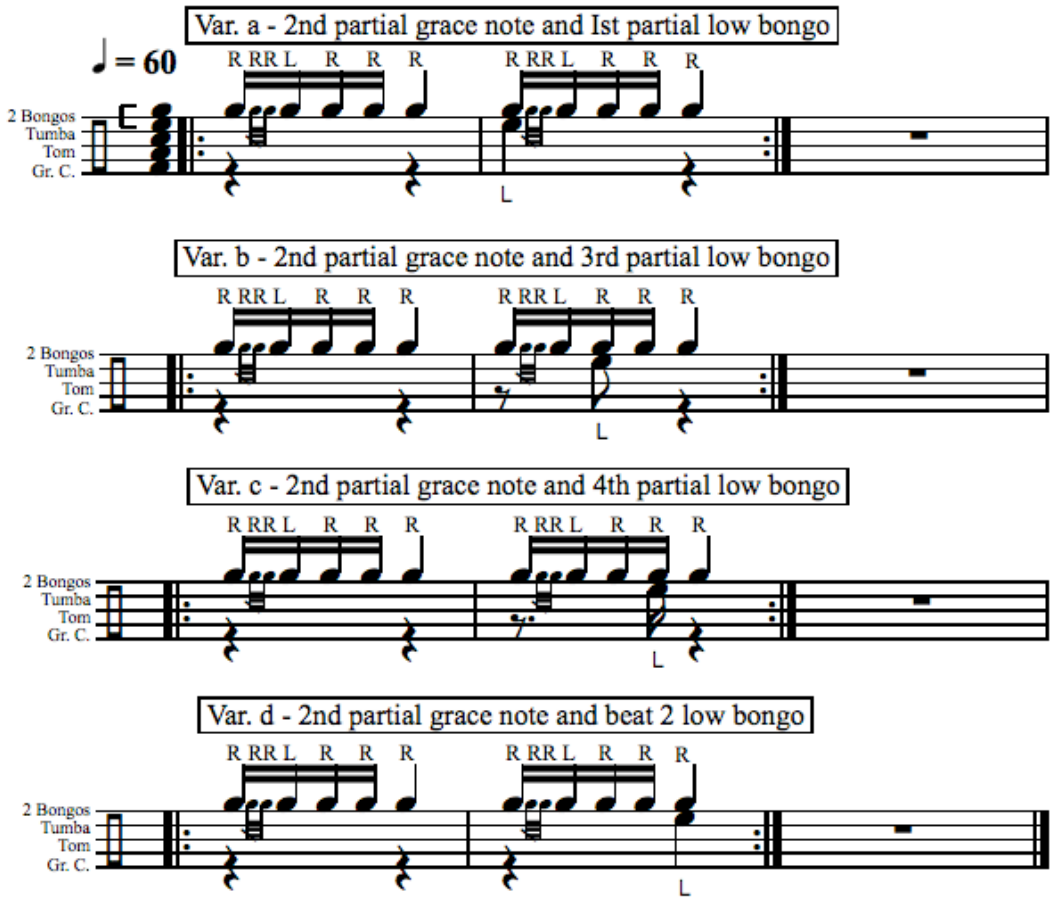
Exercise LD6 combines a high bongo grace-note figure occurring on the first sixteenth-note partial with a divided low bass drum. The second measure of each variation presents the divided low bass drum on each sixteenth-note partial within a divided drum musical passage. This ordering allows performers to establish a sixteenth-note pulse with a grace-note figure on beat one prior to playing the varied pattern of the divided low bass drum.

Exercise LD6:



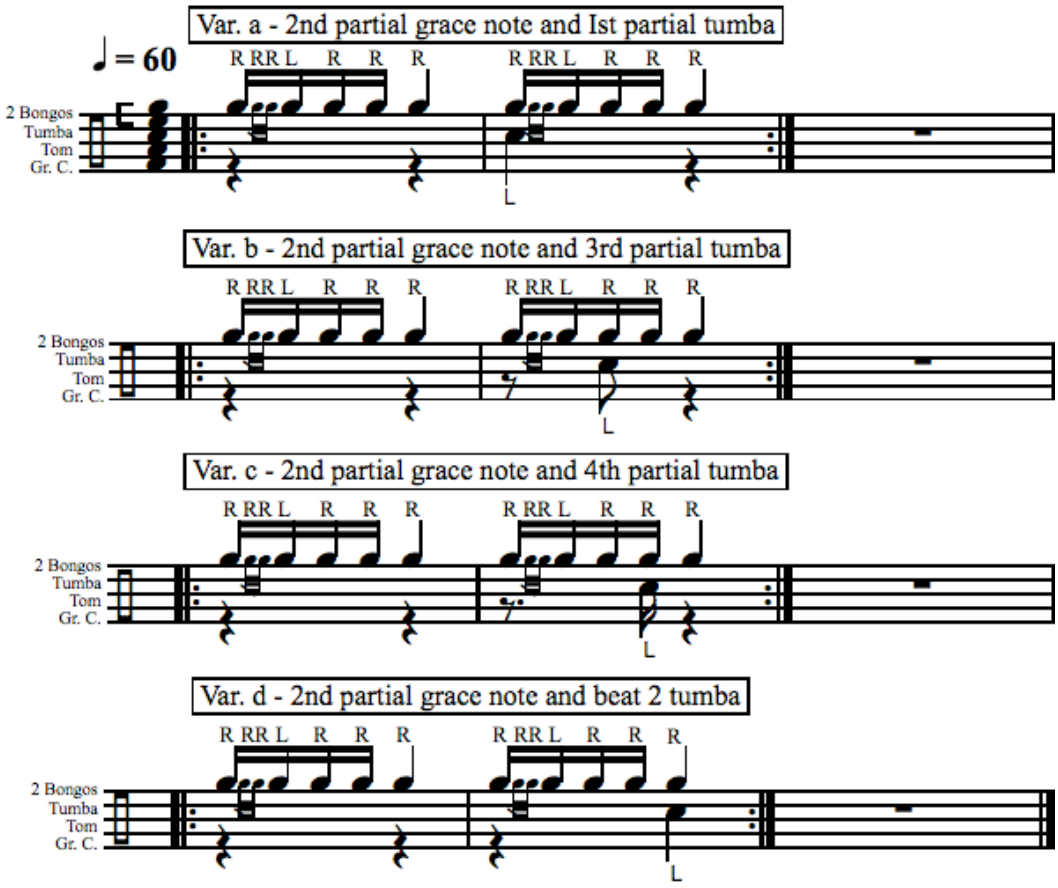
Exercise LD7 combines a high bongo grace-note figure occurring on the second sixteenth-note partial with a divided low bongo. The second measure of each variation presents the divided low bongo on each sixteenth-note partial within a divided drum musical passage. This ordering allows performers to establish a sixteenth-note pulse with a grace-note figure on the second sixteenth-note partial prior to playing the varied pattern of the divided low bongo.

Exercise LD7:



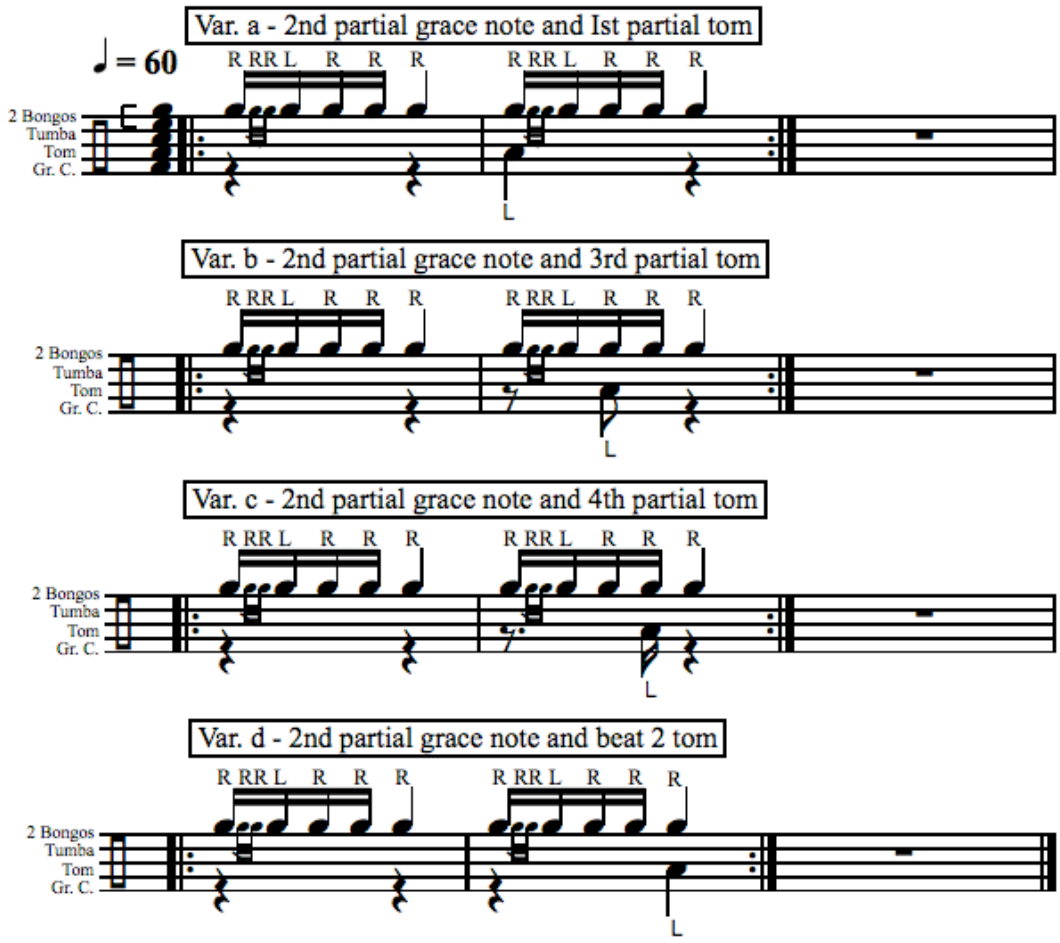
Exercise LD8 combines a high bongo grace-note figure occurring on the second sixteenth-note partial with a divided tumba. The second measure of each variation presents the divided tumba on each sixteenth-note partial within a divided drum musical passage. This ordering allows performers to establish a sixteenth-note pulse with a grace-note figure on the second sixteenth-note partial prior to playing the varied pattern of the divided tumba.

Exercise LD8:



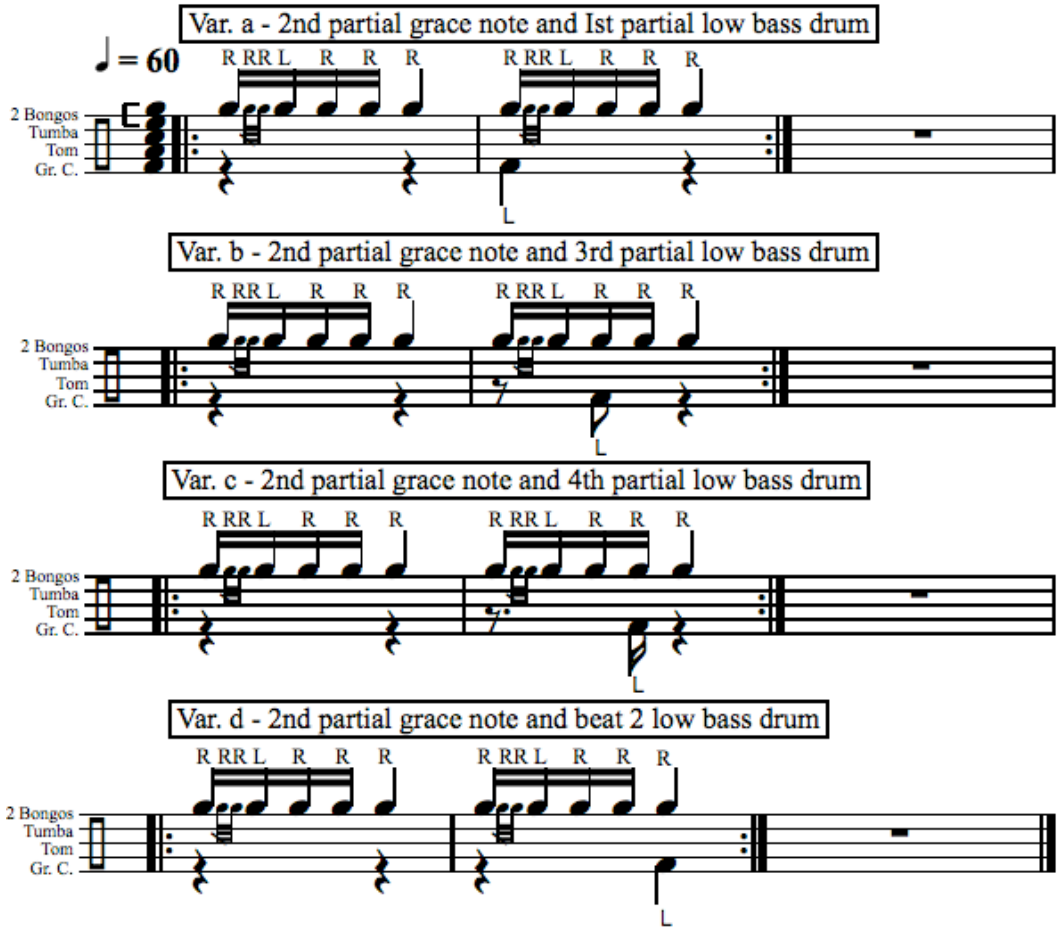
Exercise LD9 combines a high bongo grace-note figure occurring on the second sixteenth-note partial with a divided tom. The second measure of each variation presents the divided tom on each sixteenth-note partial within a divided drum musical passage. This ordering allows performers to establish a sixteenth-note pulse with a grace-note figure on the second sixteenth-note partial prior to playing the varied pattern of the divided tom.

Exercise LD9:



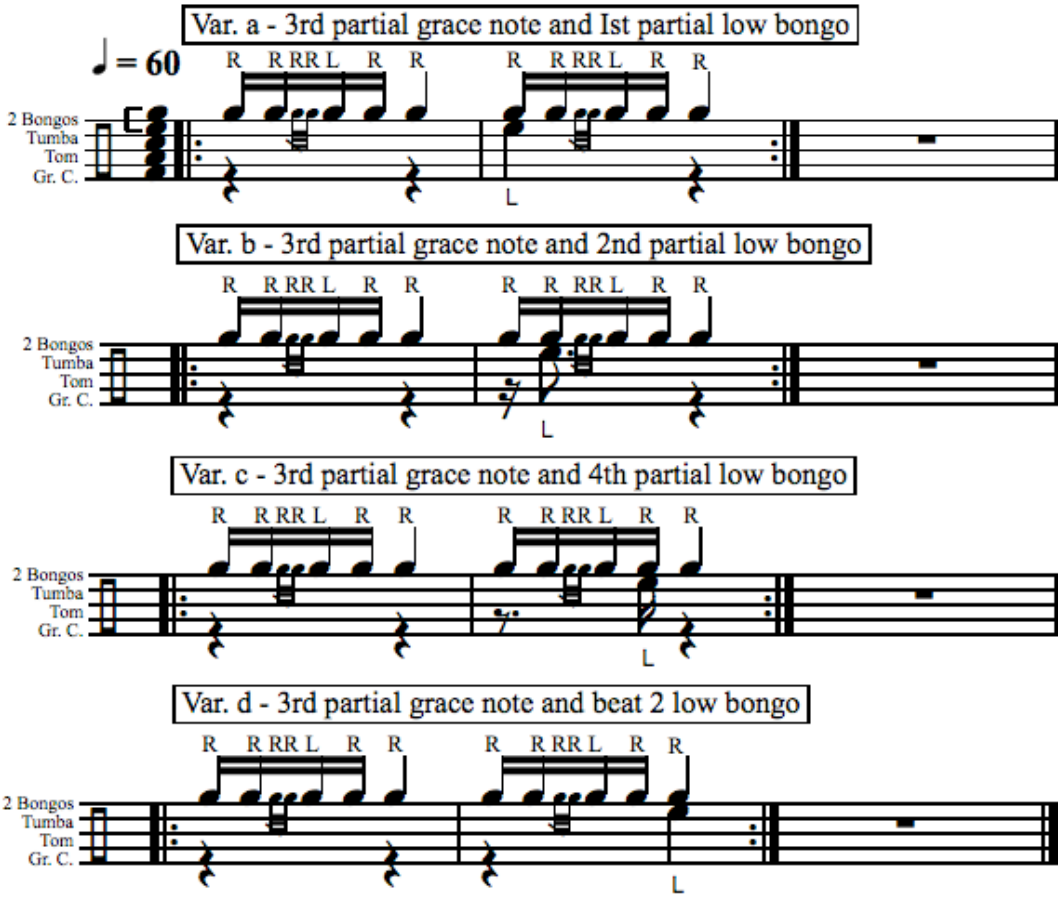
Exercise LD10 combines a high bongo grace-note figure occurring on the second sixteenth-note partial with a divided low bass drum. The second measure of each variation presents the divided low bass drum on each sixteenth-note partial within a divided drum musical passage. This ordering allows performers to establish a sixteenth-note pulse with a grace-note figure on the second sixteenth-note partial prior to playing the varied pattern of the divided low bass drum.

Exercise LD10:



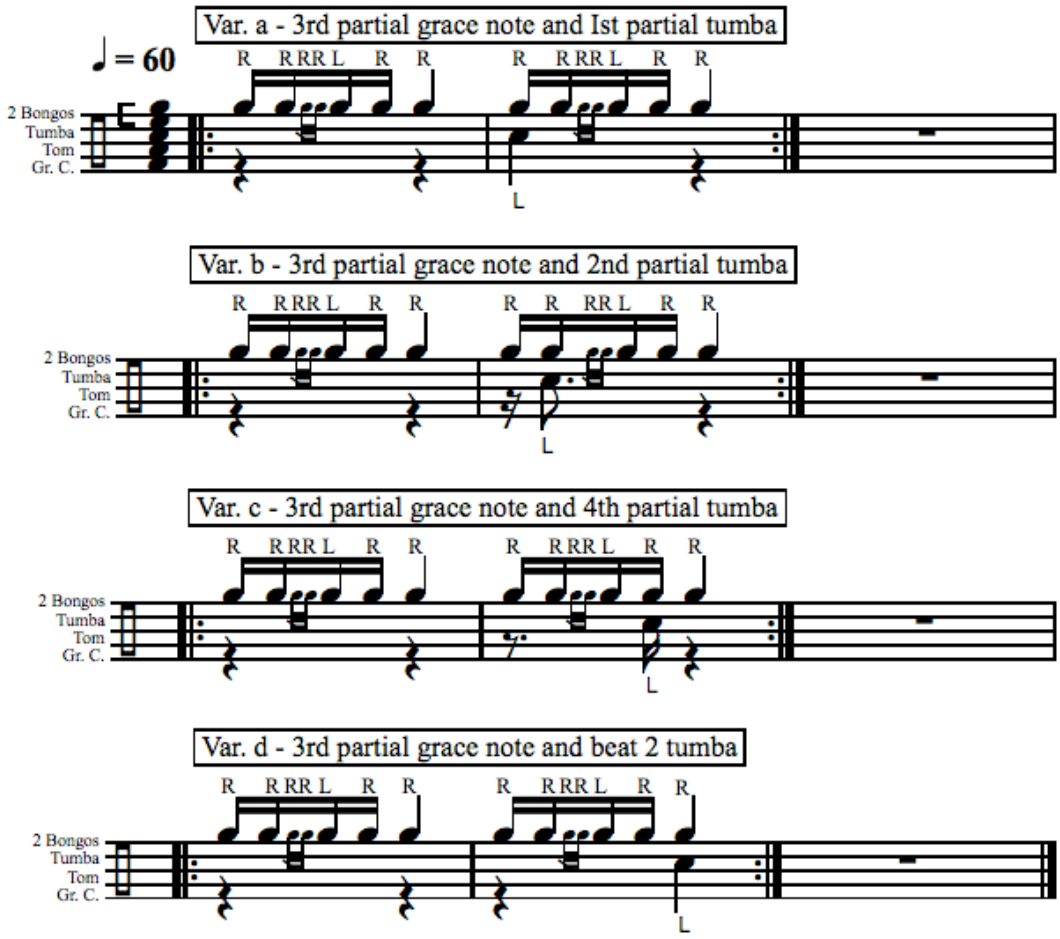
Exercise LD11 combines a high bongo grace-note figure occurring on the third sixteenth-note partial with a divided low bongo. The second measure of each variation presents the divided low bongo on each sixteenth-note partial within a divided drum musical passage. This ordering allows performers to establish a sixteenth-note pulse with a grace-note figure on the third sixteenth-note partial prior to playing the varied pattern of the divided low bongo.

Exercise LD11:



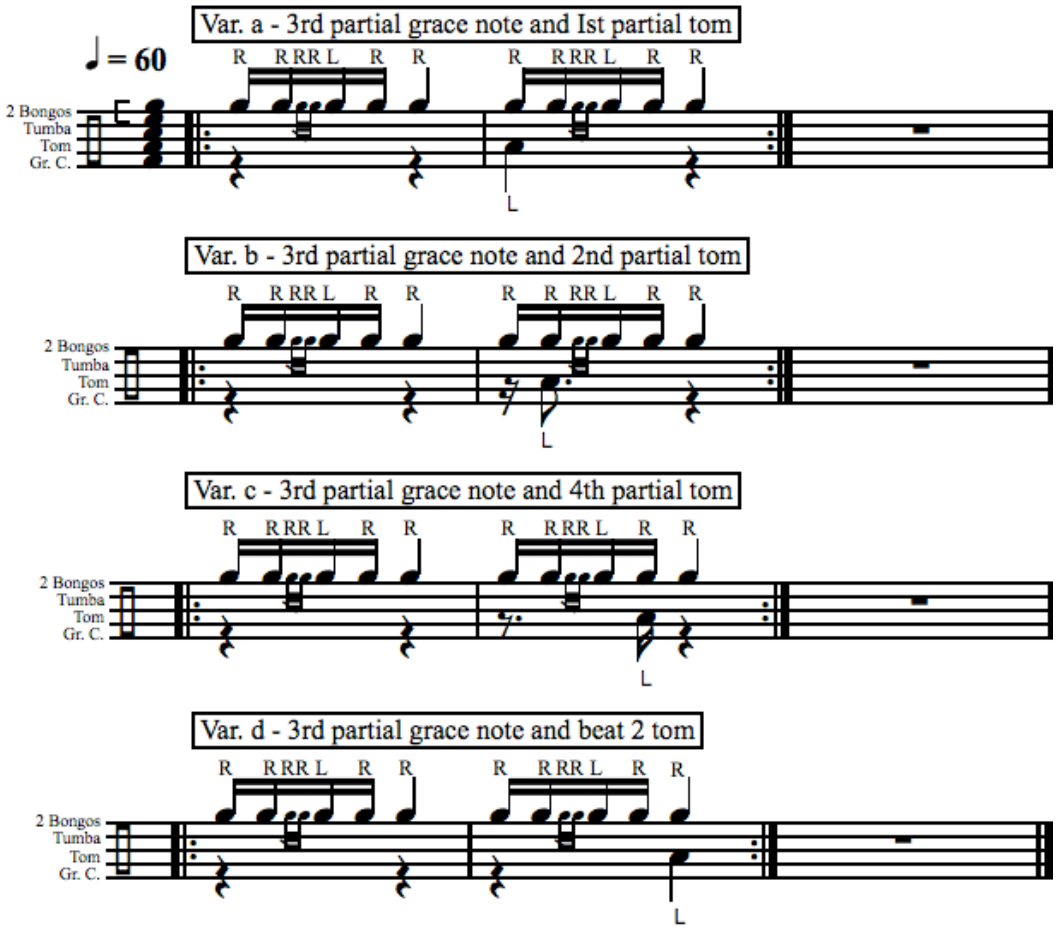
Exercise LD12 combines a high bongo grace-note figure occurring on the third sixteenth-note partial with a divided tumba. The second measure of each variation presents the divided tumba on each sixteenth-note partial within a divided drum musical passage. This ordering allows performers to establish a sixteenth-note pulse with a grace-note figure on the third sixteenth-note partial prior to playing the varied pattern of the divided tumba.

Exercise LD12:



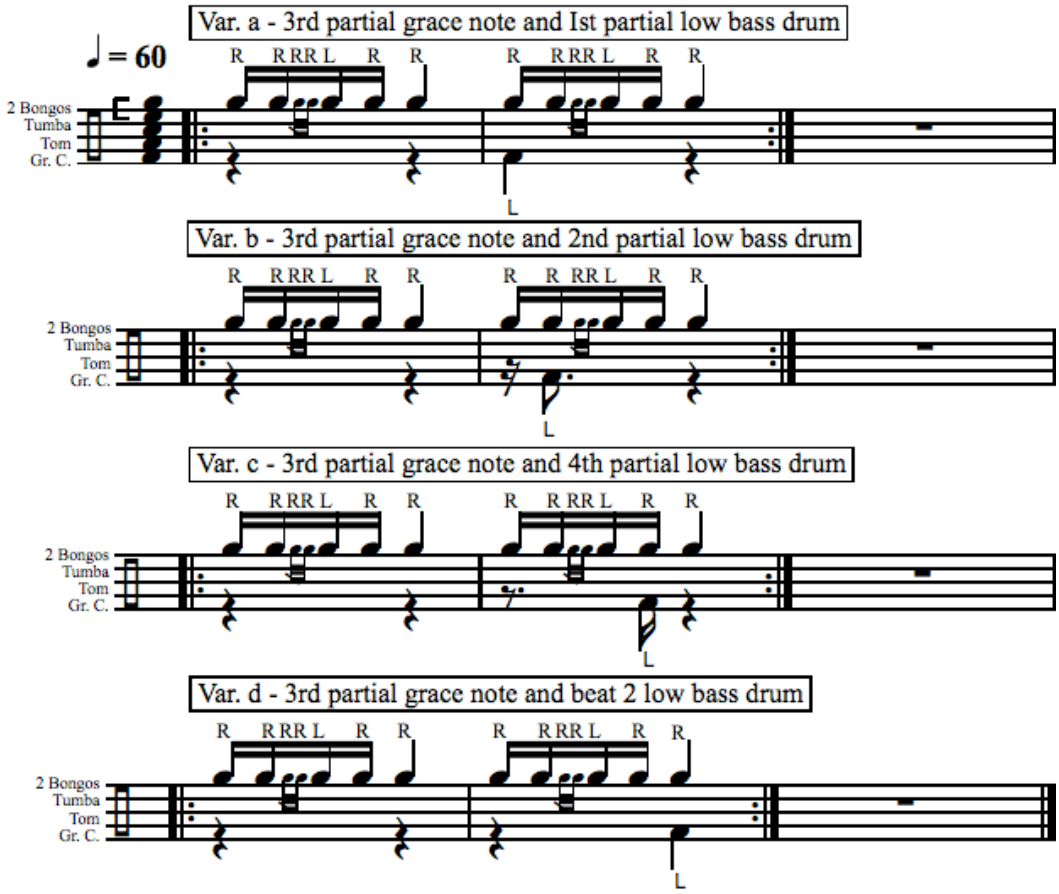
Exercise LD13 combines a high bongo grace-note figure occurring on the third sixteenth-note partial with a divided tom. The second measure of each variation presents the divided tom on each sixteenth-note partial within a divided drum musical passage. This ordering allows performers to establish a sixteenth-note pulse with a grace-note figure on the third sixteenth-note partial prior to playing the varied pattern of the divided tom.

Exercise LD13:



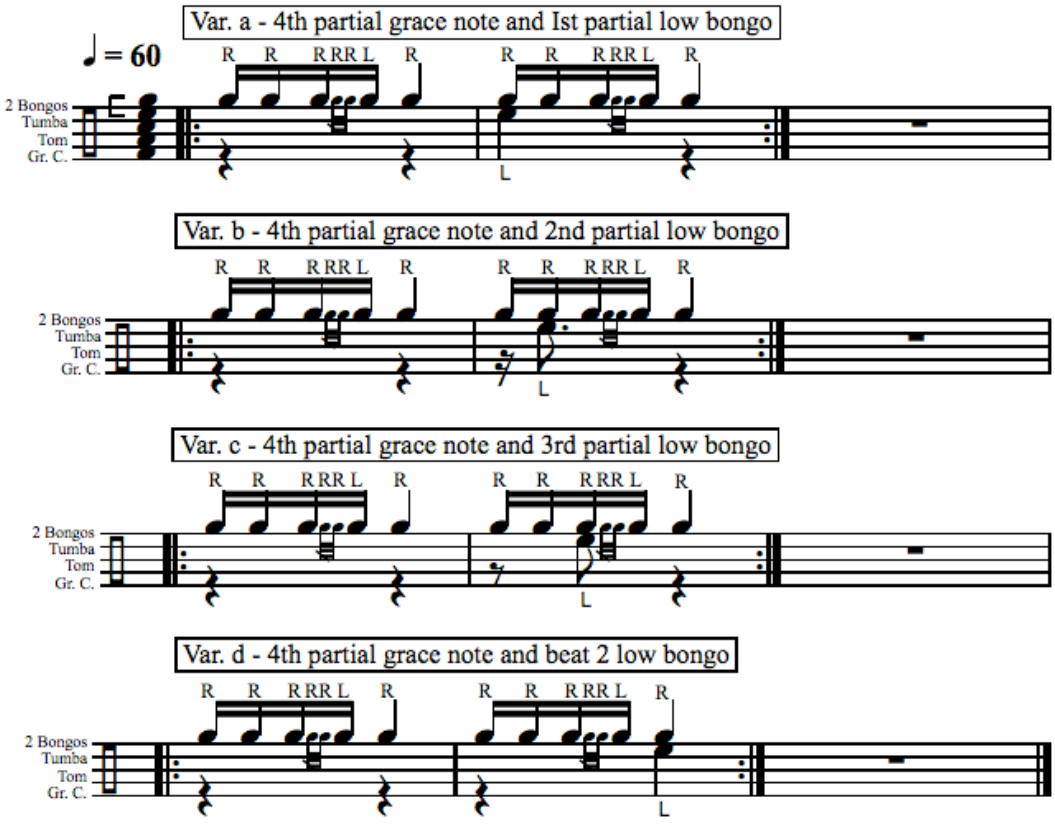
Exercise LD14 combines a high bongo grace-note figure occurring on the third sixteenth-note partial with a divided low bass drum. The second measure of each variation presents the divided low bass drum on each sixteenth-note partial within a divided drum musical passage. This ordering allows performers to establish a sixteenth-note pulse with a grace-note figure on the third sixteenth-note partial prior to playing the varied pattern of the divided bass drum.

Exercise LD14:



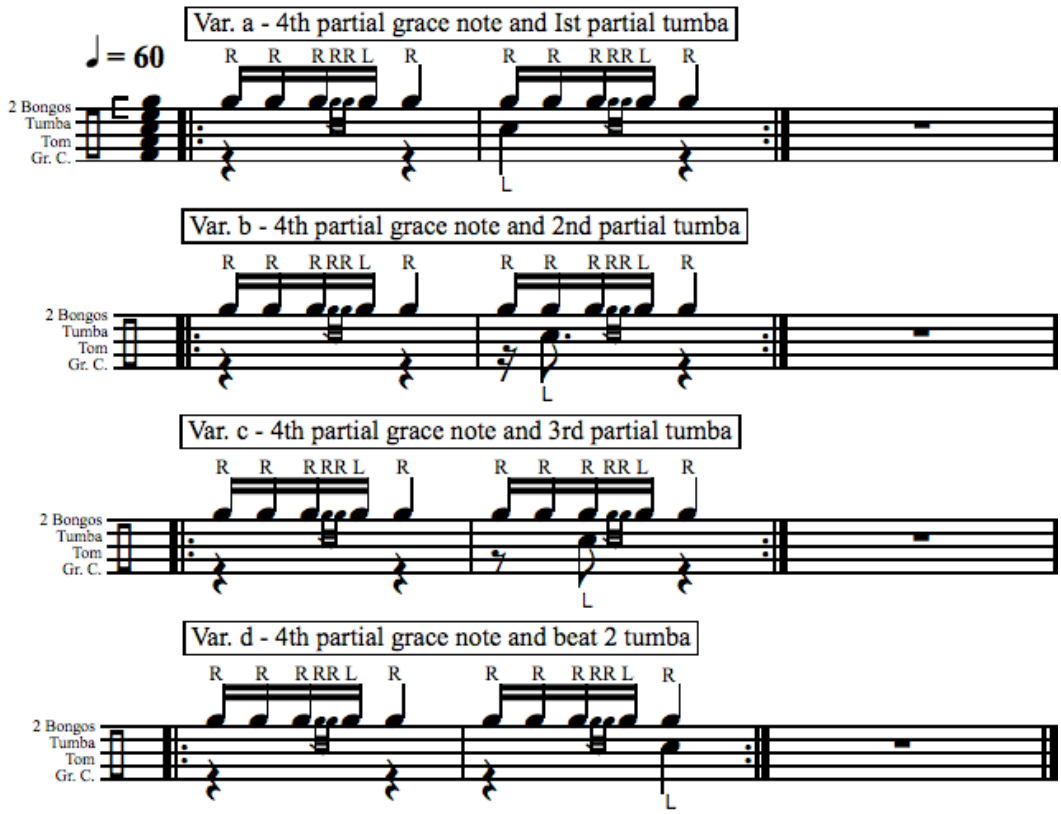
Exercise LD15 combines a high bongo grace-note figure occurring on the fourth sixteenth-note partial with a divided low bongo. The second measure of each variation presents the divided low bongo on each sixteenth-note partial within a divided drum musical passage. This ordering allows performers to establish a sixteenth-note pulse with a grace-note figure on the fourth sixteenth-note partial prior to playing the varied pattern of the divided low bongo.

Exercise LD15:



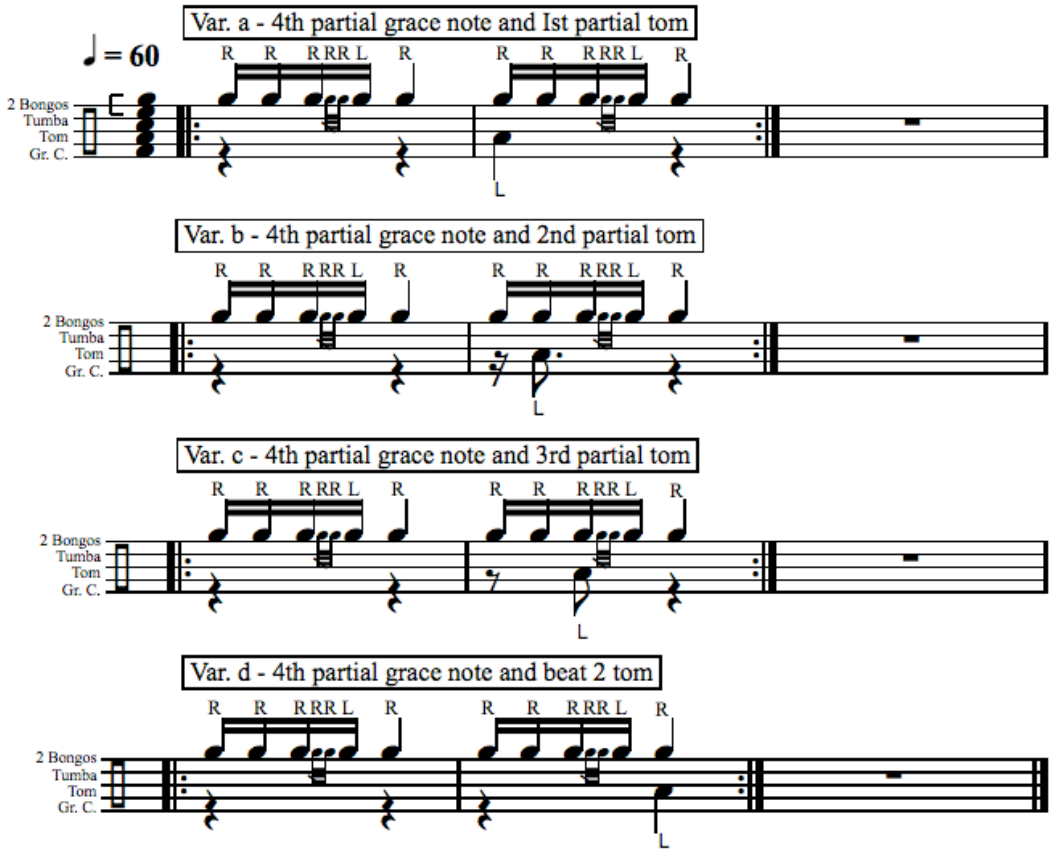
Exercise LD16 combines a high bongo grace-note figure occurring on the fourth sixteenth-note partial with a divided tumba. The second measure of each variation presents the divided tumba on each sixteenth-note partial within a divided drum musical passage. This ordering allows performers to establish a sixteenth-note pulse with a grace-note figure on the fourth sixteenth-note partial prior to playing the varied pattern of the divided tumba.

Exercise LD16:



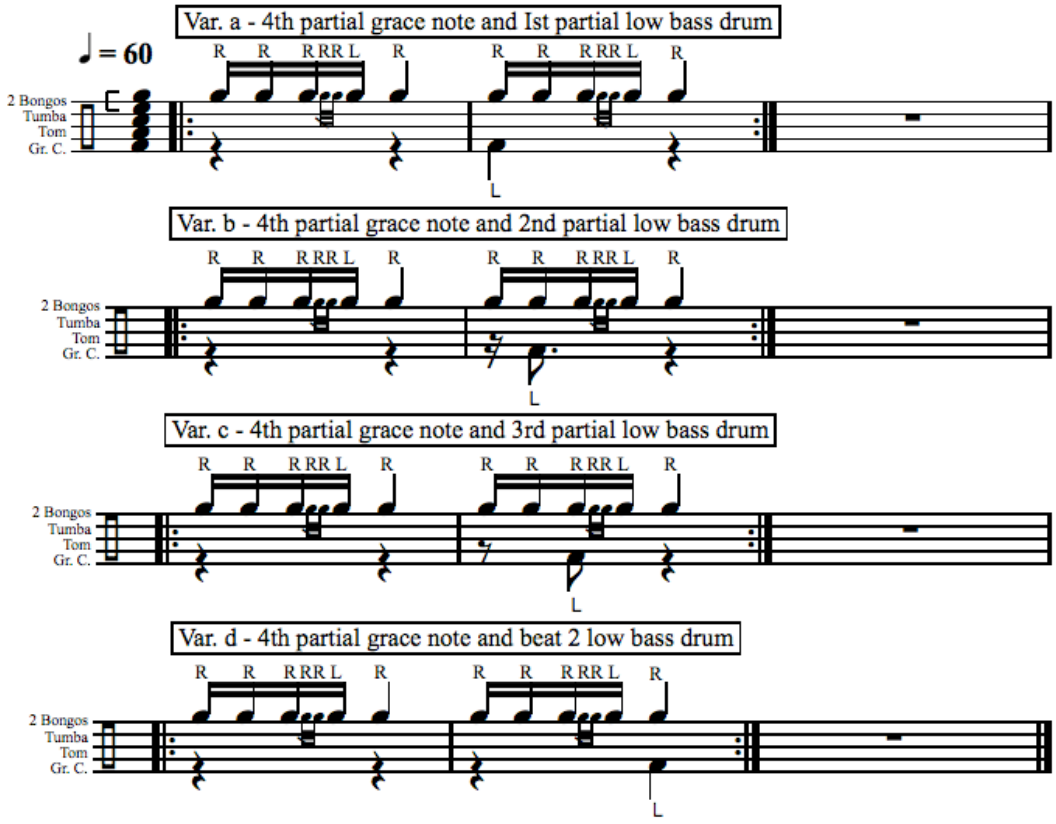
Exercise LD17 combines a high bongo grace-note figure occurring on the fourth sixteenth-note partial with a divided tom. The second measure of each variation presents the divided tom on each sixteenth-note partial within a divided drum musical passage. This ordering allows performers to establish a sixteenth-note pulse with a grace-note figure on the fourth sixteenth-note partial prior to playing the varied pattern of the divided tom.

Exercise LD17:



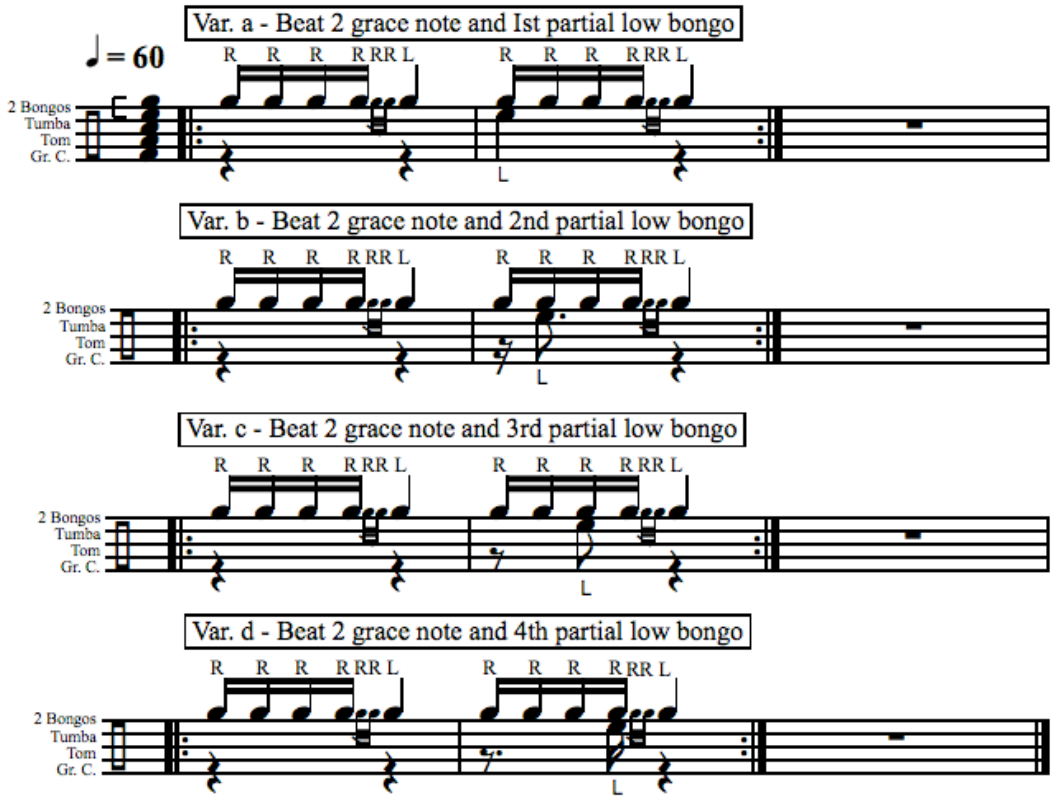
Exercise LD18 combines a high bongo grace-note figure occurring on the fourth sixteenth-note partial with a divided low bass drum. The second measure of each variation presents the divided low bass drum on each sixteenth-note partial within a divided drum musical passage. This ordering allows performers to establish a sixteenth-note pulse with a grace-note figure on the fourth sixteenth-note partial prior to playing the varied pattern of the divided low bass drum.

Exercise LD18:



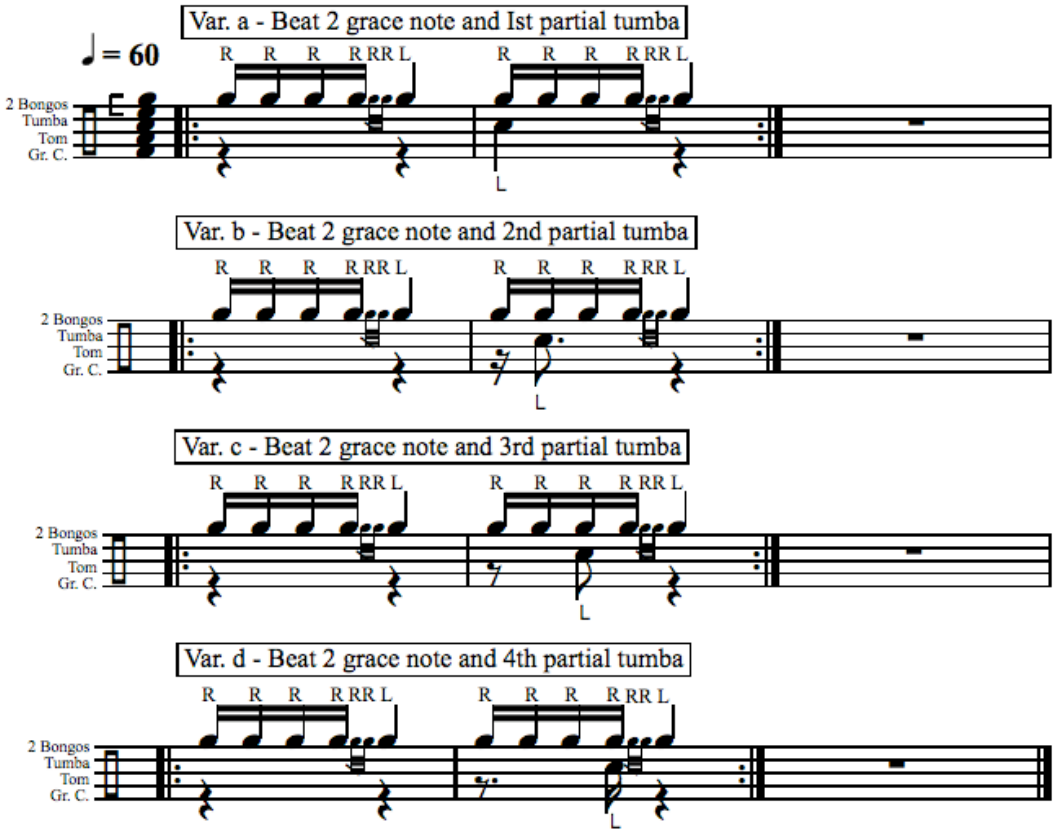
Exercise LD19 combines a high bongo grace-note figure occurring on beat two with a divided low bongo. The second measure of each variation presents the divided low bongo on each sixteenth-note partial within a divided drum musical passage. This ordering allows performers to establish a sixteenth-note pulse with a grace-note figure on beat two prior to playing the varied pattern of the divided low bongo.

Exercise LD19:



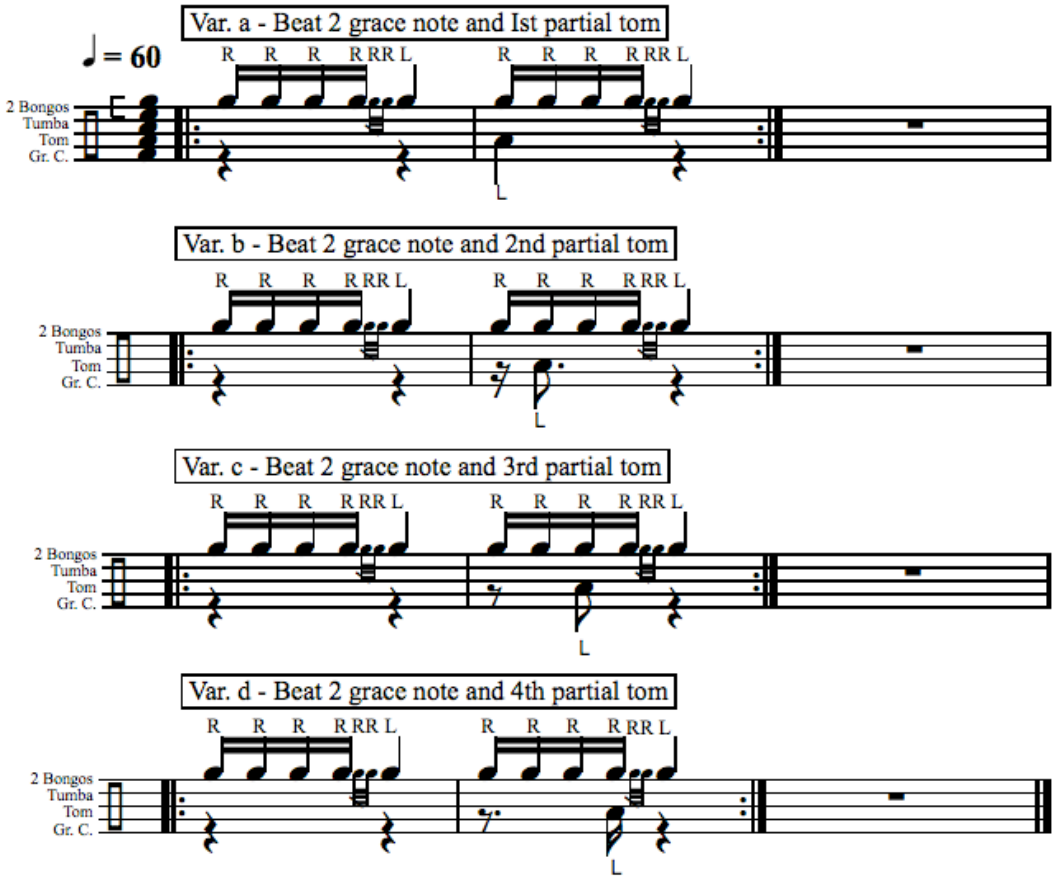
Exercise LD20 combines a high bongo grace-note figure occurring on beat two with a divided tumba. The second measure of each variation presents the divided tumba on each sixteenth-note partial within a divided drum musical passage. This ordering allows performers to establish a sixteenth-note pulse with a grace-note figure on beat two prior to playing the varied pattern of the divided tumba.

Exercise LD20:



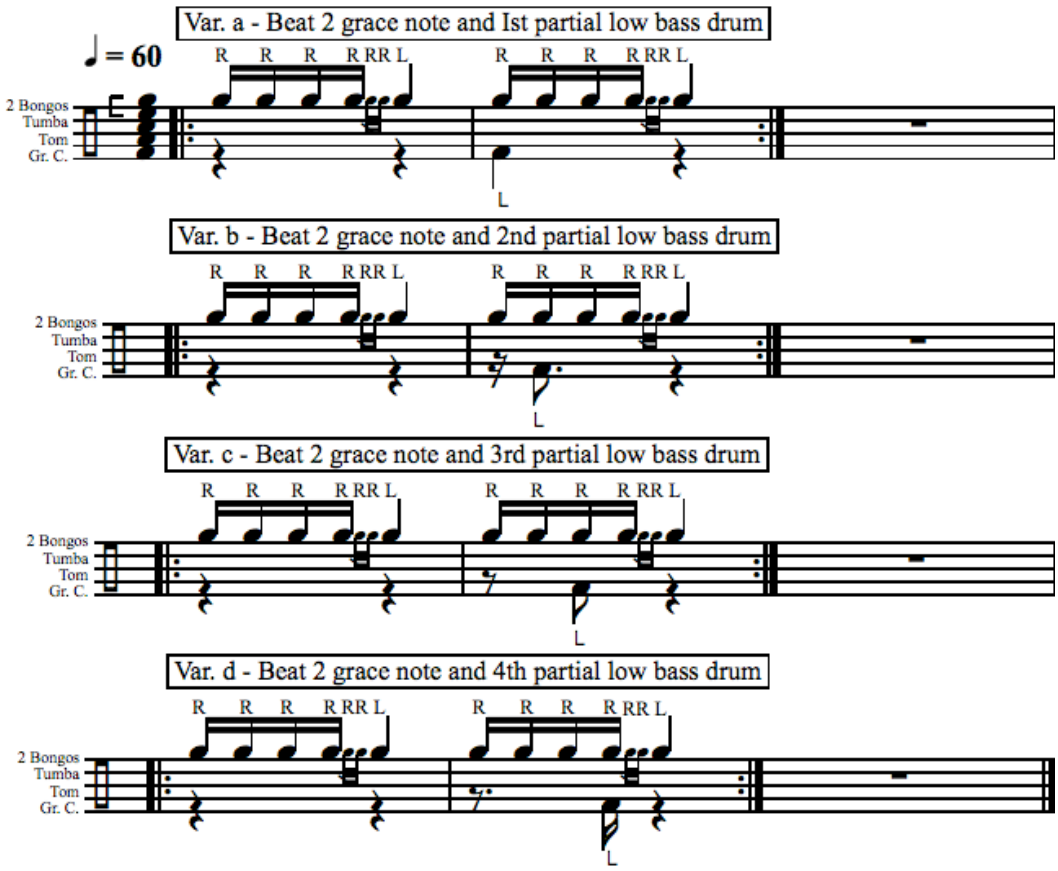
Exercise LD21 combines a high bongo grace-note figure occurring on beat two with a divided tom. The second measure of each variation presents the divided tom on each sixteenth-note partial within a divided drum musical passage. This ordering allows performers to establish a sixteenth-note pulse with a grace-note figure on beat two prior to playing the varied pattern of the divided tom.

Exercise LD21:



Exercise LD22 combines a high bongo grace-note figure occurring on beat two with a divided low bass drum. The second measure of each variation presents the divided low bass drum on each sixteenth-note partial within a divided drum musical passage. This ordering allows performers to establish a sixteenth-note pulse with a grace-note figure on beat two prior to playing the varied pattern of the divided low bass drum.

Exercise LD22:



Consecutive right-hand drag sticking method (CRD):

The *consecutive right-hand drag* sticking method requires performers to play three consecutive right-hand strokes. Specifically, two right-hand strokes for the grace note followed by a final and third stroke representing the primary note on the downbeat. Use the *consecutive right-hand drag* (CRD) sticking method for approaching *simultaneous drum* high bongo grace-note figures.

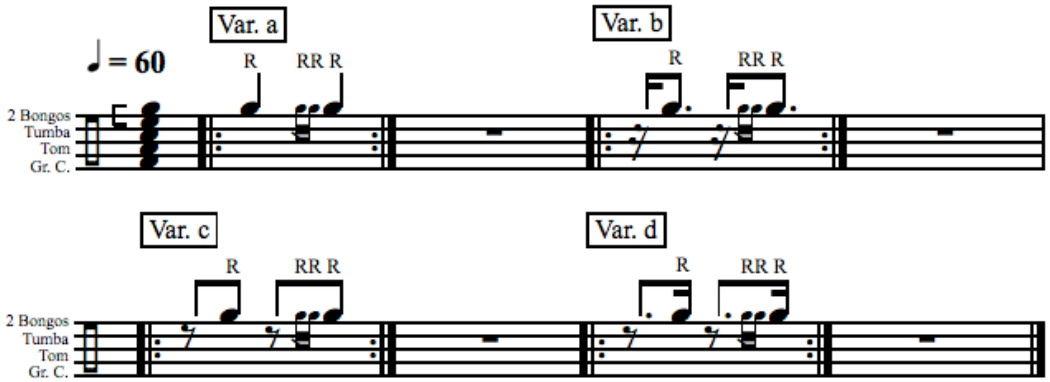
Exercise CRD1 isolates the high bongo grace-note figure on each sixteenth-note partial. Measure one of the first variation (Var. a) isolates a single stroke on beat one followed by the grace-note figure on beat two. This ordering allows performers to determine an approach to single strokes prior to playing grace-note figures. This process is repeated for three remaining variations with each occurring on subsequent sixteenth-note partials of the beat.

Exercise CRD1.5 isolates the high bongo grace-note figure preceded by a divided drum instance. Measure one of the first variation (Var. a) isolates a two-hand stroke on beat one followed by the grace-note figure on beat two. This ordering allows performers to determine an approach to two-hand strokes prior to playing grace-note figures. This process is repeated for three remaining variations with each occurring on each possible divided drum.

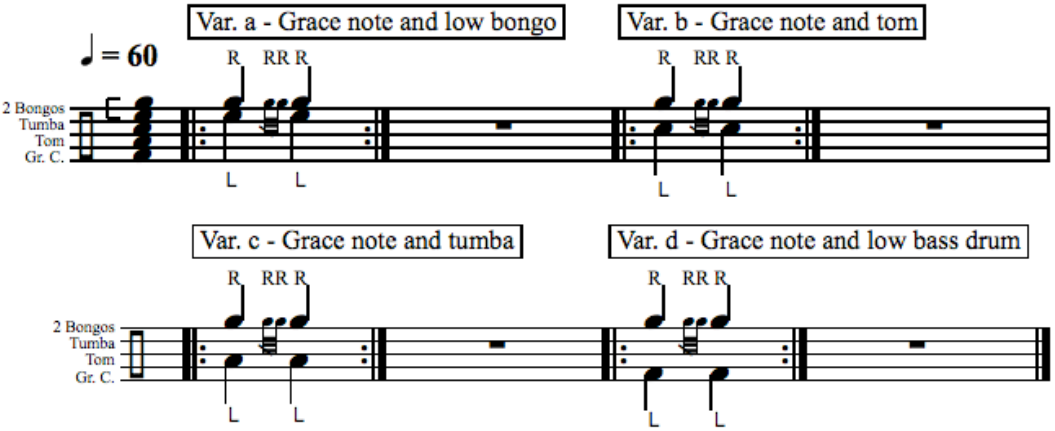
For both exercises below (Ex. CRD1 and Ex. CRD1.5), careful attention should be given to the interpretation of grace-note figures while maintaining a

constant internal sixteenth-note pulse. Performers should strive for consistent interpretation, specifically with respect to a refined clarity of diction.

Exercise CRD1:

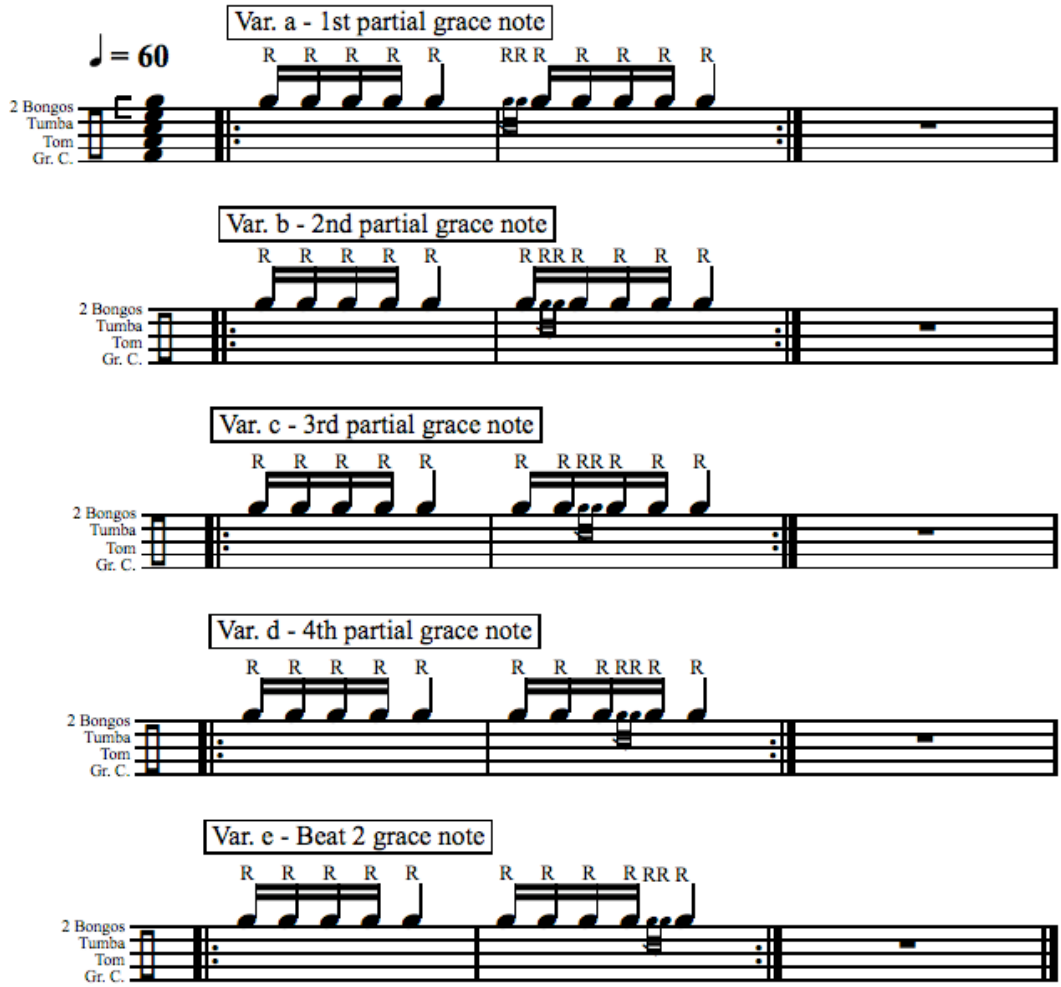


Exercise CRD1.5:



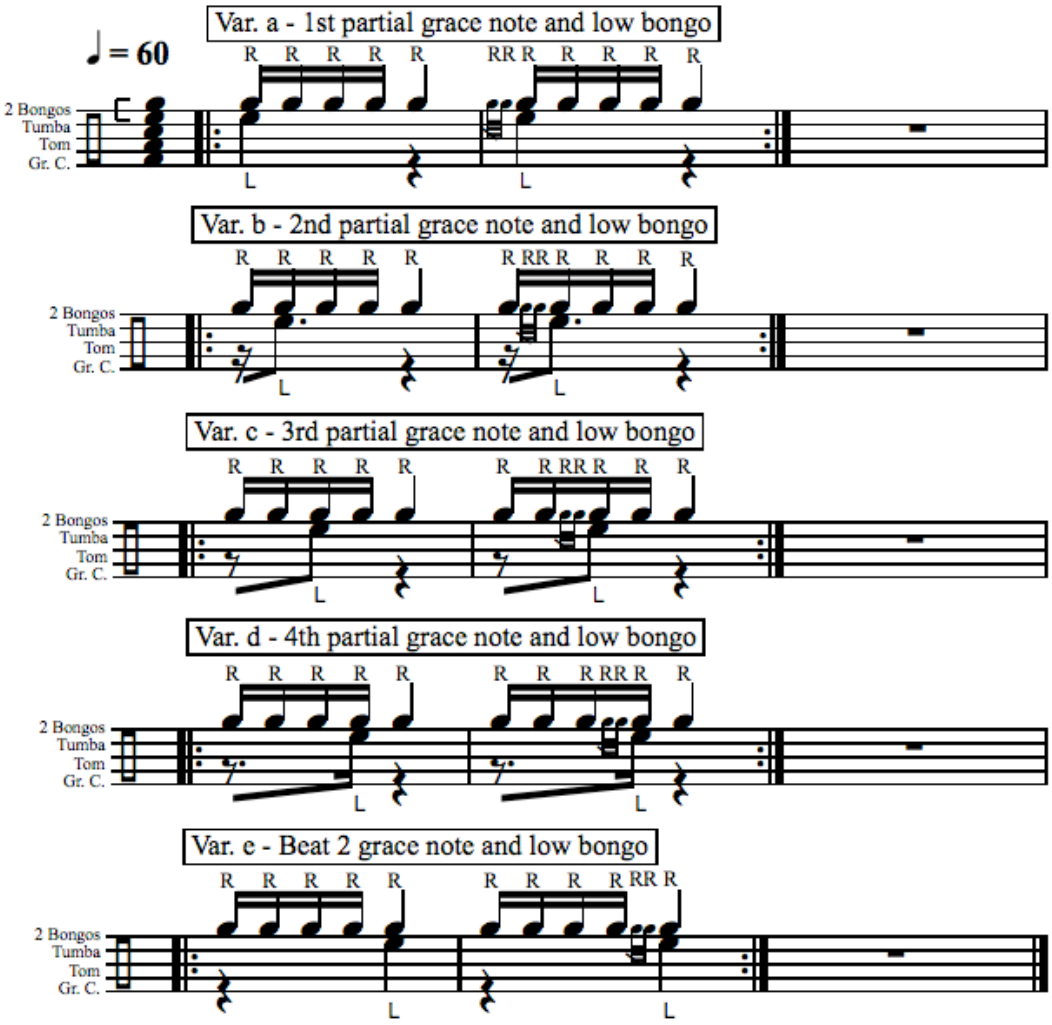
Exercise CRD2 isolates the high bongo grace-note figure on each sixteenth-note partial. The first measure of each variation (a-e) presents the sixteenth-note pulse by subdividing beat one into four sixteenth notes. The second measure of each variation presents grace-note figures on each sixteenth-note partial. This ordering allows performers to establish a sixteenth-note pulse prior to playing grace-note figures on each sixteenth-note partial.

Exercise CRD2:



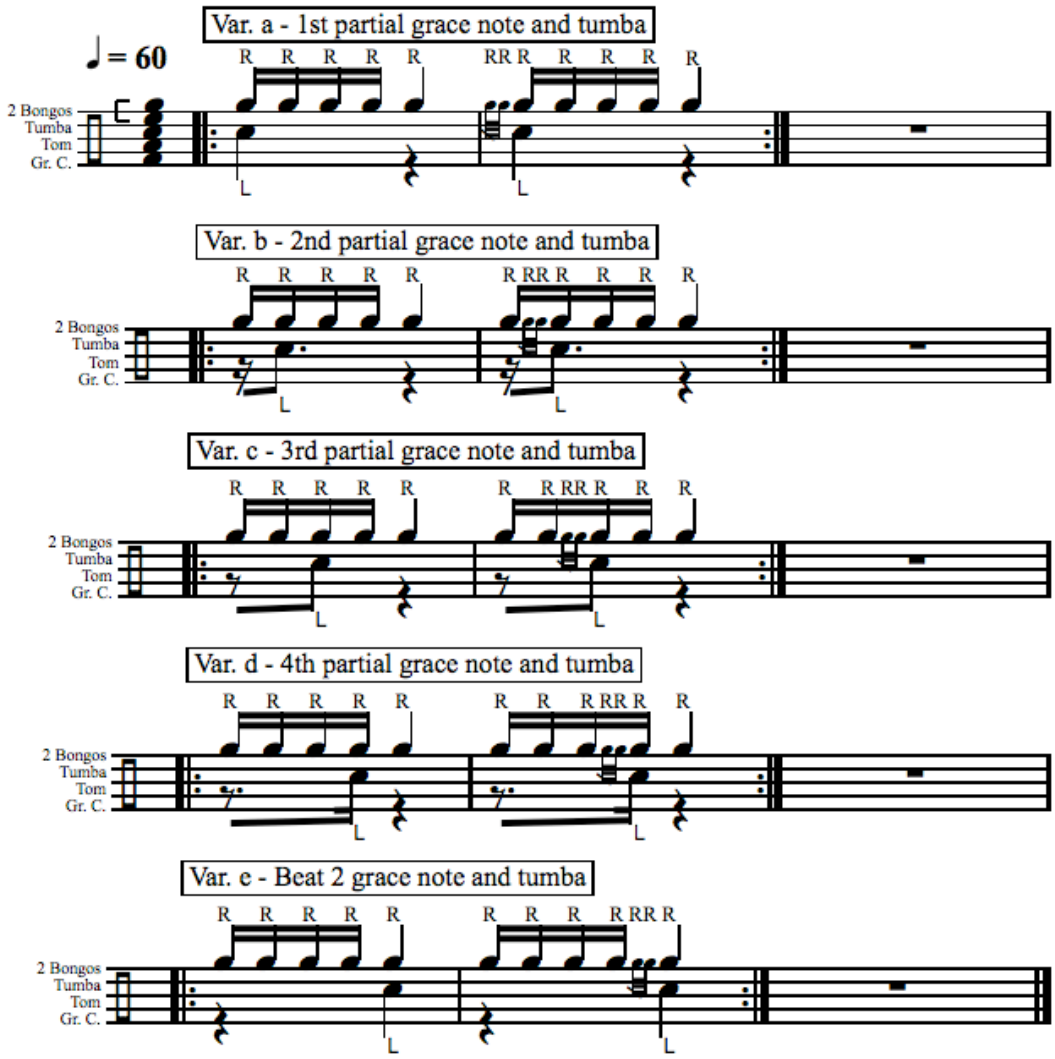
Exercise CRD3 combines a high bongo grace-note figure with a simultaneous low bongo. The first measure of each variation presents sixteenth notes in the right hand and the low bongo in the left hand on each sixteenth-note partial. The second measure of each variation combines the grace-note figure with the simultaneous low bongo on each sixteenth-note partial.

Exercise CRD3:



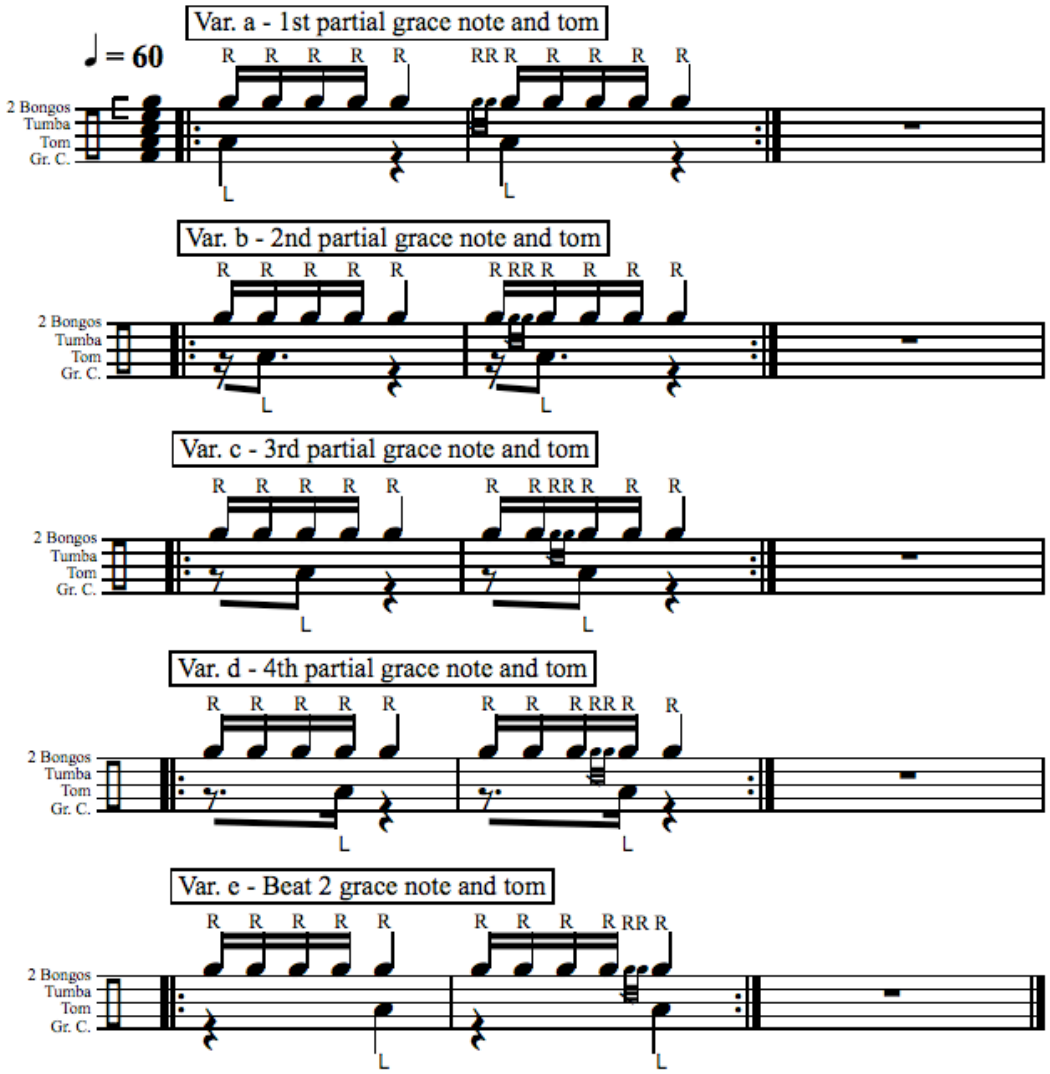
Exercise CRD4 combines a high bongo grace-note figure with a simultaneous tumba. The first measure of each variation presents sixteenth notes in the right hand and the tumba in the left hand on each sixteenth-note partial. The second measure of each variation combines the grace-note figure with the simultaneous tumba on each sixteenth-note partial.

Exercise CRD4:



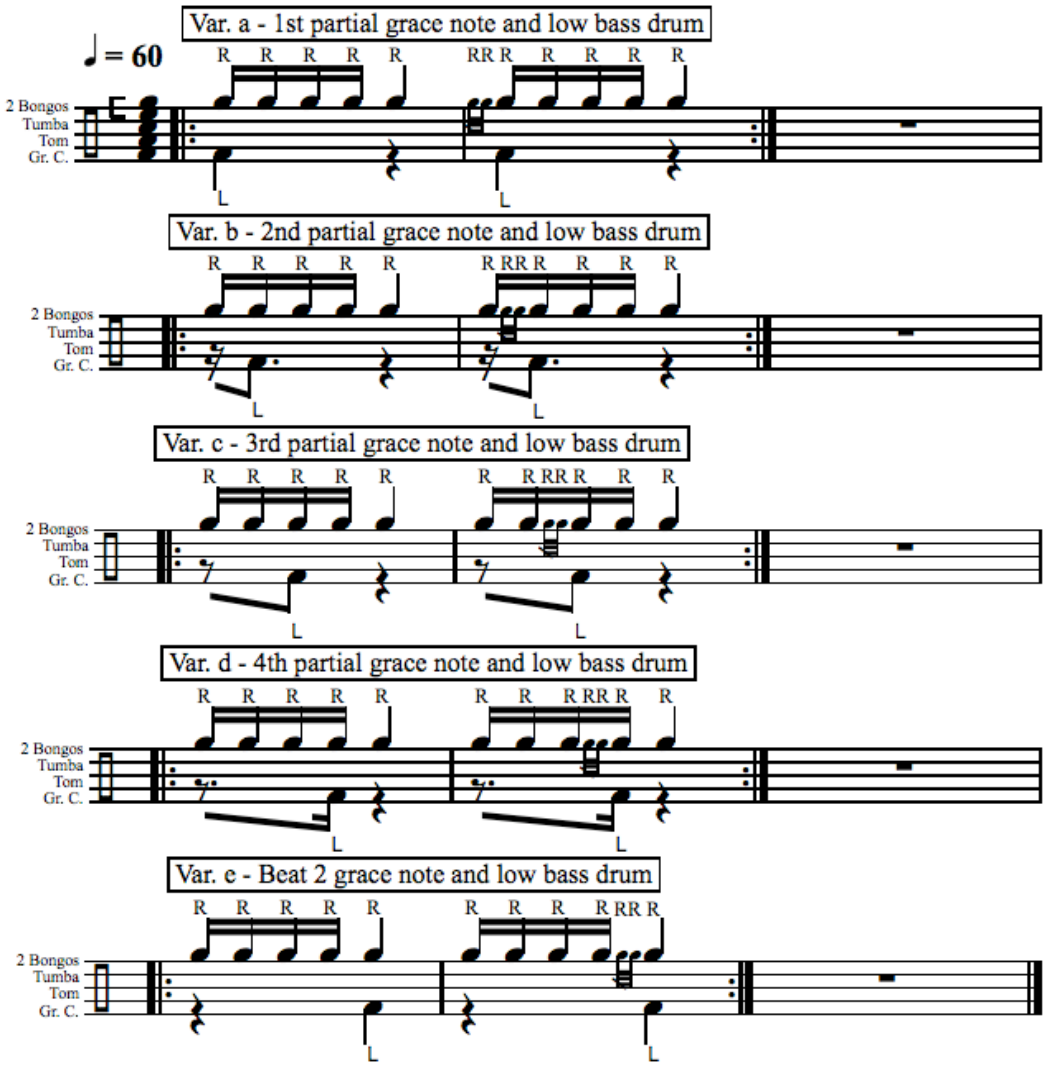
Exercise CRD5 combines a high bongo grace-note figure with a simultaneous tom. The first measure of each variation presents sixteenth notes in the right hand and the tom in the left hand on each sixteenth-note partial. The second measure of each variation combines the grace-note figure with the simultaneous tom on each sixteenth-note partial.

Exercise CRD5:



Exercise CRD6 combines a high bongo grace-note figure with a simultaneous low bass drum. The first measure of each variation presents sixteenth notes in the right hand and the low bass drum in the left hand on each sixteenth-note partial. The second measure of each variation combines the grace-note figure with the simultaneous low bass drum on each sixteenth-note partial.

Exercise CRD6:



Alternate-hand drag sticking method (AD):

The *alternate-hand drag* sticking method requires the performer to play two grace-note strokes using alternate hands. The first grace note is played with the left hand followed by the second grace note played with the right hand. The primary note, or the release immediately following the grace-note figure, is played using the right hand. Use the *alternate-hand drag* (AD) sticking method for approaching *simultaneous drum* high bongo grace-note figures.

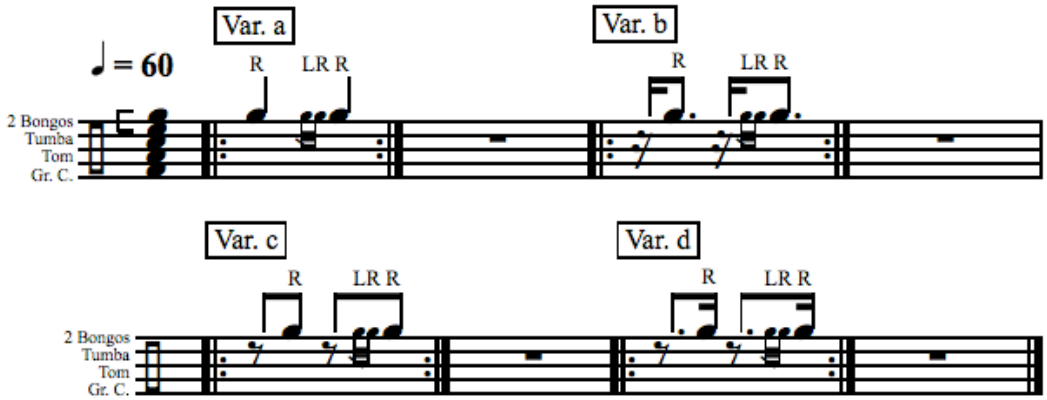
Exercise AD1 isolates the high bongo grace-note figure on each sixteenth-note partial. Measure one of the first variation (Var. a) isolates a single stroke on beat one followed by the grace-note figure on beat two. This ordering allows performers to determine an approach to single strokes prior to playing grace-note figures. This process is repeated for three remaining variations with each occurring on subsequent sixteenth-note partials of the beat.

Exercise AD1.5 isolates the high bongo grace-note figure preceded by a divided drum instance. Measure one of the first variation (Var. a) isolates a two-hand stroke on beat one followed by the grace-note figure on beat two. This ordering allows performers to determine an approach to two-hand strokes prior to playing grace-note figures. This process is repeated for three remaining variations with each occurring on each possible divided drum.

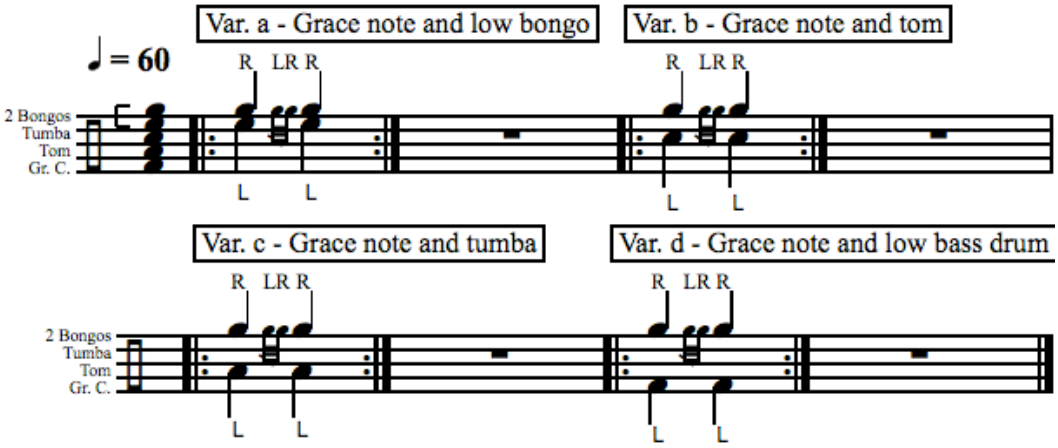
For both exercises below (Ex. AD1 and Ex. AD1.5), careful attention should be given to the interpretation of grace-note figures while maintaining a

constant internal sixteenth-note pulse. Performers should strive for consistent interpretation, specifically with respect to a refined clarity of diction.

Exercise AD1:

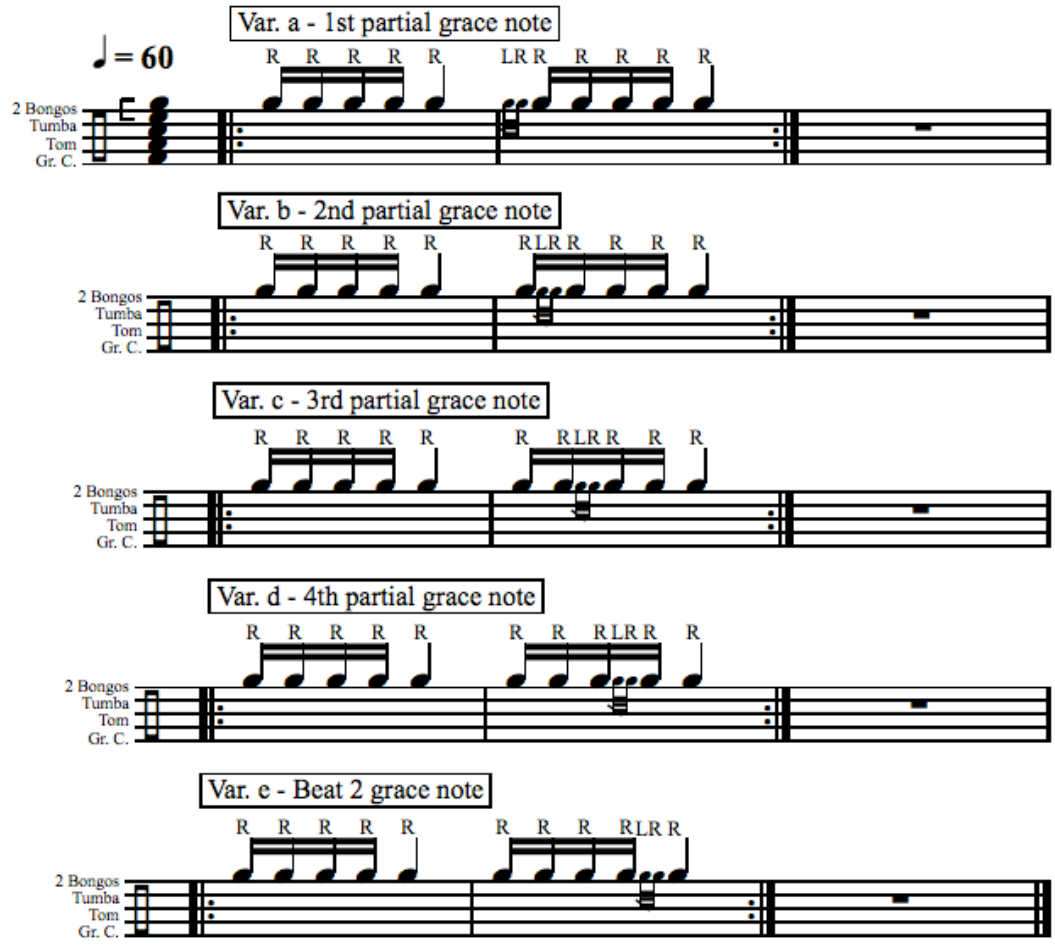


Exercise AD1.5:



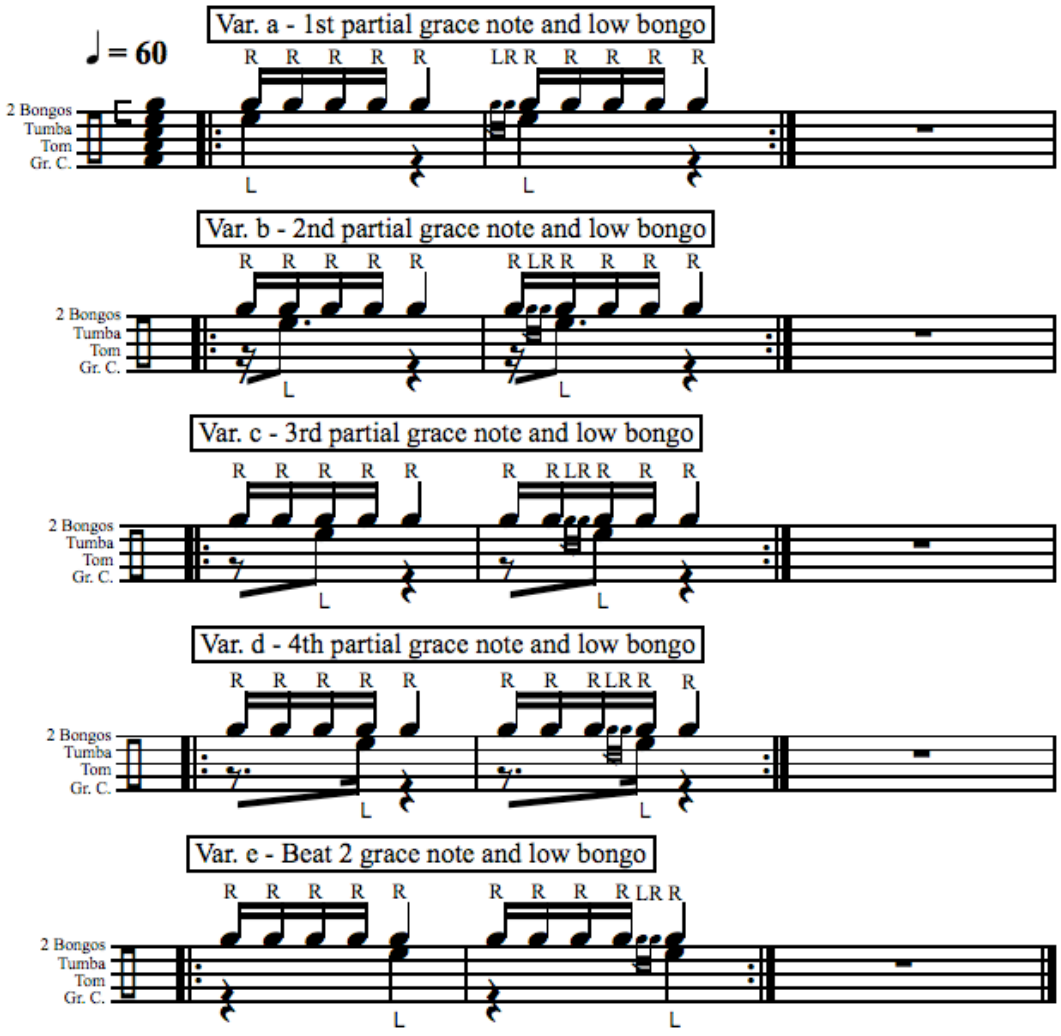
Exercise AD2 isolates the high bongo grace-note figure on each sixteenth-note partial. The first measure of each variation (a-e) presents the sixteenth-note pulse by subdividing beat one into four sixteenth notes. The second measure of each variation presents grace-note figures on each sixteenth-note partial. This ordering allows performers to establish a sixteenth-note pulse prior to playing grace-note figures on each sixteenth-note partial.

Exercise AD2:



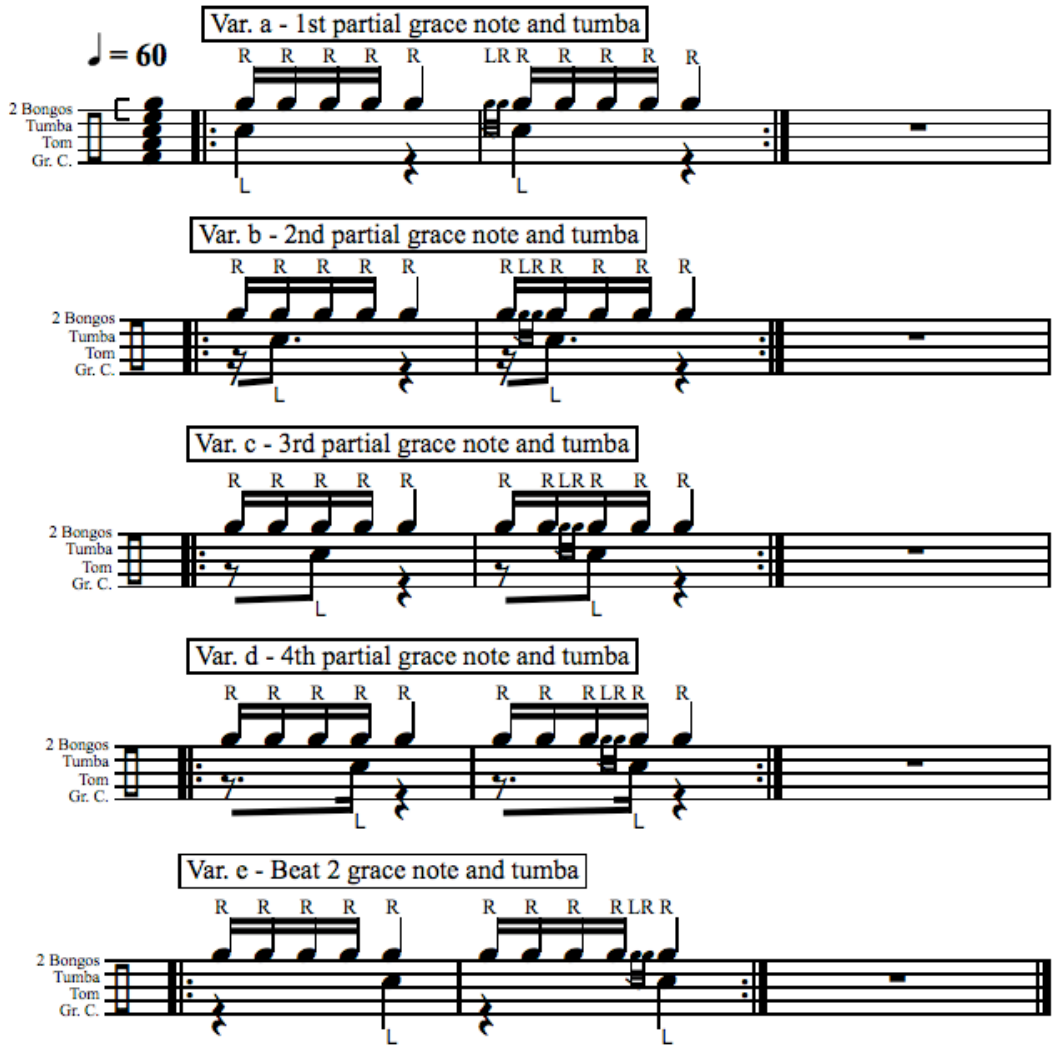
Exercise AD3 combines a high bongo grace-note figure with a simultaneous low bongo. The first measure of each variation presents sixteenth notes in the right hand and the low bongo in the left hand on each sixteenth-note partial. The second measure of each variation combines the grace-note figure with the simultaneous low bongo on each sixteenth-note partial.

Exercise AD3:



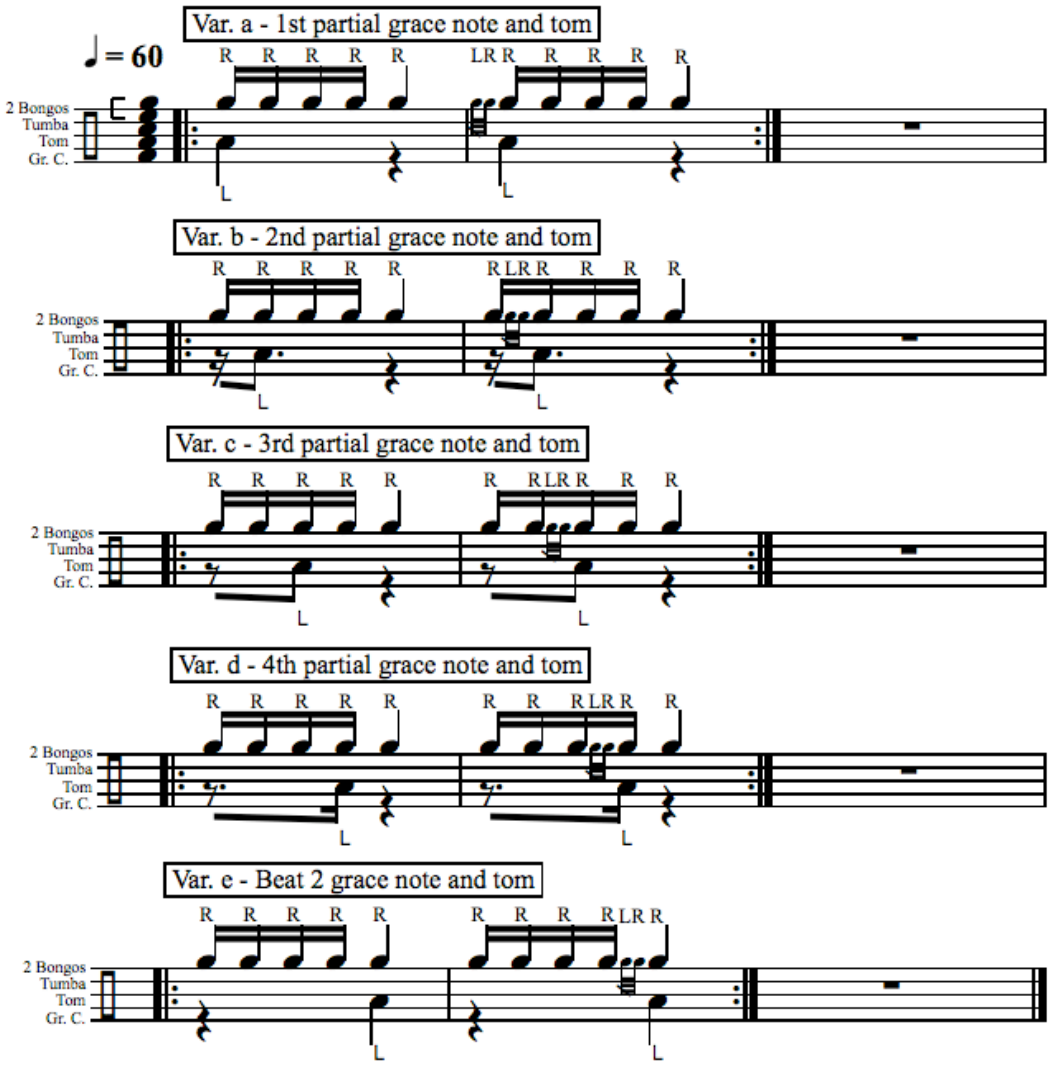
Exercise AD4 combines a high bongo grace-note figure with a simultaneous tumba. The first measure of each variation presents sixteenth notes in the right hand and the tumba in the left hand on each sixteenth-note partial. The second measure of each variation combines the grace-note figure with the simultaneous tumba on each sixteenth-note partial.

Exercise AD4:



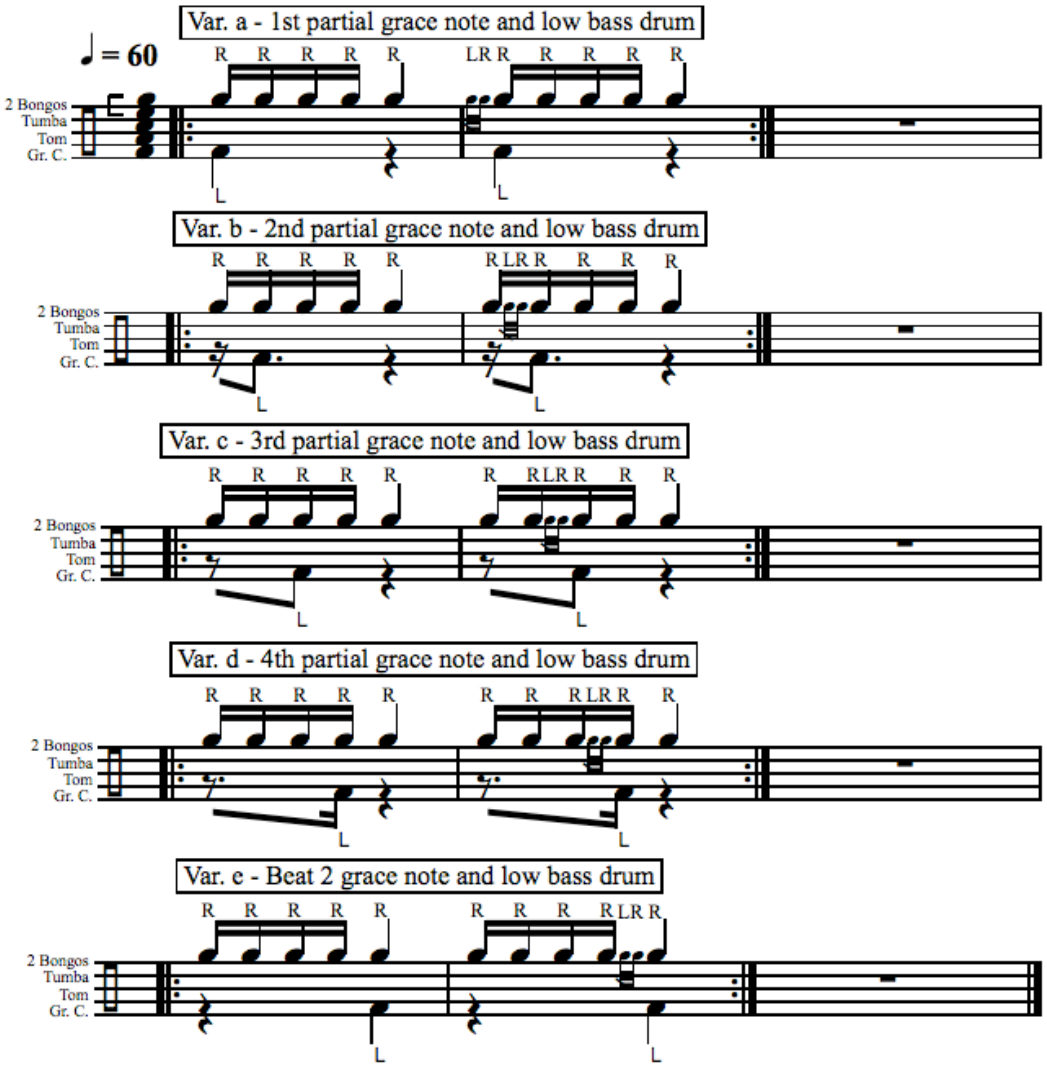
Exercise AD5 combines a high bongo grace-note figure with a simultaneous tom. The first measure of each variation presents sixteenth notes in the right hand and the tom in the left hand on each sixteenth-note partial. The second measure of each variation combines the grace-note figure with the simultaneous tom on each sixteenth-note partial.

Exercise AD5:



Exercise AD6 combines a high bongo grace-note figure with a simultaneous low bass drum. The first measure of each variation presents sixteenth notes in the right hand and the low bass drum in the left hand on each sixteenth-note partial. The second measure of each variation combines the grace-note figure with the simultaneous low bass drum on each sixteenth-note partial.

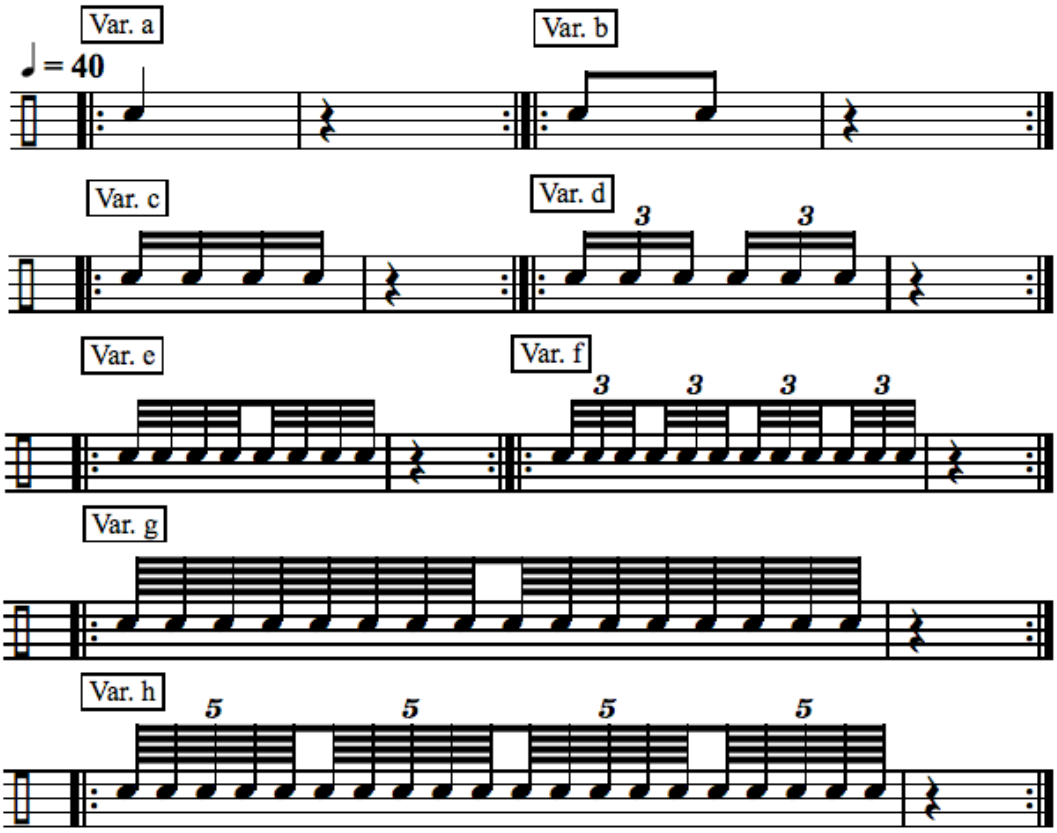
Exercise AD6:



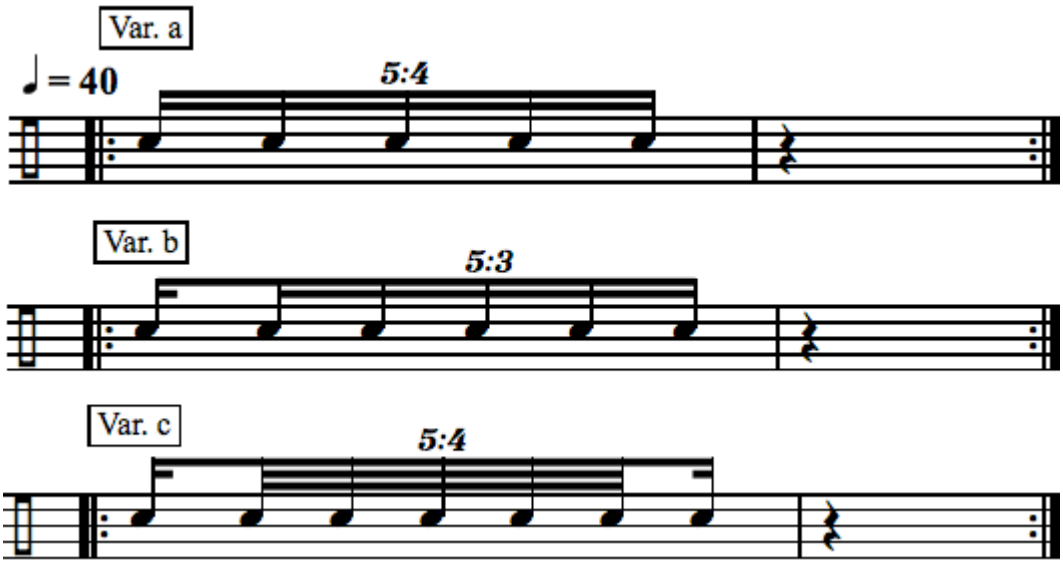
Rebonds A : Subdivisions of the beat (S)

The ability to maintain consistent tempo during practice and performance of *Rebonds A* is a significant challenge. Throughout *Rebonds A*, each beat is divided into a variety of smaller subdivisions (S). Exercises S1 and S2 display the different types of subdivisions. The subdivisions presented in exercise S1 are more common, while the metric subdivisions presented in exercise S2 are less common. Complete mastery of each subdivision will be very helpful in preparing *Rebonds A* for performance.

Exercise S1



Exercise S2

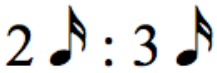


Rebonds A : Polyrhythm types (PT): Identification and Approach

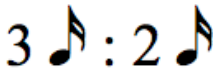
The ability to maintain tempo while constantly changing the subdivision of the beat is made increasingly difficult by the inclusion of several polyrhythms throughout *Rebonds A*. Polyrhythms are two rhythms, occurring simultaneously, which divide the beat at different rates. Pertaining to *Rebonds*, polyrhythms require the hands to act independently resulting in a technical challenge. Consequently**,** percussionists need to acquire advanced techniques to successfully perform *Rebonds A*.

Eight different polyrhythm types exist in *Rebonds A*. Each polyrhythm type is listed below with its corresponding ratio.

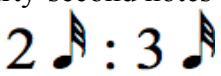
Type 1: two sixteenth notes over three sixteenth notes



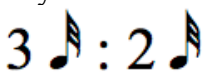
Type 2: three sixteenth notes over two sixteenth notes



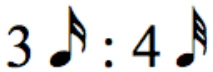
Type 3: two thirty-second notes over three thirty-second notes



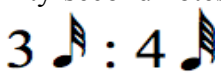
Type 4: three thirty-second notes over two thirty-second notes



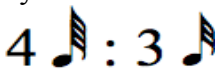
Type 5: three sixteenth notes over four thirty-second notes



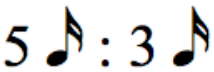
Type 6: three thirty-second notes over four sixty-fourth notes



Type 7: four sixty-fourth notes over three thirty-second notes



Type 8: five sixteenth notes over three sixteenth notes



The following *Polyrhythm Types Table* organizes polyrhythms according to their location in the music (measure number, beat placement, and sixteenth-note partial within a measure) of *Rebonds A*. The table lists each polyrhythm type and polyrhythm ratio followed by recommended exercises. In addition, corresponding page numbers are included for each suggested polyrhythm type exercise.

Table 3.6 ***REBONDS A*: POLYRHYTHM TYPES TABLE (p. 1 of 3)**

Measure Number	Beat	𝅘𝅥𝅯 Partial	Polyrhythm Type	Polyrhythm Ratio	Exercise	Page #
6	3	2nd & 3rd	1	2 𝅘𝅥𝅯 : 3 𝅘𝅥𝅯	PT1	104
7	1 & 2	4th & 1st	1	2 𝅘𝅥𝅯 : 3 𝅘𝅥𝅯	PT1	104
8	4	1st & 2nd	2	3 𝅘𝅥𝅯 : 2 𝅘𝅥𝅯	PT2	105
9	2	3rd & 4th	1	2 𝅘𝅥𝅯 : 3 𝅘𝅥𝅯	PT1	104
10	2	3rd & 4th	2	3 𝅘𝅥𝅯 : 2 𝅘𝅥𝅯	PT2	105
11	2	2nd & 3rd	1	2 𝅘𝅥𝅯 : 3 𝅘𝅥𝅯	PT1	104
12	1	1st & 2nd	1	2 𝅘𝅥𝅯 : 3 𝅘𝅥𝅯	PT1	104
12	2	2nd & 3rd	2	3 𝅘𝅥𝅯 : 2 𝅘𝅥𝅯	PT2	105
13	2	1st & 2nd	2	3 𝅘𝅥𝅯 : 2 𝅘𝅥𝅯	PT2	105
13	3 & 4	4th & 1st	2	3 𝅘𝅥𝅯 : 2 𝅘𝅥𝅯	PT2	105
14	1	3rd & 4th	1	2 𝅘𝅥𝅯 : 3 𝅘𝅥𝅯	PT1	104
14	3	3rd & 4th	2	3 𝅘𝅥𝅯 : 2 𝅘𝅥𝅯	PT2	105
14	4	3rd & 4th	1	2 𝅘𝅥𝅯 : 3 𝅘𝅥𝅯	PT1	104
15	1 & 2	4th & 1st	2	3 𝅘𝅥𝅯 : 2 𝅘𝅥𝅯	PT2	105
15	3	3rd & 4th	5	3 𝅘𝅥𝅯 : 4 𝅘𝅥𝅯	PT5	113
17	3	4th	4	3 𝅘𝅥𝅯 : 2 𝅘𝅥𝅯	PT4	109
17	4	1st	4	3 𝅘𝅥𝅯 : 2 𝅘𝅥𝅯	PT4	109
19	2	3rd & 4th	2	3 𝅘𝅥𝅯 : 2 𝅘𝅥𝅯	PT2	105
21	1	2nd, 3rd & 4th	8.1	5 𝅘𝅥𝅯 : 3 𝅘𝅥𝅯	PT8	120
23	1	2nd	3	2 𝅘𝅥𝅯 : 3 𝅘𝅥𝅯	PT3	106
23	1	3rd	4	3 𝅘𝅥𝅯 : 2 𝅘𝅥𝅯	PT4	109
24	2	1st	6	3 𝅘𝅥𝅯 : 4 𝅘𝅥𝅯	PT6	114
25	2	2nd	6	3 𝅘𝅥𝅯 : 4 𝅘𝅥𝅯	PT6	114
25	4	1st	7	4 𝅘𝅥𝅯 : 3 𝅘𝅥𝅯	PT7	117
26	2	2nd	6	3 𝅘𝅥𝅯 : 4 𝅘𝅥𝅯	PT6	114
26	3	4th	7	4 𝅘𝅥𝅯 : 3 𝅘𝅥𝅯	PT7	117

Table 3.7	***REBONDS A*: POLYRHYTHM TYPES TABLE (p. 2 of 3)**					
Measure Number	**Beat**	**Partial**	**Polyrhythm Type**	**Polyrhythm Ratio**	**Exercise**	**Page #**
28	2 & 3	4th, 1st & 2nd	8.2	5 : 3	PT8	120
32	1	4th	7	4 : 3	PT7	117
33	2	3rd	6	3 : 4	PT6	114
33	4	2nd	6	3 : 4	PT6	114
34	3	2nd	7	4 : 3	PT7	117
35	2	1st	7	4 : 3	PT7	117
36	1	3rd	6	3 : 4	PT6	114
36	4	2nd	6	3 : 4	PT6	114
38	1	2nd	6	3 : 4	PT6	114
38	3	1st	7	4 : 3	PT7	117
39	1	2nd	7	4 : 3	PT7	117
40	2	3rd	6	3 : 4	PT6	114
41	2	4th	6	3 : 4	PT6	114
41	4	4th	6	3 : 4	PT6	114
42	2	3rd	6	3 : 4	PT6	114
42	4	2nd	6	3 : 4	PT6	114
43	2	3rd	6	3 : 4	PT6	114
45	1	1st	6	3 : 4	PT6	114
46	1	3rd	6	3 : 4	PT6	114
48	2	4th	7	4 : 3	PT7	117
48	3	4th	3	2 : 3	PT3	106
48	4	3rd	7	4 : 3	PT7	117
49	1	3rd	6	3 : 4	PT6	114
49	2	1st	7	4 : 3	PT7	117
49	2	3rd	7	4 : 3	PT7	117
49	3	1st	6	3 : 4	PT6	114

Table 3.8	***REBONDS A*: POLYRHYTHM TYPES TABLE (p. 3 of 3)**					
Measure Number	**Beat**	**Partial**	**Polyrhythm Type**	**Polyrhythm Ratio**	**Exercise**	**Page #**
49	3	4th	3	2 : 3	PT3	106
49	4	2nd	7	4 : 3	PT7	117
49	4	3rd	7	4 : 3	PT7	117
50	1	2nd	7	4 : 3	PT7	117
50	1	4th	4	3 : 2	PT4	109
50	2	4th	6	3 : 4	PT6	114
50	3	1st	3	2 : 3	PT3	106
50	4	3rd	3	2 : 3	PT3	106
51	1	1st	4	3 : 2	PT4	109
51	1	3rd	3	2 : 3	PT3	106
52	4	3rd	6	3 : 4	PT6	114
53	1	2nd	7	4 : 3	PT7	117
53	1	3rd	6	3 : 4	PT6	114
53	3	3rd	6	3 : 4	PT6	114
53	4	3rd	4	3 : 2	PT4	109

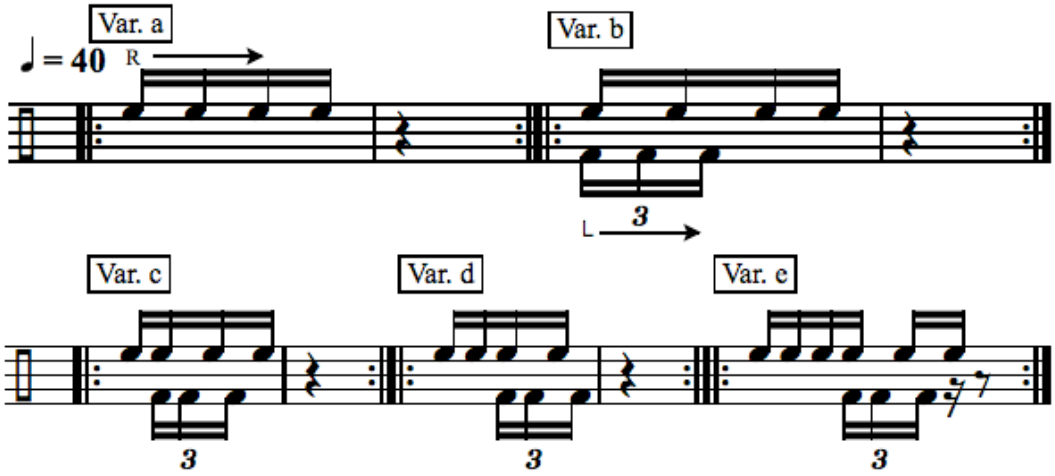
Each of the polyrhythm types identified in this document place elevated technical demands on the performer. As a result, several exercises were created as an aid for developing advanced techniques associated with each polyrhythm type. For maximum benefit, all polyrhythm exercises should be repeated until each advanced technique is achieved consistently and effortlessly. Rest measures were inserted allowing performers to synthesize the passage perfectly in the mind. In

addition, articulations were purposely omitted. Performers should apply these learned advanced techniques to corresponding musical passages in *Rebonds A.*

Polyrhythm type 1: 2 : 3

Exercise PT1 presents sixteenth notes in the right hand while simultaneously presenting sixteenth-note triplets in the left hand. The first variation (var. a) establishes a sixteenth-note pulse in the right hand. Each successive variation introduces sixteenth-note-triplet figures beginning on each sixteenth-note partial respectively.

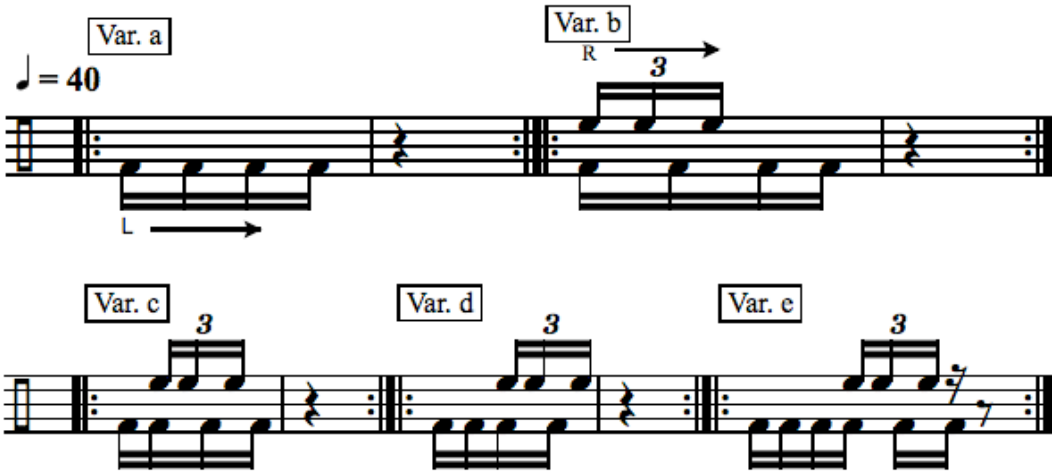
Exercise PT1: 2 : 3



Polyrhythm type 2: 3 : 2

Exercise PT2 presents sixteenth notes in the left hand while simultaneously presenting sixteenth-note triplets in the right hand. The first variation (var. a) establishes a sixteenth-note pulse in the left hand. Each successive variation introduces sixteenth-note-triplet figures beginning on each sixteenth-note partial respectively.

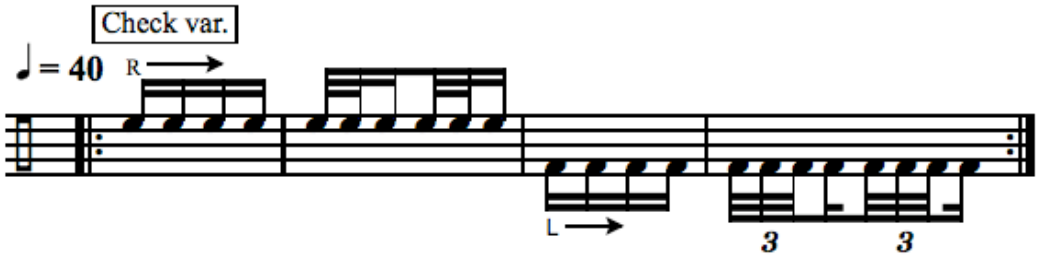
Exercise PT2: 3 : 2



Polyrhythm type 3: 2 : 3

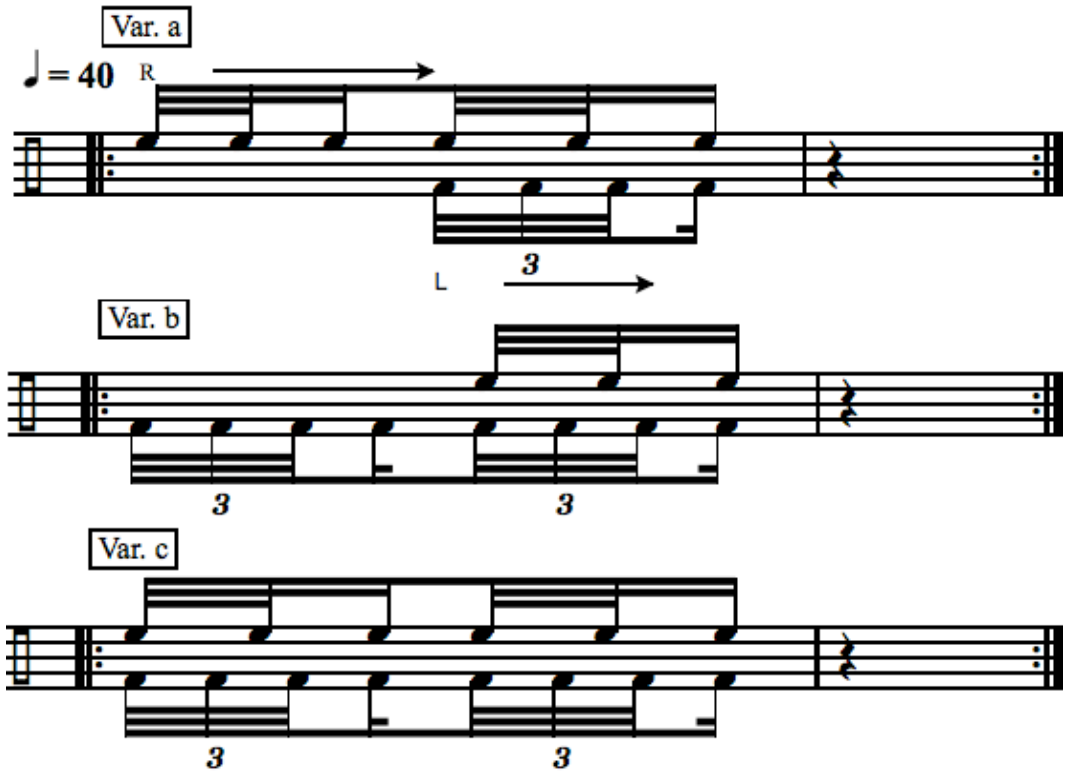
In the check variation of exercise PT3, measure one presents sixteenth notes in the right hand followed by a further subdivided second measure. Careful attention should be given to the thirty-second-note subdivision of the sixteenth note in measure two. Likewise, in measure three, the left hand plays sixteenth notes followed by a thirty-second-note-triplet subdivision in measure four.

Exercise PT3: 2 : 3



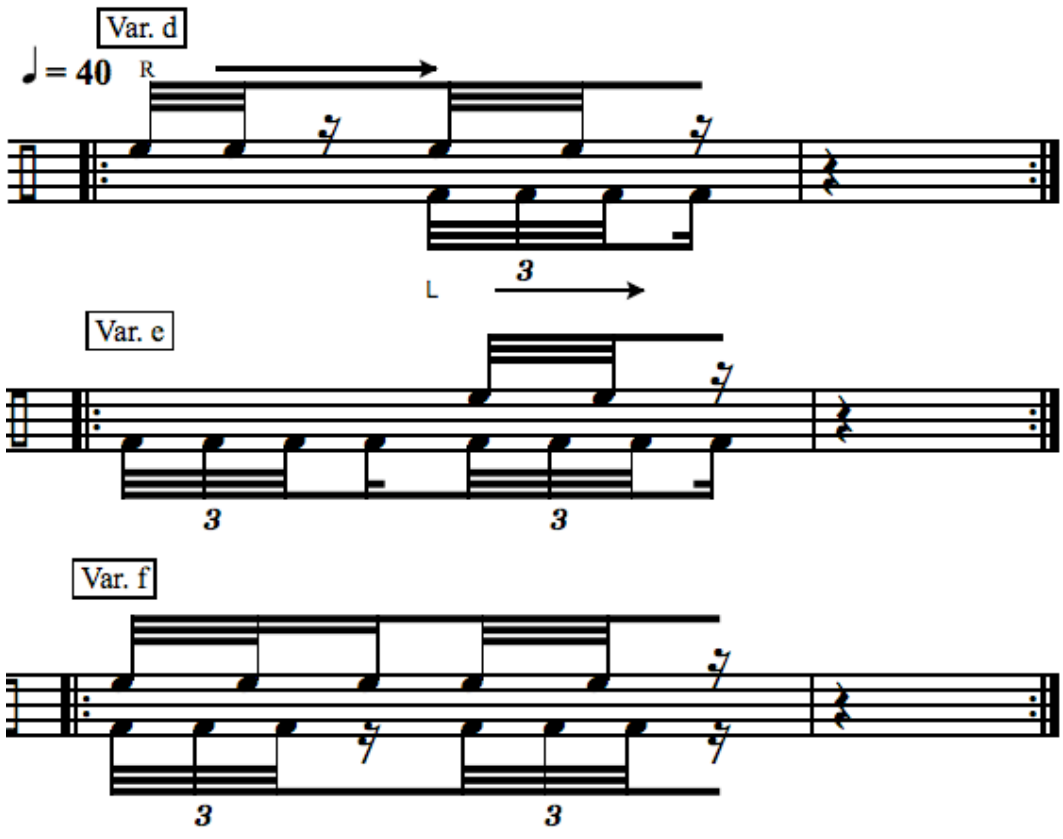
Exercise PT3 (var. a-c) targets the 2 : 3 polyrhythm technique specifically. The first variation (var. a) allows for performers to establish a thirty-second-note/sixteenth-note rhythm in the right hand prior to introducing a thirty-second-note-triplet/sixteenth-note rhythm in the left hand. Conversely, the second variation (var. b) establishes a thirty-second-note-triplet/sixteenth-note rhythm in the left hand prior to introducing a thirty-second-note/sixteenth-note rhythm in the right hand. The first two variations systematically isolate one instance of the 2 : 3 polyrhythm. The third variation (var. c) allows for continuous repetition of the 2 : 3 polyrhythm.

Exercise PT3 (a-c): 2 : 3



Exercise PT3 (var. d –f) is designed to continue work on the 2 : 3 polyrhythm while incorporating the appropriate sixteenth-note rests into the pattern. Performers should use the muscle memory gained from practicing the previous exercise variations to assist in executing the correct rhythm of the following exercise variations.

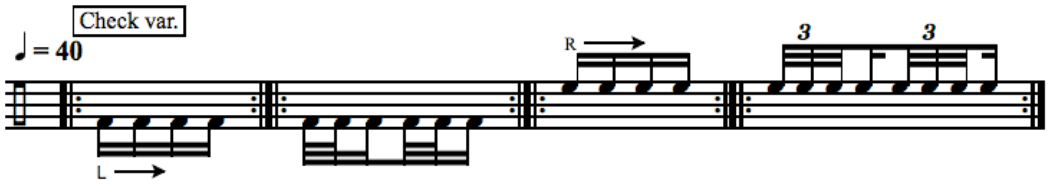
Exercise PT3 (d-f): 2 : 3



Polyrhythm type 4: 3 : 2

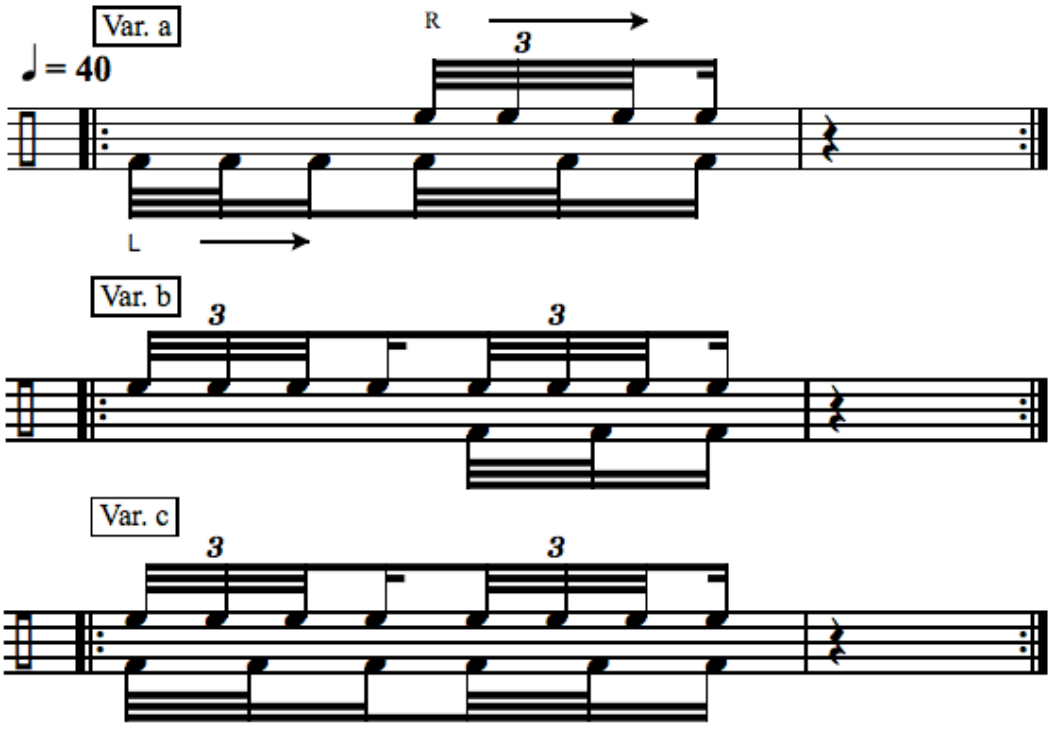
In the check variation of exercise PT4, measure one presents sixteenth notes in the left hand followed by a further subdivided second measure. Careful attention should be given to the thirty-second-note subdivision of the sixteenth note in measure two. Likewise, in measure three, the right hand plays sixteenth notes followed by a thirty-second-note-triplet subdivision in measure four.

Exercise PT4: 3 : 2



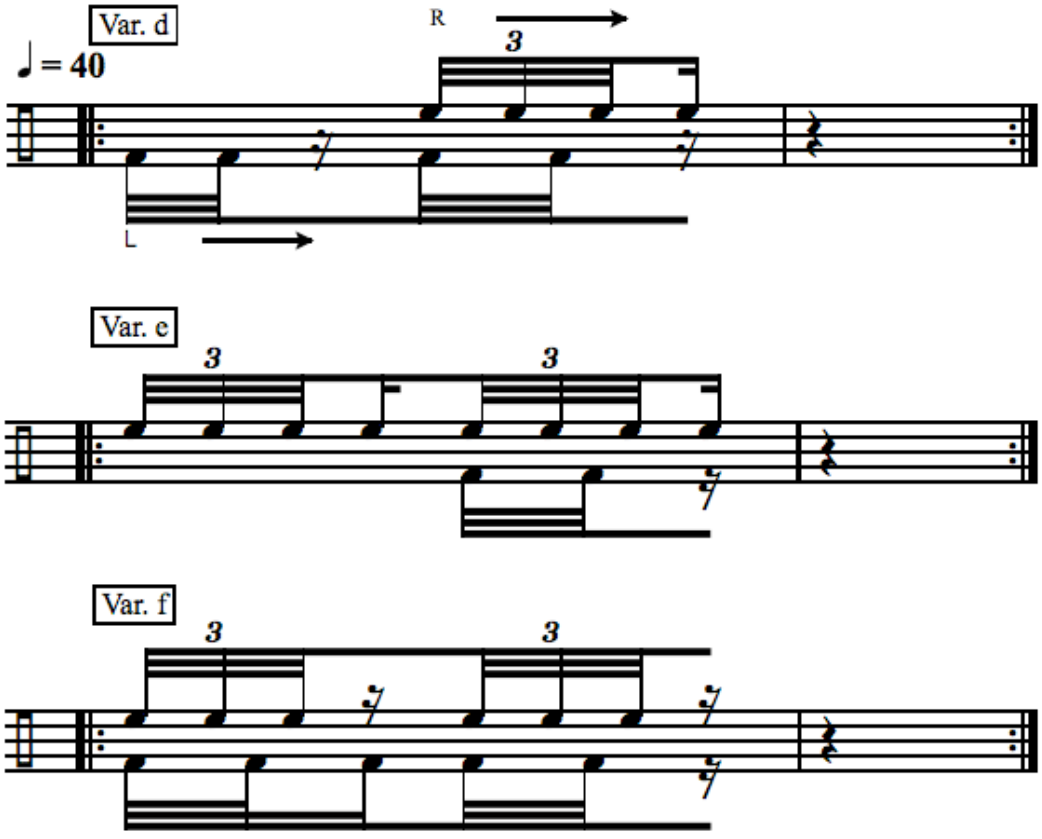
Exercise PT4 (var. a-c) targets the 3 𝅘𝅥𝅯 : 2 𝅘𝅥𝅯 polyrhythm technique specifically. The first variation (var. a) allows for performers to establish a thirty-second-note/sixteenth-note rhythm in the left hand prior to introducing a thirty-second-note-triplet/sixteenth-note rhythm in the right hand. Conversely, the second variation (var. b) establishes a thirty-second-note-triplet/sixteenth-note rhythm in the right hand prior to introducing a thirty-second-note/sixteenth-note rhythm in the left hand. The first two variations systematically isolate one instance of the 3 𝅘𝅥𝅯 : 2 𝅘𝅥𝅯 polyrhythm. The third variation (var. c) allows for continuous repetition of the 3 𝅘𝅥𝅯 : 2 𝅘𝅥𝅯 polyrhythm.

Exercise PT4 (a-c): 3 𝅘𝅥𝅯 : 2 𝅘𝅥𝅯



Exercise PT4 (var. d –f) is designed to continue work on the 3 : 2 polyrhythm while incorporating the appropriate sixteenth-note rests into the pattern. Performers should use the muscle memory gained from practicing the previous exercise variations to assist in executing the correct rhythm of the following exercise variations.

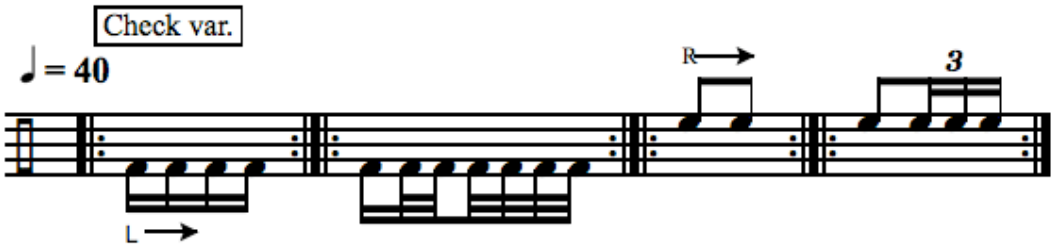
Exercise PT4 (d-f): 3 : 2



Polyrhythm type 5: 3 : 4

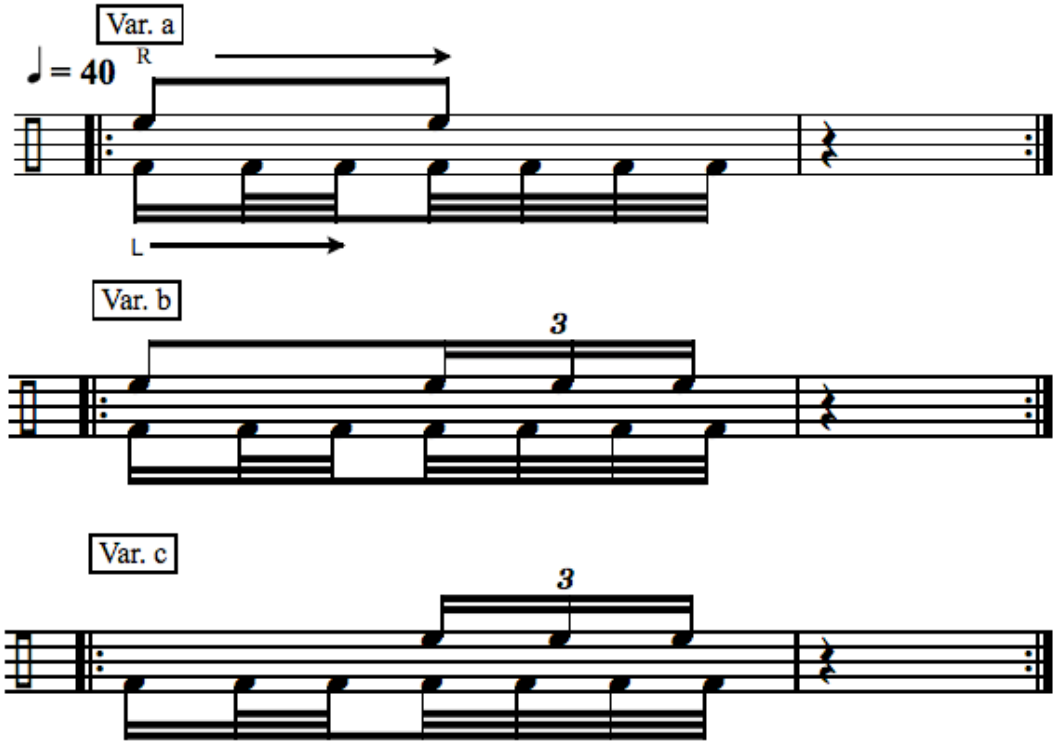
In the check variation of exercise PT5, measure one presents sixteenth notes in the left hand followed by a further subdivided second measure. Careful attention should be given to the thirty-second-note subdivision of the sixteenth note in measure two. Likewise, in measure three, the right hand plays eighth notes followed by a sixteenth-note-triplet subdivision.

Exercise PT5: 3 : 4



Exercise PT5 (var. a-c) targets the 3 : 4 polyrhythm technique specifically. The first variation (var. a) allows for performers to establish a sixteenth-note/thirty-second-note rhythm in the left hand while playing eighth notes in the right hand. The second variation (var. b) includes the addition of sixteenth-note triplets beginning on the third sixteenth-note partial. The third variation (var. c) omits the eighth-note downbeat prior to the sixteenth-note triplets.

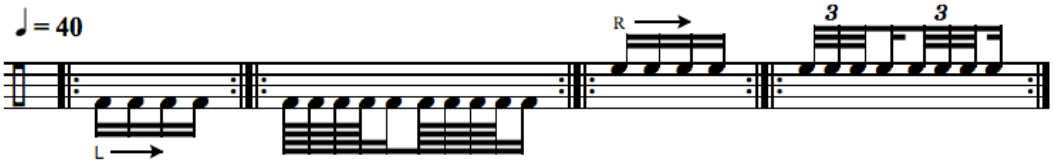
Exercise PT5 (a-c): 3 : 4



Polyrhythm type 6: 3 : 4

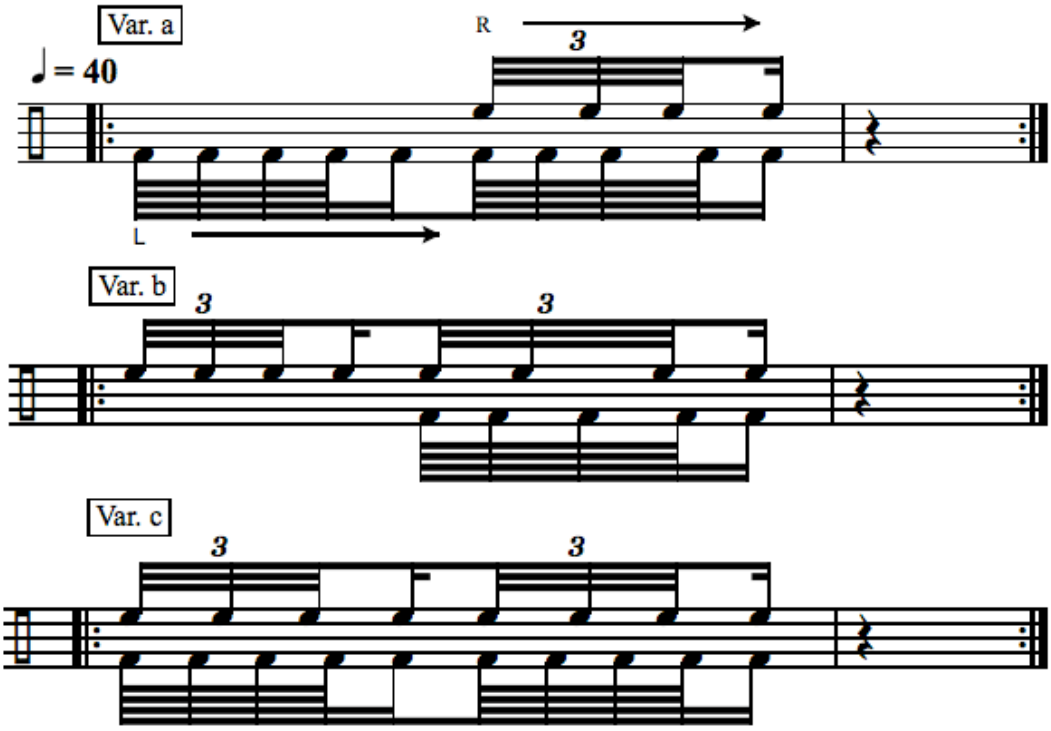
In the check variation of exercise PT6, measure one presents sixteenth notes in the left hand followed by a further subdivided second measure. Careful attention should be given to the sixty-fourth-note subdivision of the sixteenth note. Likewise, in measure three, the right hand plays sixteenth notes followed by a thirty-second-note-triplet subdivision.

Exercise PT6: 3 : 4



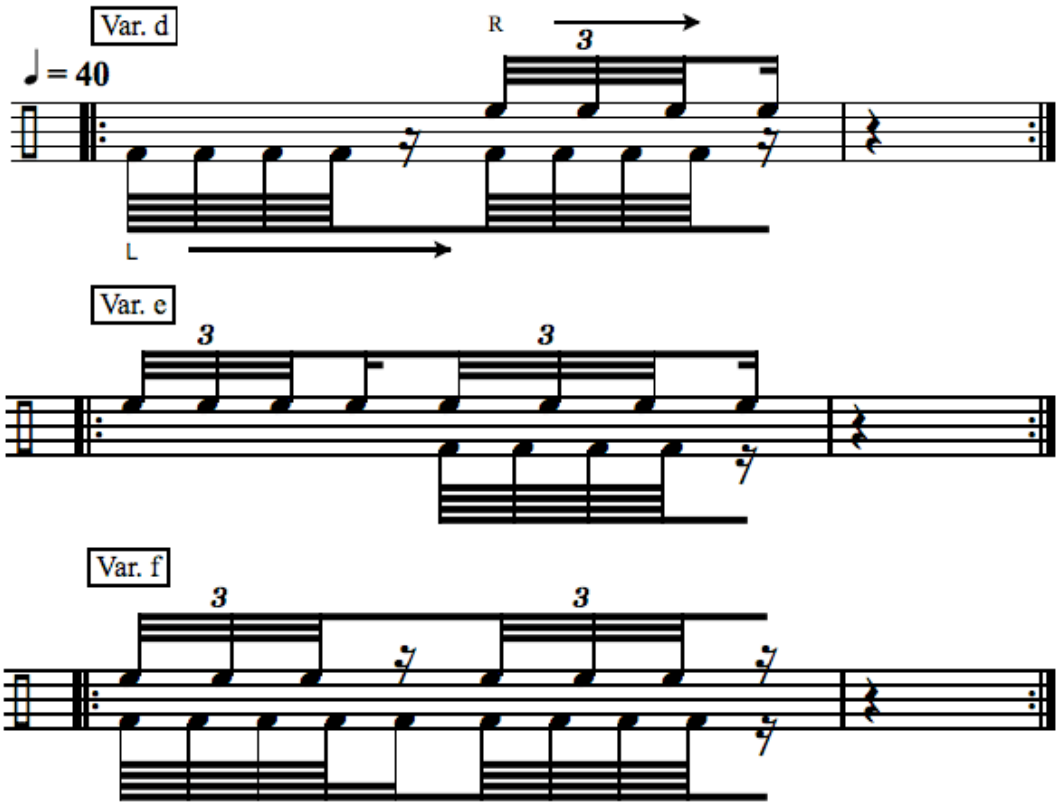
Exercise PT6 (var. a-c) targets the 3 : 4 polyrhythm technique specifically. The first variation (var. a) allows for performers to establish a sixty-fourth-note/sixteenth-note rhythm in the left hand prior to introducing a thirty-second-note-triplet/sixteenth-note rhythm in the right hand. The second variation (var. b) establishes a thirty-second-note-triplet/sixteenth-note rhythm of the right hand prior to introducing a sixty-fourth-note/sixteenth-note rhythm in the left hand. The third variation (var. c) allows for continuous repetition of the 3 : 4 polyrhythm.

Exercise PT6 (a-c): 3 : 4



Exercise PT6 (var. d –f) is designed to continue work on the 3 : 4 polyrhythm while incorporating the appropriate sixteenth-note rests into the pattern. Performers should use the muscle memory gained from practicing the previous exercise variations to assist in executing the correct rhythm of the following exercise variations.

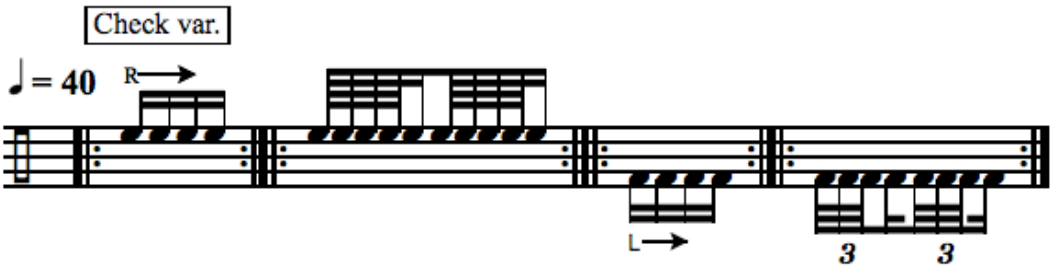
Exercise PT6 (d-f): 3 : 4



Polyrhythm type 7: 4 : 3

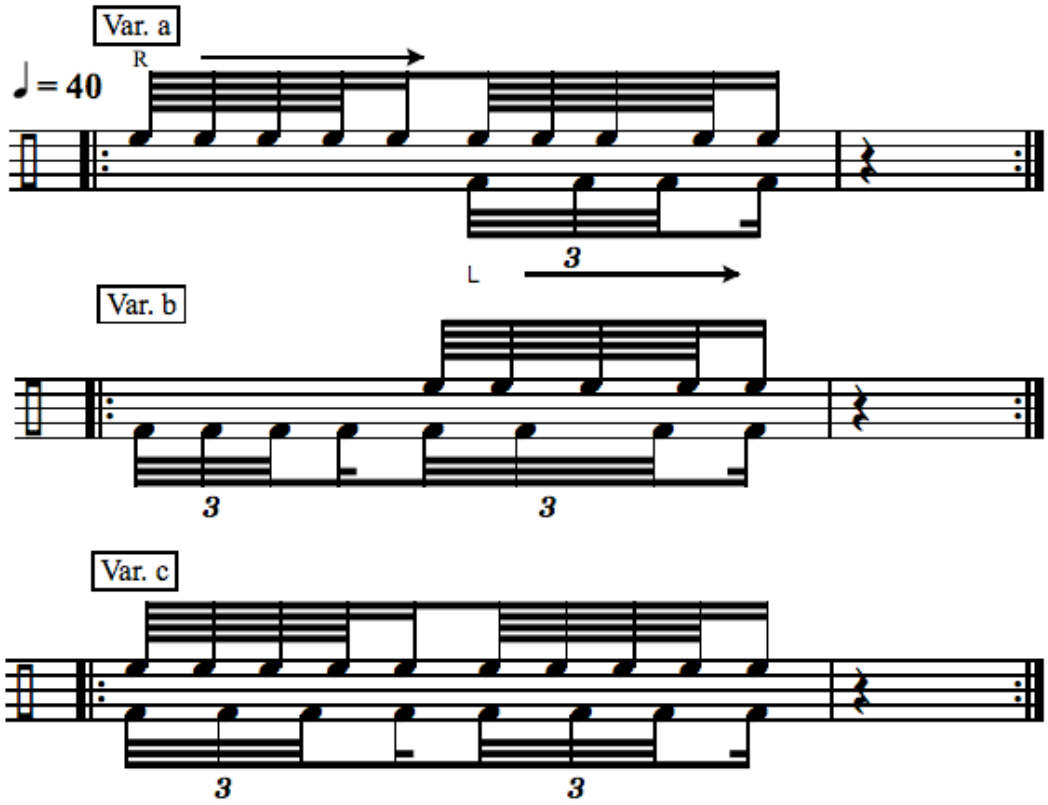
In the check variation of exercise PT7, measure one presents sixteenth notes in the right hand followed by a further subdivided second measure. Careful attention should be given to the sixty-fourth-note subdivision of the sixteenth note. Likewise, in measure three, the left hand plays sixteenth notes followed by a thirty-second-note-triplet subdivision.

Exercise PT7: 4 : 3



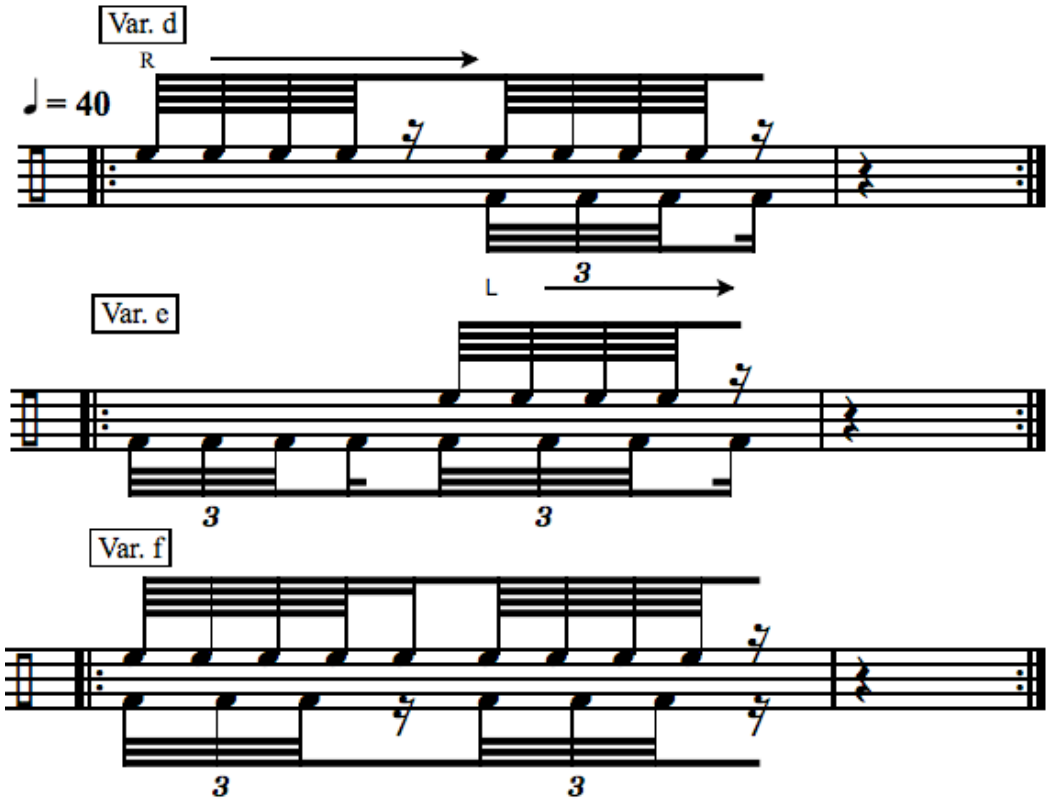
Exercise PT7 (var. a-c) targets the 4 : 3 polyrhythm technique specifically. The first variation (var. a) allows for performers to establish a sixty-fourth-note/sixteenth-note rhythm in the right hand prior to introducing a thirty-second-note-triplet/sixteenth-note rhythm in the left hand. The second variation (var. b) establishes a thirty-second-note-triplet/sixteenth-note rhythm in the left hand prior to introducing a sixty-fourth-note/sixteenth-note rhythm in the right hand. The third variation (var. c) allows for continuous repetition of the 4 : 3 polyrhythm.

Exercise PT7 (a-c): 4 : 3



Exercise PT7 (var. d –f) is designed to continue work on the 4 : 3 polyrhythm while incorporating the appropriate sixteenth-note rests into the pattern. Performers should use the muscle memory gained from practicing the previous exercise variations to assist in executing the correct rhythm of the following exercise variations.

Exercise PT7 (d-f): 4 : 3

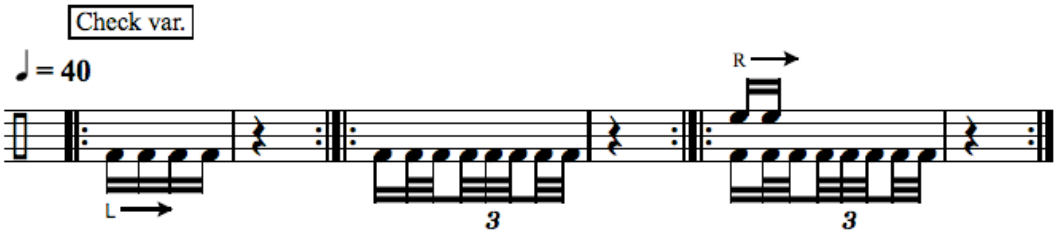


Polyrhythm type 8: 5 : 3

The exercises in this section target two of the most difficult polyrhythm techniques in *Rebonds A*. Exercise PT8 targets the 5 : 3 polyrhythm technique in measure 21; beat 1. In this example, the sixteenth-note pulse associated with the 5 : 3 polyrhythm (within the 2nd, 3rd, & 4th sixteenth-note partial) is subdivided into thirty-second-note groupings of 2+3+2.

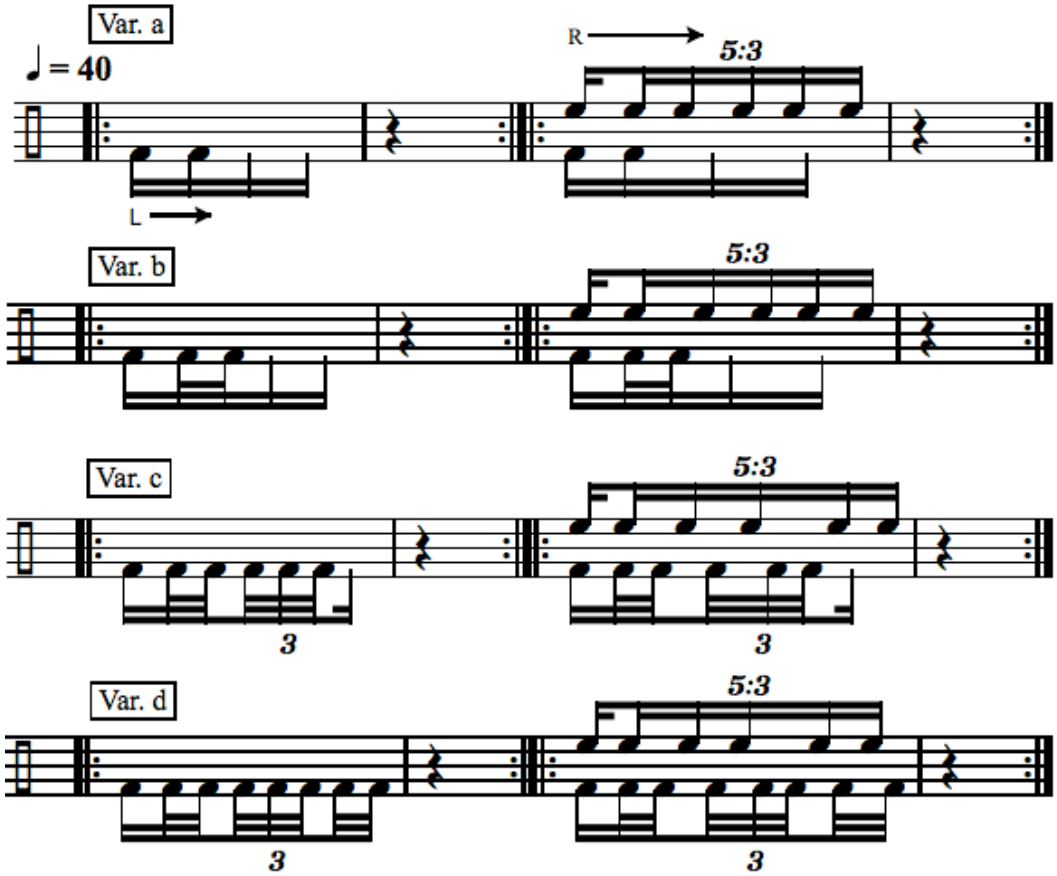
The check variation of exercise PT8 establishes the rhythmic groupings of the left hand. Measure one presents a sixteenth-note pulse followed by a further subdivided third measure. Careful attention should be given to the rhythmic accuracy of the thirty-second-note groupings of 2+3+2. This represents the complete rhythmic groupings of the left hand. The fifth measure introduces the right-hand sixteenth-note subdivision prior to the 5 : 3 polyrhythm.

Exercise PT8: 5 : 3



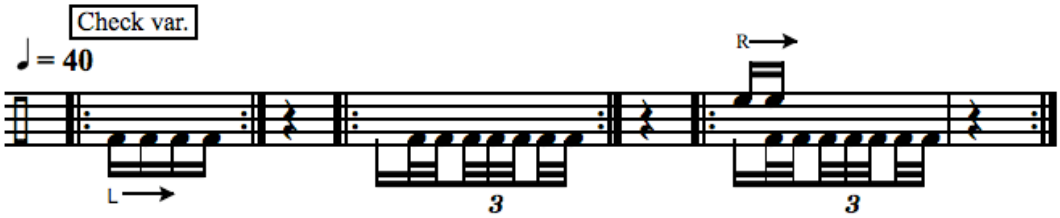
Exercise PT8 (var. a-d) systematically rebuilds the left-hand rhythmic groupings previously learned from exercise PT8 (Check var.) while playing the 5 : 3 polyrhythm on the right hand. The first measure of each variation isolates the left-hand rhythmic grouping. Measure three of each variation adds the 5 : 3 polyrhythm to the pre-established left-hand rhythmic grouping. The final pattern of this exercise (var. d, third measure) represents the complete 5 : 3 polyrhythm technique in measure 21; beat 1.

Exercise PT8 (a-d): 5 : 3

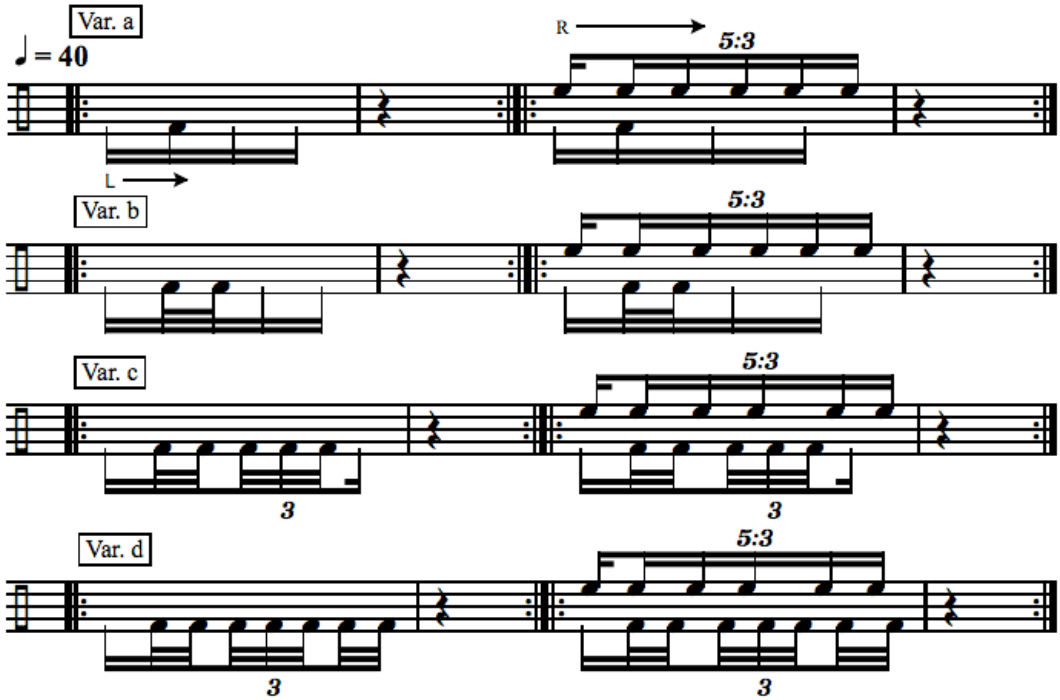


Exercise PT8.1 is designed to continue work on the 5 : 3 polyrhythm while incorporating the appropriate sixteenth-note rests into the pattern. Performers should use the muscle memory gained from practicing the previous exercise variations to assist in executing the correct rhythm of the following exercise variations.

Exercise PT8.1 (Check var.): 5 : 3



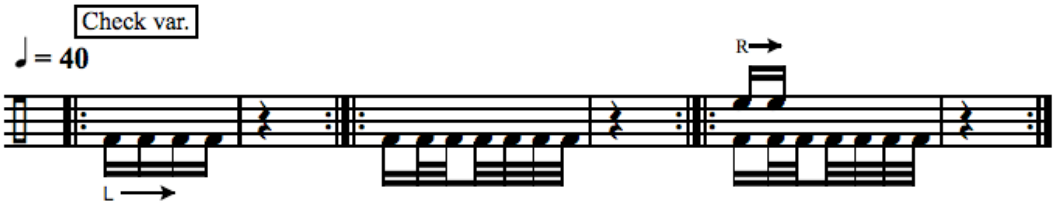
Exercise PT8.1 (a-d): 5 : 3



Exercises PT8.2 targets the 5 𝅘𝅥𝅯 : 3 𝅘𝅥𝅯 polyrhythm technique in measure 28; beats 2 & 3. In this example, the sixteenth-note pulse associated with the 5 𝅘𝅥𝅯 : 3 𝅘𝅥𝅯 polyrhythm is subdivided into groupings of 2+2+2.

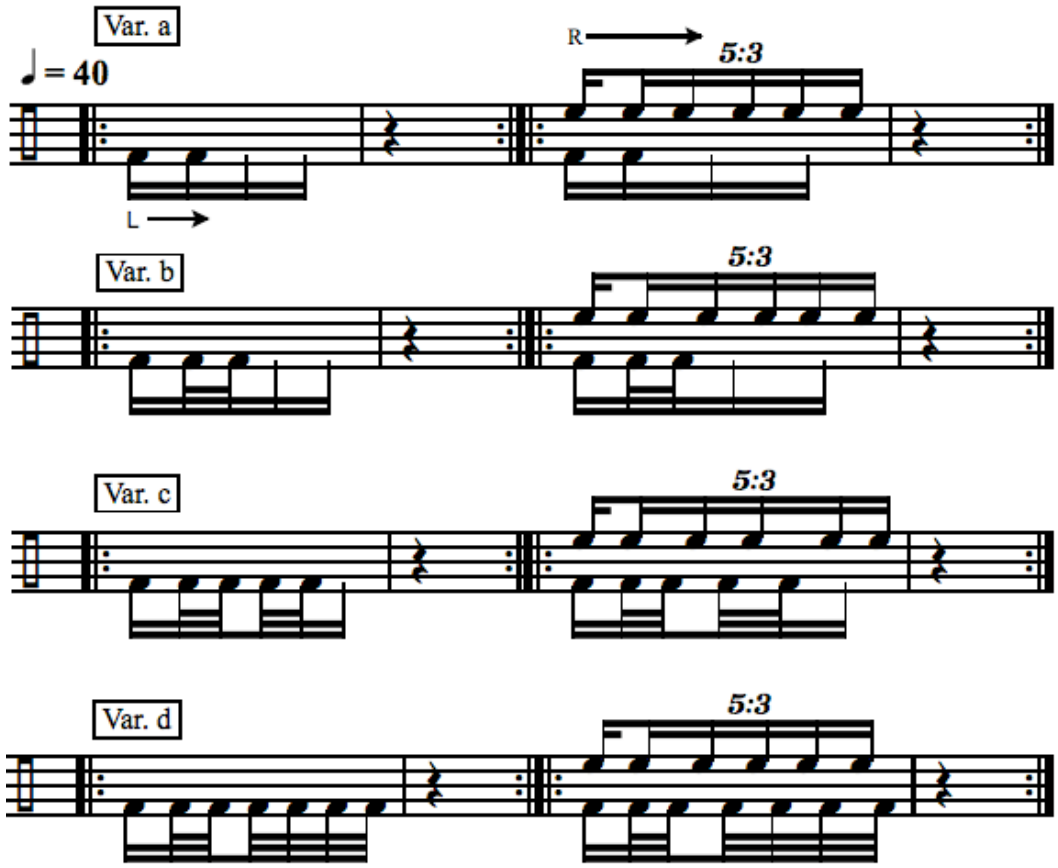
The check variation of exercise PT8.2 establishes the rhythmic groupings of the left hand. Measure one presents a sixteenth-note pulse followed by a further subdivided third measure. Careful attention should be given to the rhythmic accuracy of the thirty-second-note groupings of 2+2+2. This represents the complete rhythmic groupings of the left hand. The fifth measure introduces the right-hand sixteenth-note subdivision prior to the 5 𝅘𝅥𝅯 : 3 𝅘𝅥𝅯 polyrhythm.

Exercise PT8.2 (Check var.): 5 𝅘𝅥𝅯 : 3 𝅘𝅥𝅯



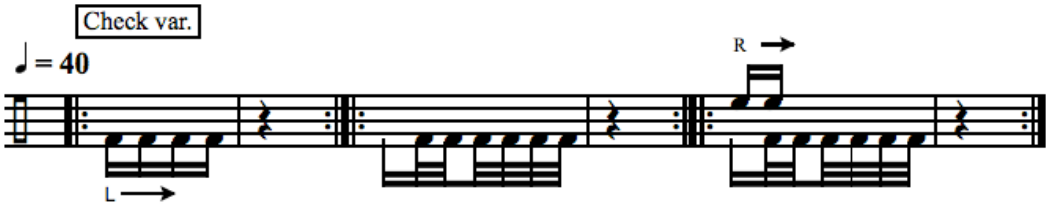
Exercises PT8.2 (var. a-d) systematically rebuilds the left-hand rhythmic groupings previously learned from exercise PT8.2 (Check var.) while playing the 5 : 3 polyrhythm on the right hand. Measure three of each variation adds the 5 : 3 polyrhythm to the pre-established left-hand rhythmic grouping. The final pattern of this exercise (var. d, third measure) represents the complete 5 : 3 polyrhythm technique in measure 28; beats 2 & 3.

Exercise PT8.2 (a-d): 5 : 3

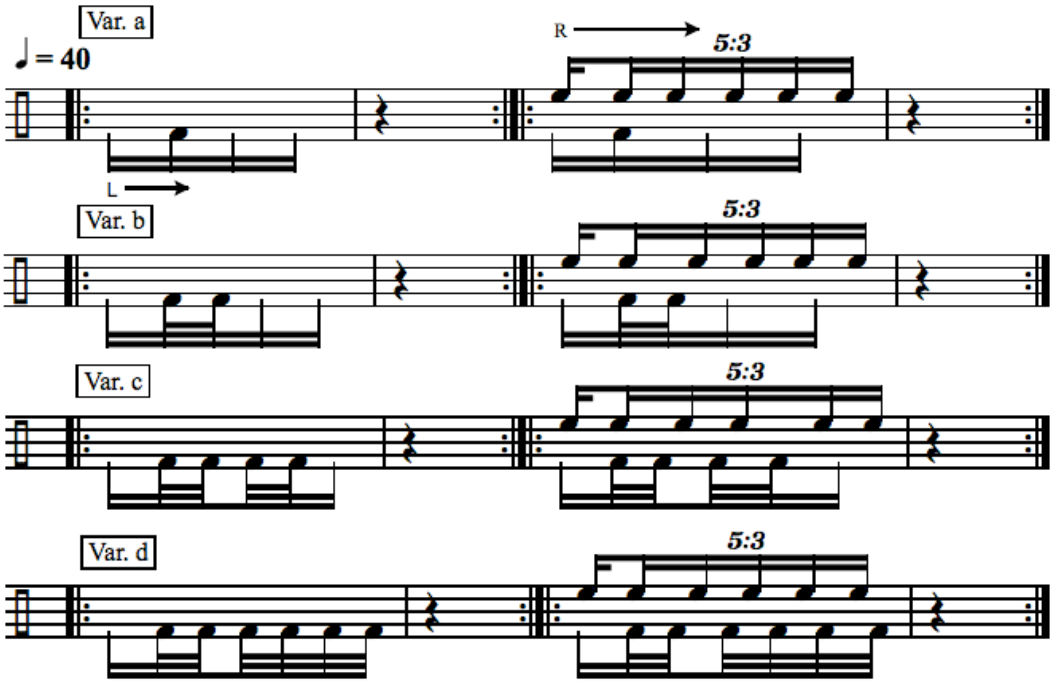


Exercise PT8.3 is designed to continue work on the 5 : 3 polyrhythm while incorporating the appropriate sixteenth-note rests into the pattern. Performers should use the muscle memory gained from practicing the previous exercise variations to assist in executing the correct rhythm of the following exercise variations.

Exercise PT8.3 (Check var.): 5 : 3



Exercise PT8.3 (var. a-d): 5 : 3



Performance Questions

The following performance questions were written to aid performers in preparing *Rebonds* for performance. Answers to these performance questions are purposely omitted from this document because the performance questions are intended to stimulate creative thought from performers of *Rebonds* rather than dictate each aspect of performance.

Question 1: As Xenakis calls for two slightly different instrumentations for *Rebonds A* and *Rebonds B*, are two different instrumental set-ups necessary and practical?

Question 2: What are the advantages of using two sets of five woodblocks in a stacking (one on top of the other) fashion?

Question 3: Should single-headed toms or double-headed tom-toms be used?

Question 4: Should plastic heads or Fiberskyn heads be used?

Question 5: How should the drums be tuned?

Question 6: What type of implements should be used?

Question 7: What are the benefits of memorizing the music?

Question 8: If memorization of the music isn't possible, how can the music stands be arranged for performance?

CHAPTER IV

SUMMARY, CONCLUSION, AND RECOMMENDATIONS FOR FURTHER RESEARCH

Summary

During the first half of the twentieth century, music for multiple-percussion existed among small instrumental ensembles. This repertoire required advanced techniques from percussionists establishing the groundwork for further innovation and development of solo percussion music. Early works for percussion ensemble were historically significant to solo percussion music. The contributions of John Cage and his contemporaries dramatically expanded interest in composing music for percussion. Since the mid-1950s, the amount of repertoire written for solo percussion increased substantially. Since the mid-1970s, interest in studying and performing solo percussion music grew significantly. However, contrary to the increased interest and growth in solo percussion, few scholarly documents exist that specifically discuss solo percussion pedagogy. As a result, this document provides a pedagogical study and performance analysis of *Rebonds*, one of the most difficult works in solo percussion music.

Conclusion

Educators and performers of contemporary solo percussion literature are advised to use this document as a reference work to prepare *Rebonds* for performance. The practice guide was created as an educational tool for performers of *Rebonds.* This practice guide represents the primary focus and product of the research effort in this document and reflects my own experiences in preparing *Rebonds* for performance. The practice guide includes directions and exercises to address each identified technical challenge in *Rebonds*. These exercises were written to develop and improve advanced techniques necessary in performing *Rebonds*. In addition to being a reference, this document also serves to stimulate further interest in solo percussion music in particular and percussion arts in general.

My experiences performing *Rebonds* on numerous occasions have led me to the following conclusions. I use the same instrumental set-up for both movements. I have performed *Rebonds* with one and two sets of woodblocks. Consequently, I use two sets of woodblocks to assist with the woodblock tremolo passages and woodblock grace-note figures. I use double-headed tom-toms as they provide more depth to the sound. I prefer Fiberskyn top heads because they produce more warmth and resonance. I tune the drums to create the widest range possible between the high bongo and bass drum. Regarding implements, I prefer wooden timpani mallets. Through my experience both performing and watching

Rebonds, the work is more engaging when performed from memory. Although, if music memorization is not possible, strategic music stand placement is crucial.

Recommendations for Further Research

Rebonds is an intricate composition for solo percussion. Therefore, additional research and analysis should be performed. This document provides a practice guide that includes directions and exercises to address several technical challenges inherent to the composition. For future study, exercises could be written to develop and improve advanced techniques associated with woodblock passages in *Rebonds B*.

The literary search performed for this document revealed that interest in studying and performing solo percussion music has grown significantly during the last decade. Due to the limited number of scholarly writings on pedagogy for solo percussion music, a detailed pedagogical study and performance analysis could be performed on other compositions for solo percussion.

A comparison between *Rebonds* and *Psappha*, Xenakis's other work for solo for percussion, could be studied. Performers of solo percussion music would benefit in understanding similarities and differences between these two important compositions for solo percussion. Furthermore, Xenakis wrote several other works for percussion. A detailed pedagogical study and performance analysis of these other percussion works would also provide compelling research topics.

As Xenakis's compositional processes were informed by mathematics and his knowledge and experience with engineering and architecture, a theoretical analysis would provide useful information to educators and performers of solo percussion.

A survey could be conducted to determine which compositions for solo percussion are most commonly studied and performed. Documenting this type of information could positively influence percussion curriculums across the United States and further stimulate interest in solo percussion music.

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Leoson, Mark. *Percussion*. Caprice Records recording CAP 21466. Stockholm, Sweden: Caprice Records, 1996.

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APPENDIX ONE

REBONDS B: ERRATA

Several errors were found in the written notation of the latest 1991 score edition. The following table lists each error found during a comparative review of the 1988 manuscript and the 1991 edition. The correct notation in the 1988 manuscript is juxtaposed with the incorrect notation in the 1991 score edition. Each error is accompanied by a brief description (see Table 3.0).

Measure Number	Beat & Partial	1988 Manuscript	1991 Edition	Description of error
16	2 e	tom 2	tom 3	Wrong drum notated
18	3			Inclusion of note on center line instead of rest
49	1 +	"et"	omitted	Missing information
59	4 e		omitted	Missing grace note
63	4			Inclusion of note on center line instead of rest

Table 3.0 – *Rebonds B*: Errata

APPENDIX TWO

REBONDS B: HIGH BONGO GRACE-NOTE FIGURES TABLE

The following *High Bongo Grace-note Figures Table* organizes high bongo grace-note figures according to their location in the music (measure number and beat placement within a measure) of *Rebonds B*. The table lists recommended sticking methods for specific occurrences of the *divided drum* and *simultaneous drum* high bongo grace-note figures. In addition, corresponding page numbers are included for each suggested exercise.

Table 3.1 ***REBONDS B*: HIGH BONGO GRACE-NOTE FIGURES TABLE (p. 1 of 5)**

Location in the music		Sticking Methods							
		Divided drum				Simultaneous drum			
		Right-hand		Left-hand		Consecutive right		Alternate-hand	
Measure Number	Beat	Exercise	Page #	Exercise	Page #	Exercise	Page #	Exercise	Page #
1	1					CRD5a	88	AD5a	95
1	3					CRD3a	86	AD3a	93
2	1	RD2a	39	LD2a	62				
2	3	RD4a	41	LD4a	64				
		RD6c	43	LD6c	66				
3	1	RD6a	43	LD6a	66				
3	3	RD6a	43	LD6a	66				
		RD5b	42	LD5b	65				
4	1					CRD6a	89	AD6a	96
4	3					CRD5a	88	AD5a	95
5	1					CRD4a	87	AD4a	94
5	3					CRD6a	89	AD6a	96
6	1	RD6c	43	LD6c	66				
6	2					CRD4d	87	AD4d	94
6	4					CRD6d	89	AD6d	96
7	2					CRD5d	88	AD5d	95
7	4					CRD4d	87	AD4d	94
9	3					CRD6b	89	AD6b	96
10	1	RD7b	44	LD7b	67				
10	3	RD2b	39	LD2b	62				
11	1					CRD3a	86	AD3a	93
11	3	RD6c	43	LD6c	66				
12	1	RD6b	43	LD6b	66				
		RD5c	42	LD5c	65				
12	2	RD2d	39	LD2d	62				
12	4	RD11a	48	LD11a	71				
		RD12c	49	LD12c	72				
13	2	RD2c	39	LD2c	62				
13	4	RD16c	53	LD16c	76				
14	2	RD14b	51	LD14b	74				
		RD11c	48	LD11c	71				
14	4	RD14a	51	LD14a	74				
		RD13b	50	LD13b	73				
15	2	RD16b	53	LD16b	76				
15	4	RD18a	55	LD18a	78				
		RD15c	52	LD15c	75				
16	2	RD17b	54	LD17b	77				

Table 3.2 ***REBONDS B*: HIGH BONGO GRACE-NOTE FIGURES TABLE (p. 2 of 5)**

Location in the music		Sticking Methods							
		Divided drum				Simultaneous drum			
		Right-hand		Left-hand		Consecutive right		Alternate-hand	
Measure Number	Beat	Exercise	Page #	Exercise	Page #	Exercise	Page #	Exercise	Page #
18	3	RD4a	41	LD4a	67				
19	1	RD6a	43	LD6a	69				
19	2					CRD4d	87	AD4d	94
20	1					CRD3a	86	AD3a	93
20	3					CRD5b	88	AD5b	95
21	1	RD16a	53	LD16a	76				
		RD18c	55	LD18c	78				
21	3	RD15b	52	LD15b	75				
22	1	RD17a	54	LD17a	77				
		RD18b	55	LD18b	78				
22	4	RD10a	47	LD10a	70				
		RD7c	44	LD7c	67				
23	2	RD18a	55	LD18a	78				
		RD17b	54	LD17b	77				
		RD18c	55	LD18c	78				
24	1	RD6a	43	LD6a	66				
24	3	RD6a	43	LD6a	66				
		RD5b	42	LD5b	65				
25	1	RD4a	41	LD4a	64				
25	3	RD3b	40	LD3b	63				
26	1	RD9a	46	LD9a	69				
		RD10b	57	LD10b	70				
26	4	RD6a	43	LD6a	66				
27	2	RD6a	43	LD6a	66				
		RD5b	42	LD5b	65				
27	4	RD3a	40	LD3a	63				
28	2	RD2a	39	LD2a	62				
28	3	RD10b	47	LD10b	70				
28	4	RD11a	48	LD11a	71				
		RD13c	50	LD13c	73				
29	1	RD18b	55	LD18b	78				
		RD17c	54	LD17c	77				
29	3	RD10a	47	LD10a	70				
		RD7b	44	LD7b	67				
29	4	RD12b	49	LD12b	72				
		RD14c	51	LD14c	74				
30	2	RD6b	43	LD6b	66				

Table 3.3 ***REBONDS B*: HIGH BONGO GRACE-NOTE FIGURES TABLE (p. 3 of 5)**

Location in the music		Sticking Methods							
		Divided drum				Simultaneous drum			
		Right-hand		Left-hand		Consecutive right		Alternate-hand	
Measure Number	Beat	Exercise	Page #	Exercise	Page #	Exercise	Page #	Exercise	Page #
30	4	RD6a	43	LD6a	66				
		RD5b	42	LD5b	65				
35	2					CRD5c	88	AD5c	95
35	4	RD14a	51	LD14a	74				
36	2					CRD3c	86	AD3c	93
36	4	RD7c	44	LD7c	67				
37	2	RD13a	50	LD13a	73				
		RD11b	48	LD11b	71				
37	4	RD11c*	48	LD11c*	71				
38	2	RD12a	49	LD12a	72				
		RD14b	51	LD14b	74				
		RD12c	49	LD12c	72				
38	4	RD11a	48	LD11a	71				
39	2	RD2a	39	LD2a	62				
39	3	RD15b	52	LD15b	75				
		RD18c	55	LD18c	78				
40	1	RD13b	50	LD13b	73				
		RD14c	51	LD14c	74				
40	3	RD7b	44	LD7b	67				
		RD8c	45	LD8c	68				
41	1	RD3b	40	LD3b	63				
41	2	RD11c	48	LD11c	71				
41	3					CRD4b	87	AD4b	94
41	4	RD7c	44	LD7c	67				
42	1	RD3b	40	LD3b	63				
42	2	RD10b	47	LD10b	70				
		RD9c	46	LD9c	69				
42	3	RD8a	45	LD8a	68				
		RD7c	44	LD7c	67				
42	4	RD3b	40	LD3b	63				
43	1	RD2a	39	LD2a	62				
		RD2d	39	LD2d	62				
43	2	RD14a	51	LD14a	74				
		RD13b	50	LD13b	73				
		RD11c	48	LD11c	71				
43	3	RD10a	47	LD10a	70				
		RD2d	39	LD2d	62				

Table 3.4 ***REBONDS B*: HIGH BONGO GRACE-NOTE FIGURES TABLE (p. 4 of 5)**

Location in the music		Sticking Methods							
		Divided drum				Simultaneous drum			
		Right-hand		Left-hand		Consecutive right		Alternate-hand	
Measure Number	Beat	Exercise	Page #	Exercise	Page #	Exercise	Page #	Exercise	Page #
43	4	RD7a	44	LD7a	67				
48	2	RD14a	51	LD14a	74				
		RD13c	50	LD13c	73				
48	3	RD16b	53	LD16b	76				
		RD18c	55	LD18c	78				
49	1	RD3a	40	LD3a	63				
49	2	RD6a	43	LD6a	66				
		RD5b	42	LD5b	65				
49	3	RD10b*	47	LD10b*	70				
49	4					CRD4c	87	AD4c	94
50	1	RD15b	52	LD15b	75				
50	2	RD18a	55	LD18a	78				
		RD17b	54	LD17b	77				
50	4	RD5a	42	LD5a	65				
		RD4c	41	LD4c	64				
51	1	RD7a	44	LD7a	67				
		RD9b	46	LD9b	69				
		RD10c	47	LD10c	70				
51	2	RD14c	51	LD14c	74				
51	3	RD11b	48	LD11b	71				
		RD13c	50	LD13c	73				
51	4	RD12a	49	LD12a	72				
		RD11b	48	LD11b	71				
		RD13c	50	LD13c	73				
52	1	RD12b	49	LD12b	72				
		RD14c	51	LD14c	74				
52	2	RD15b	52	LD15b	75				
		RD18c	55	LD18c	78				
52	3	RD17b	54	LD17b	77				
		RD15c	52	LD15c	75				
53	1	RD6a	43	LD6a	66				
		RD4b	41	LD4b	64				
		RD3c	40	LD3c	63				
53	2	RD5a	42	LD5a	65				
		RD6b	43	LD6b	66				
		RD17b	54	LD17b	77				
		RD18c	55	LD18c	78				

Table 3.5 ***REBONDS B*: HIGH BONGO GRACE-NOTE FIGURES TABLE (p. 5 of 5)**

Location in the music		Sticking Methods							
		Divided drum				Simultaneous drum			
		Right-hand		Left-hand		Consecutive right		Alternate-hand	
Measure Number	Beat	Exercise	Page #	Exercise	Page #	Exercise	Page #	Exercise	Page #
53	3	RD15a	52	LD15a	75				
		RD17b	54	LD17b	77				
53	4	RD2c	39	LD2c	62				
58	1	RD1d	37	LD1d	60				
58	4	RD1b	37	LD1b	60				
59	1	RD1b	37	LD1b	60				
59	2	RD1a	37	LD1a	60				
		RD1d	37	LD1d	60				
59	4	RD7a*	44	LD7a*	67				
		RD9b	46	LD9b	69				
60	1	RD8b	45	LD8b	68				
60	2	RD6a	43	LD6a	66				
		RD4b	41	LD4b	64				
		RD3c	40	LD3c	63				
60	4	RD5a	42	LD5a	65				
		RD17b	54	LD17b	77				
61	1	RD16a	53	LD16a	76				
		RD18c	55	LD18c	78				
61	3	RD1a	37	LD1a	60				
		RD1d	37	LD1d	60				
62	1	RD1a	37	LD1a	60				
62	2	RD1a	37	LD1a	60				
		RD1d	37	LD1d	60				
62	3	RD1d	37	LD1d	60				
62	4	RD1c	37	LD1c	60				
63	1	RD1d	37	LD1d	60				
63	3	RD1a	37	LD1a	60				
		RD1d	37	LD1d	60				
64	1	RD2a	39	LD2a	62				
		RD2d	39	LD2d	62				
64	3	RD2a	39	LD2a	62				
		RD2c	39	LD2c	62				
64	4	RD2a	39	LD2a	62				
		RD2d	39	LD2d	62				
65	1	RD2b	39	LD2b	62				
65	2	RD1a	37	LD1a	60				

* - Denotes slight variation from exercise to musical passage

APPENDIX THREE

REBONDS A: POLYRHYTHM TABLE

The following *Polyrhythm Types Table* organizes polyrhythms according to their location in the music (measure number, beat placement, and sixteenth-note partial within a measure) of *Rebonds A*. The table lists each polyrhythm type and polyrhythm ratio followed by recommended exercises. In addition, corresponding page numbers are included for each suggested polyrhythm type exercise.

Table 3.6 ***REBONDS A*: POLYRHYTHM TYPES TABLE (p. 1 of 3)**

Measure Number	Beat	Partial	Polyrhythm Type	Polyrhythm Ratio	Exercise	Page #
6	3	2nd & 3rd	1	2 : 3	PT1	104
7	1 & 2	4th & 1st	1	2 : 3	PT1	104
8	4	1st & 2nd	2	3 : 2	PT2	105
9	2	3rd & 4th	1	2 : 3	PT1	104
10	2	3rd & 4th	2	3 : 2	PT2	105
11	2	2nd & 3rd	1	2 : 3	PT1	104
12	1	1st & 2nd	1	2 : 3	PT1	104
12	2	2nd & 3rd	2	3 : 2	PT2	105
13	2	1st & 2nd	2	3 : 2	PT2	105
13	3 & 4	4th & 1st	2	3 : 2	PT2	105
14	1	3rd & 4th	1	2 : 3	PT1	104
14	3	3rd & 4th	2	3 : 2	PT2	105
14	4	3rd & 4th	1	2 : 3	PT1	104
15	1 & 2	4th & 1st	2	3 : 2	PT2	105
15	3	3rd & 4th	5	3 : 4	PT5	113
17	3	4th	4	3 : 2	PT4	109
17	4	1st	4	3 : 2	PT4	109
19	2	3rd & 4th	2	3 : 2	PT2	105
21	1	2nd, 3rd & 4th	8.1	5 : 3	PT8	120
23	1	2nd	3	2 : 3	PT3	106
23	1	3rd	4	3 : 2	PT4	109
24	2	1st	6	3 : 4	PT6	114
25	2	2nd	6	3 : 4	PT6	114
25	4	1st	7	4 : 3	PT7	117
26	2	2nd	6	3 : 4	PT6	114
26	3	4th	7	4 : 3	PT7	117

Table 3.7	***REBONDS A*: POLYRHYTHM TYPES TABLE (p. 2 of 3)**					
Measure Number	**Beat**	**Partial**	**Polyrhythm Type**	**Polyrhythm Ratio**	**Exercise**	**Page #**
28	2 & 3	4th, 1st & 2nd	8.2	5 : 3	PT8	120
32	1	4th	7	4 : 3	PT7	117
33	2	3rd	6	3 : 4	PT6	114
33	4	2nd	6	3 : 4	PT6	114
34	3	2nd	7	4 : 3	PT7	117
35	2	1st	7	4 : 3	PT7	117
36	1	3rd	6	3 : 4	PT6	114
36	4	2nd	6	3 : 4	PT6	114
38	1	2nd	6	3 : 4	PT6	114
38	3	1st	7	4 : 3	PT7	117
39	1	2nd	7	4 : 3	PT7	117
40	2	3rd	6	3 : 4	PT6	114
41	2	4th	6	3 : 4	PT6	114
41	4	4th	6	3 : 4	PT6	114
42	2	3rd	6	3 : 4	PT6	114
42	4	2nd	6	3 : 4	PT6	114
43	2	3rd	6	3 : 4	PT6	114
45	1	1st	6	3 : 4	PT6	114
46	1	3rd	6	3 : 4	PT6	114
48	2	4th	7	4 : 3	PT7	117
48	3	4th	3	2 : 3	PT3	106
48	4	3rd	7	4 : 3	PT7	117
49	1	3rd	6	3 : 4	PT6	114
49	2	1st	7	4 : 3	PT7	117
49	2	3rd	7	4 : 3	PT7	117
49	3	1st	6	3 : 4	PT6	114

Table 3.8	***REBONDS A*: POLYRHYTHM TYPES TABLE (p. 3 of 3)**					
Measure Number	**Beat**	**Partial**	**Polyrhythm Type**	**Polyrhythm Ratio**	**Exercise**	**Page #**
49	3	4th	3	2 : 3	PT3	106
49	4	2nd	7	4 : 3	PT7	117
49	4	3rd	7	4 : 3	PT7	117
50	1	2nd	7	4 : 3	PT7	117
50	1	4th	4	3 : 2	PT4	109
50	2	4th	6	3 : 4	PT6	114
50	3	1st	3	2 : 3	PT3	106
50	4	3rd	3	2 : 3	PT3	106
51	1	1st	4	3 : 2	PT4	109
51	1	3rd	3	2 : 3	PT3	106
52	4	3rd	6	3 : 4	PT6	114
53	1	2nd	7	4 : 3	PT7	117
53	1	3rd	6	3 : 4	PT6	114
53	3	3rd	6	3 : 4	PT6	114
53	4	3rd	4	3 : 2	PT4	109

APPENDIX FOUR

LIST OF EXERCISES

Rebonds B : High bongo grace-note figures: Identification and Approach
Right-hand drag sticking method (RD)

RD1 37
RD1.5 37
RD2 39
RD3 40
RD4 41
RD5 42
RD6 43
RD7 44
RD8 45
RD9 46
RD10 47
RD11 48
RD12 49
RD13 50
RD14 51
RD15 52
RD16 53
RD17 54
RD18 55
RD19 56
RD20 57
RD21 58
RD22 59

Rebonds B : High bongo grace-note figures: Identification and Approach
Left-hand drag sticking method (LD)

LD1 60
LD1.5 60
LD2 62
LD3 63
LD4 64
LD5 65
LD6 66

LD7 67
LD8 68
LD9 69
LD10 70
LD11 71
LD12 72
LD13 73
LD14 74
LD15 75
LD16 76
LD17 77
LD18 78
LD19 79
LD20 80
LD21 81
LD22 82

Rebonds B : High bongo grace-note figures: Identification and Approach
Consecutive right-hand drag sticking method (CRD)

CRD1 83
CRD1.5 83
CRD2 85
CRD3 86
CRD4 87
CRD5 88
CRD6 89

Rebonds B : High bongo grace-note figures: Identification and Approach
Alternate-hand drag sticking method (AD)

AD1 90
AD1.5 90
AD2 92
AD3 93
AD4 94
AD5 95
AD6 96

Rebonds A : Subdivisions of the beat (S)

S1 97
S2 98

Rebonds A : Polyrhythm types (PT): Identification and Approach

PT1 104
PT2 105
PT3 106
PT4 109
PT5 112
PT6 114
PT7 117
PT8 120
PT8.1 122
PT8.2 123
PT8.3 125