STRENGTH TRAINING MANUAL
The Agile Periodization Approach
Volume One & Two: Theory

MLADEN JOVANOVIĆ

Strength Training Manual

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Volume One and Two: Theory

Mladen Jovanović

Belgrade, Serbia
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For information: www.complementarytraining.net

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To my son Nikša

List of abbreviations used in the text

Abbreviation	Meaning
1/N	Naive diversification heuristic involving equal distribution across options
1RM	One Repetition Maximum, or the maximal weight that can be lifted once with defined technique
3F	3F Model: Fitness, Fatigue and Facilitation
A+A	Alactic Aerobic
AGT	Anti-Glycolytic Training
aI	Average Intensity
AMRAP	As Many Reps As Possible. Could be in a set to failure, or predetermined time
ANCOVA	Analysis of covariance
ANOVA	Analysis of variance
APRE	Autoregulated Progressive Resistance Exercise
aRI	Average Relative Intensity
BB	Barbell
BP	Bench Press
BS	Back Squat
BW	Bodyweight
CE	Contractal Element
CE	Competitive Exercise
CG	Central Governor
CK	Creatine Kinase
CLA	Constraints-Led Approach
CM	Competition Maximum
CNS	Central Nervous System
COM	Center of Mass
CSA	Cross Sectional Area
CV	Coefficient of Variation
CXL	Central Exertion Load
DAGs	Directed Acyclical Graphs
DAPRE	Daily Autoregulated Progressive Resistance Exercise
DB	Dumbbell
DE	Dynamic Effort

Abbreviation	Meaning
DED	Diminishing Effect Dose
DGP	Data Generating Process
DL	Deadlift
DUP	Daily Undulating Progression/Periodization
DUPe	Daily Undulating Periodization
DUPr	Daily Undulating Progression
ECC	Eccentric
EDM	Every Day Maximum
EDT	Escalatory Density Training
EMG	Electromyography
EMOM	Every Minute On the Minute
est1RM	Estimated 1RM
FP	Fatigue Percentage
GPE	General Preparatory Exercise
GUT	Grand Unified Theory
GVT	German Volume Training
HR	Heart Rate
HRmax	Maximal Heart Rate
HRV	Heart Rate Variability
ICE	Individual Conditional Expectation
IMTP	Isometric Mid-Thigh Pull
INOL	Intensity Of Lift
ISO	Isometric
IYI	Intellectual Yet Idiot
KB	Kettlebell
KNN	K-Nearest Neighbors
LB	Lower Body
LPT	Linear Position Transducer
LV	Load-Velocity
MAS	Maximum Aerobic Speed
MCAR	Missing Completely At Random
ME	Maximum Effort
MED	Minimum Effective Dose

Abbreviation	Meaning
MF	Momentary Failure
MNAR	Missing Not At Random
MP	Military Press
MRD	Minimum Retention Dose
MSE	Mean Square Error
MTD	Maximum Tolerated/Tolerable Dose
MV	Mean Velocity
MVC	Maximum Voluntary Contraction
MVP	Minimum Viable Program/Performance
MVPe	Minimum Viable Performance
MVPr	Minimum Viable Program
NL	Number of Lifts
nRM	Maximal weight that can be lifted for N reps with defined technique
OKR	Objectives and Key Results
PAP	Post Activation Potentiation
PB	Personal Best
PDCA	Plan-Do-Check-Adjust
PDP	Partial Dependence Plots
Perc Drop	Percentage Drop - progression model
PP	Peak Power
PR	Personal Record
pred1RM	Predicted 1RM
prox1RM	Proximity of 1RM
PV	Peak Velocity
pVO2max	Power associated with VO2max
PXL	Peripheral Exertion Load
rCXL	Relative Central Exertion Load
RDL	Romanian Deadlift
RE	Repetition Effort
RI	Relative Intensity
RIR	Reps In Reserve
RIR Inc	RIR Increment - progression model
RMSE	Root Mean Square Error

Abbreviation	Meaning
RPE	Rate of Perceived Effort/Exertion/Exhaustion
rPXL	Relative Peripheral Exertion Load
S&C	Strength and Conditioning
SD	Standard Deviation
SDE	Specific Development Exercise
SE	Serial Element
SJ	Squat Jump
SJW	Social Justice Warrior
SL	Single Leg
SPE	Special Preparatory Exercise
TB	Total Body
TCQ	Time Complexity Quadrants
T&F	Track and Field (athletics)
TM	Training Maximum
TOV	Take Off Velocity
TT	Time Trial
UB	Upper Body
VBT	Velocity Based Training
VO2max	Maximum Oxygen Consuption
vVO2max	Velocity associated with VO2max
WOD	Workout Of the Day
XL	Exertion Load

Table of Contents

1 Introduction

As a strength and conditioning coach, I have always collected and referenced numerous tables, heuristics and guidelines (such as various rep max tables, the Prilepin table, exercise max ratios, to name a few) that helped me create strength training programs. Unfortunately, these were usually spread all over the place: various books and papers, countless Excel sheets and PowerPoint presentations. Every time I wanted to quickly find something to reference and possibly compare, it was a major pain in the arse to find it. Therefore, I have decided to put them all together in one place, where I can easily find and use them, possibly have it at arm's reach in the gym.

Thus, I have decided to create this manual. But as soon I started writing it, I noticed it will become bigger than I expected[1]. I also started learning as I wrote, and I went to *explore* some "side-roads" without knowing where it will take me. I discovered as I wrote, and I also learnt new things and new perspectives. This made me realize that writing is not a simple dump of information on the paper, but an act of exploration and discovery. Maybe that's the reason I like writing. I also decided to publish this manual in three volumes.

E-book version of the Strength Training Manual comes in three volumes: Volume One, Volume Two, and Volume Three. Paperback edition of the Strength Training Manual (the one that you are currently reading) comes in two volumes: Volume One & Two, and Volume Three. This is done to avoid confusion and discrepancies between paperback and E-book versions of the manual

Volume One and Two of this manual is in-depth look into strength training planning and general training theory, as well as introduction to the Agile Periodization framework. I believe that I haven't left any stone unturned in the Volume One and Two. But to do that I had to go *full circle*: I had to go deep into nitty gritty details, show issues, assumption, flawed reasoning, and finally present simple solutions or even different paradigms.

1 That's what she said! No seriously, I had to break the ice with a shitty joke

Volume Three is straighter to the point and represents a collection of all the useful tables and heuristics from Volume One and Two that you can use as a starting point when designing your strength training programs. Volume Three is my original writing intention, but as I already said, when I started writing I realized that some things needed more thorough description and explanation (and besides, I went off-the-track to explore some concepts that emerged during the writing process), rather than do-this-and-not-this perspective. In short, Volume One and Two are more theory inclined, while Volume Three is more practically inclined.

Before diving into the material, it is important to quickly go through some of the rationale and warnings. It is a bit philosophical, but, please, bear with me for the next few pages.

1.1 Precision versus Significance

"*As complexity rises, precise statements lose meaning and meaningful statements lose precision*" - Lofti Zadeh

All of the material in this manual is WRONG. It is not precise. It will vary, sometimes a lot, between exercises, individuals, and genders (all 457 of them). This should be expected, since day-to-day motivation and readiness to train, improvement rates, testing errors, among others, are not constant and predictable, but rather represent sources of uncertainty, often experienced when working with athletes or dealing with any kind of performance enhancement. It is, therefore, up to you to update it with the information you possess and acquire through the training iterations. Figure 1.1 perfectly depicts the difference between the precision and the significance, as well as the aim of this manual.

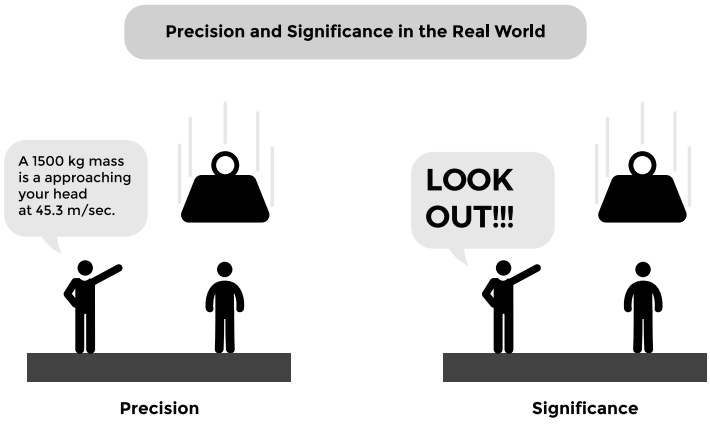


Figure 1.1 Difference between precision and significance.
Image modified based on the image in ''Fuzzy Logic Toolbox™'' User's Guide (MathWorks, 2019)

1.2 Generalizations, Priors, and Bayesian updating

Not sure if there is anything else that pisses me off more than hearing someone say: "You cannot generalize!". Yeah, right, I will approach every phenomenon in the Universe as unique and genuine. I am not sure we have the brain power for that - that's why we try to reduce the amount of information by generalizing. There is no science without generalization. That's why we have generalizations, laws, archetypes, stereotypes.

Nevertheless, smart people are not slaves to generalizations - they start with generalizations, but quickly *update* them with new information to improve their insights. For example, one can say that females are generally weaker than males (yeah, sexist generalization), which means two things: (1) average female is weaker than the average male, and (2) randomly selected female will very likely be weaker than randomly selected male in the population. Of course, we also need to take into account *how much* weaker, but without making this a statistic treatise about magnitudes of effects, one cannot claim that *all* females are weaker than *all* males.

Here is an example. Let's say I start working with a new female client that I have no information about. My best guess (i.e. *prior* belief), without seeing her, would be that she is weaker than the average male. This generalization will affect how I will approach her planning. But as soon as she started lifting, I noticed she is strong as hell and has world-class powerlifting potential. I would be stupid not to update my prior belief about her, since she is stronger than 95% of males. This doesn't negate the need for generalizations or that there are no *general patterns* that are true. But it does imply that we shouldn't stick to generalizations when the strong evidence hit us in the head.

This means that we need to update our prior beliefs (e.g. generalizations or heuristics) with our own observations in the process called *Bayesian updating (*Figure 1.2*)*, in order to gain insights which will improve our decision making.

This manual is full of generalizations. Therefore, you need to look at them as a starting point, which you should update with your own observations, experience, experimentations, and intuition. Just don't be a dumbfuck and blindly believe and adopt everything that has been written. Again, use it as a starting point (*prior*).

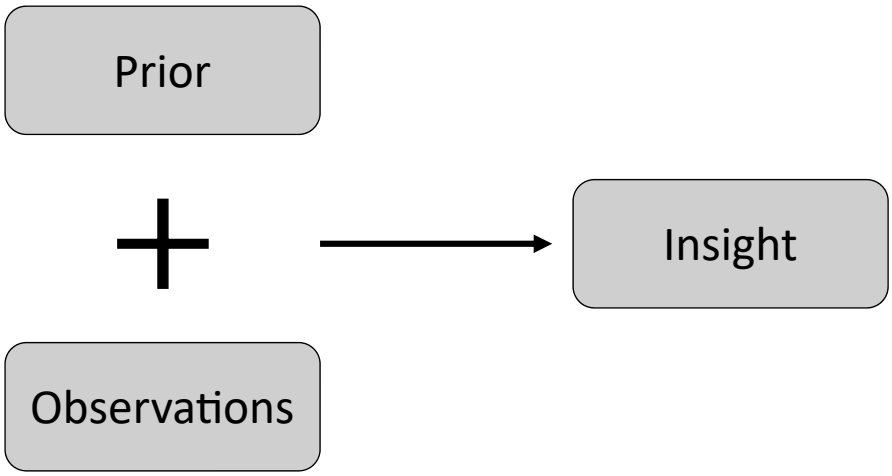


Figure 1.2 Bayesian updating, simplified

1.3 Large and Small Worlds

The real world is very complex and uncertain. To help ourselves understand and act, we create maps and models. These are simplifications of reality, or representations of the real world. In the outstanding statistics book "Statistical Rethinking" (McElreath, 2015), author uses an analogy, originally coined by Leonard Savage (Savage, 1972; Binmore, 2011; Volz & Gigerenzer, 2012; Gigerenzer, Hertwig & Pachur, 2015a), that differentiates between the *Large World* and the *Small Worlds*:

> "T*he small world is the self-contained, logical world of the model. Within the small world, all possibilities are nominated. There are no pure surprises, like the existence of a huge continent between Europe and Asia. Within the small world of the model, it is important to be able to verify the model's logic, making sure that it performs as expected under favorable assumptions. Bayesian models have some advantages in this regard, as they have reasonable claims to optimality: No alternative model could make better use of the information in the data and support better decisions, assuming the small world is an accurate description of the real world.*
>
> *The large world is the broader context in which one deploys a model. In the large world, there may be events that were not imagined in the small world. Moreover, the model is always an incomplete representation of the large world and so will make mistakes, even if all kinds of events have been properly nomi-*

nated. The logical consistency of a model in the small world is no guarantee that it will be optimal in the large world. But it is certainly a warm comfort." [2]

Everything written in this manual represents Small Worlds - self-contained models of assumptions about how things work or should work. Although they are all wrong, some of them are useful[3] (to quote George Box), especially as a starting point in your orientation, experimentation, and deployment to the Large World. It is important to remember the distinction between these two. I embrace the *integrative pluralism* (Mitchell, 2002, 2012) in a way that there are multiple models (Page, 2018) that we should use to explain, predict and plan intervention in the Large World. But please note that I do not promote *relativism*, but rather pluralism of the models. Not every model is of equal quality, usability and importance – there is hierarchy.

1.4 Different prediction errors and accompanying costs

Since all models are wrong, but some are useful, we need to make sure they don't come with harmful errors and potential costs. We can make different types of errors, and they come at different costs. Let's take a simplistic model of predicting 1RM (one-repetition maximum or maximal weight one can lift with a proper technique):

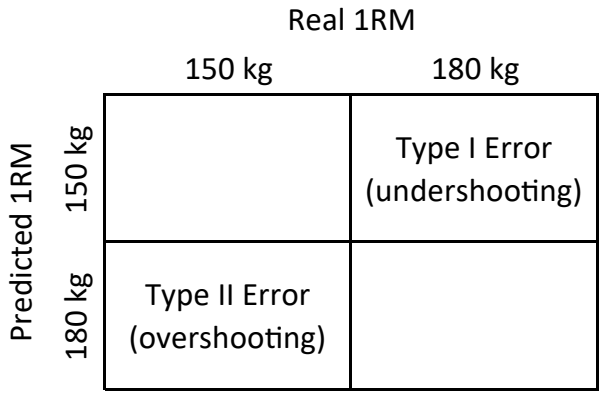


Figure 1.3 Different types of prediction error

Figure 1.3 represents a common scenario for predicting 1RM. The top row contains two TRUE values (150kg and 180kg) and on the side, we have two predictions. Type

2 Excerpt taken from "Statistical Rethinking" (McElreath, 2015), page 19

3 "All models are wrong, but some are useful" is aphorism that is generally attributed to the statistician George Box. Nassim Nicholas Taleb expanded this aphorism to "All models are wrong, many are useful, some are deadly"

I error is undershooting (predicting 150kg when the real value is 180kg), and Type II error is overshooting (predicting 180kg when the real value is 150kg). Does making these two errors come with different costs if the predicted 1RM is implemented into the training program? Hell yes!

It must be noted that undershooting a lot is still safer than overshooting a little. This is because when you undershoot, you can still perform training sessions and easily update, whereas if you overshoot, you will hit the wall quite quickly, and potentially injure someone or create expectation stress and/or heavy soreness. Plus, in my own experience, it is easier to ask for more from an athlete, than less. Furthermore, imagine that your program calls for 3 sets of 5 reps with 100kg, and your athlete feels great and performs 8 reps in the last set instead of the situation where your program calls for 3 sets of 5 reps with 110kg and the athlete struggles to finish it, or might even need to strip the weights down. Performing better than written in the training program is always motivating (first situation), whereas the opposite can be very discouraging (second situation).

The problem is that we cannot get rid of errors - we can balance them out by accepting higher Type I error, while minimizing Type II error, or vice versa. In this manual, I have accepted the fact that when making errors (and I do make them), I want them to be Type I errors, or undershooting errors, since they come up with much less cost that can easily be fixed through a few training iterations. Because of that, you might notice that some percentages in this manual are quite low. Therefore, I suggest you take a similar philosophy when deciding about percentages and every other guideline in this manual: lean on the side of conservatism and safety first.

1.5 Classification, Categorization and Fuzzy borders

As it is the case with generalizations, classifications and categorizations (which I consider synonyms here and use interchangeably) are aimed at reducing the number of dimensions and numbers of particular phenomena at hand (with the aim of easier orientation and action). This possibly means that the items in one bracket or class might differ, while items from different brackets or classes might be similar. Besides, there are multiple approaches for classifying phenomena which might have different depths

or levels of precision (see Figure 1.3). To paraphrase Jordan B. Peterson: "Categories are constructed in relationship to their functional significance", meaning that there are no objective or unbiased approaches to categorization and classification, and they depend on how we aim to use these categorizations. For example, powerlifter might classify strength training means, methods, qualities, and objectives differently than Olympic weightlifter or a soccer player. This is because they experience different phenomena and demand a different *forum for action*.

Categorization is not an exercise in futility, but rather helps us make better decisions (more educated and faster decisions via information reduction and simplification). This simplification has some similarities with *heuristics* (fast and frugal rules of thumb that help to avoid overfitting in a complex and uncertain world). Hence, the categories should have *functional significance*. In other words, you want to *use* those categories somehow. Therefore, one should stop categorizing once there is no functional significance.

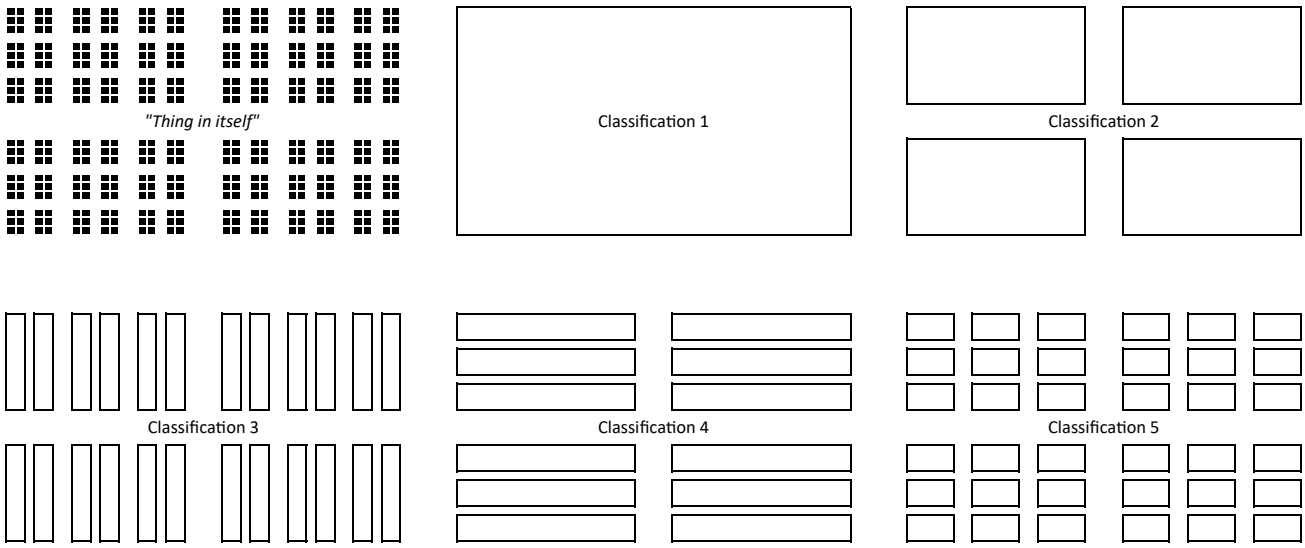


Figure 1.4 There is no bias-free, objective way to classify phenomena. Classification depends on what you plan to use it for

That being said, categories should be in the lowest possible "compression" (lowest resolution) that still conveys information that is pragmatic enough. Since there are numerous ways to categorize certain items (see Kant's *thing in itself*[4]), the way we approach categorization and what we see, depends on what we plan to use it for (see Fig-

4 From Wikipedia ("Thing-in-itself," 2019): "The thing-in-itself (German: *Ding an sich*) is a concept introduced by Immanuel Kant. Things-in-themselves would be objects as they are, independent of observation"

ure 1.4). I might be wrong, but this reminds me of both *phenomenology*[5] (things as they manifest to us) and *pragmatism*[6] (practical application), although they are radically opposed philosophical positions. It is beyond this manual (and my current knowledge) to discuss these topics, but in my opinion, philosophy is very much alive, and it needs to be taken into account, especially with the recent rise of *scientism*[7] in sport science and performance.

1.6 Place of Things vs. Forum for Action

Classification thus serves a dual purpose: *place of things* and *forum for action*. By term *place of things,* I refer to simply classifying phenomena relative to some *objective* criteria (this is usually physiological, anatomical or biomechanical criteria), or using an *analytical* approach. On the other hand, the *forum for action* refers to a classification based on how we intend to use these classes in planning, action, and intervention. In this manual, I am leaning more toward *forum for action* approach in classifying phenomena, mostly as a strength and conditioning coach of team sports athletes, rather than powerlifting or a weightlifting coach. This doesn't mean that powerlifting and weightlifting coaches cannot use this manual (at the end of the day, we have common physiology, anatomy, psychology, and experience shared phenomena in training), but that they might classify things a bit differently because their forum for action differs from the forum for action of the non-strength-sport athletes.

It is also important to mention that class membership is not a TRUE/FALSE state (although it does simplify things a lot), but rather fuzzy (or continuous) membership. For example, is split squat double leg or single leg movement? For simplicity purposes (Small World model), it is easier to assume it belongs only to one class or category, but in real life (Large World) we know it is not that easy to make a strict border between classes (thus, it can be 60% double leg, and 40% single leg, or what have you). One use-

5 From Stanford Encyclopedia of Philosophy (Smith, 2018): "Literally, phenomenology is the study of "phenomena": appearances of things, or things as they appear in our experience, or the ways we experience things, thus the meanings things have in our experience. Phenomenology studies conscious experience as experienced from the subjective or first-person point of view."

6 From Stanford Encyclopedia of Philosophy (Legg & Hookway, 2019)including: that all philosophical concepts should be tested via scientific experimentation, that a claim is true if and only if it is useful (relatedly: if a philosophical theory does not contribute directly tosocial progress then it is not worth much: "Pragmatism is a philosophical tradition that – very broadly – understands knowing the world as inseparable from agency within it."

7 Belief or stance that all things can be reduced to science (Boudry & Pigliucci, 2017)

ful approach, that helps me minimize how much I break my own balls over categorization, is to ask "How do I plan using this classification and for whom?". Also, remember that you do not need to be very precise, but rather meaningful and significant in helping yourself orienting from the forum for action perspective (see Figure 1.1).

1.7 Qualities, Ontology, Phenomenology, Complexity, Causality

Most, if not all, coaching education material regarding planning and periodization comes with highly biased classification using *objective* physiological and biomechanical approaches (*place of things*; analytical approach (Loland, 1992; Jovanović, 2018)). These fields have a monopoly on defining *ontology*[8] ("What exists out there") of qualities and methods: maximal strength, explosive strength, VO2max, anaerobic capacity, you name it. Some individuals tend to wave around with this *scientific method*, as something *objective* and *unbiased*, but they are just value signaling, because they are using a *scientific approach*, and you, the little dungeon dweller, are not. But unfortunately, there is no *objective* or *unbiased* approach, and you, the dungeon dweller, might engage phenomena classification as you experience it (phenomenology) and you should not be embarrassed about your *subjectivity*. Yes, you should understand anatomy, physiology and biomechanics, but they should not hold the monopoly over how you classify the phenomena of importance to yourself. It is necessary, but not sufficient knowledge.

Since these fields define what is real (ontology), it is thus natural to follow up with an approach that assumes these qualities are the building blocks of *periodized* training programs. Beyond this, we assume very simplistic causal models (Small World models of what causes what), where we further assume there is some magic training method, or intensity zone, that drives adaptation of the qualities we need to address. For example, we might claim that reps >90% improve maximal strength and that reps with 65% done fast improve explosiveness. This is bullshit. Even worse than this is the Load Velocity curve with associated qualities and intensity zones.

8 From Wikipedia ("Ontology," 2019): "Ontology is the philosophical study of being. More broadly, it studies concepts that directly relate to being, in particular becoming, existence, reality, as well as the basic categories of being and their relations. Traditionally listed as a part of the major branch of philosophy known as metaphysics, ontology often deals with questions concerning what entities exist or may be said to exist and how such entities may be grouped, related within a hierarchy, and subdivided according to similarities and differences."

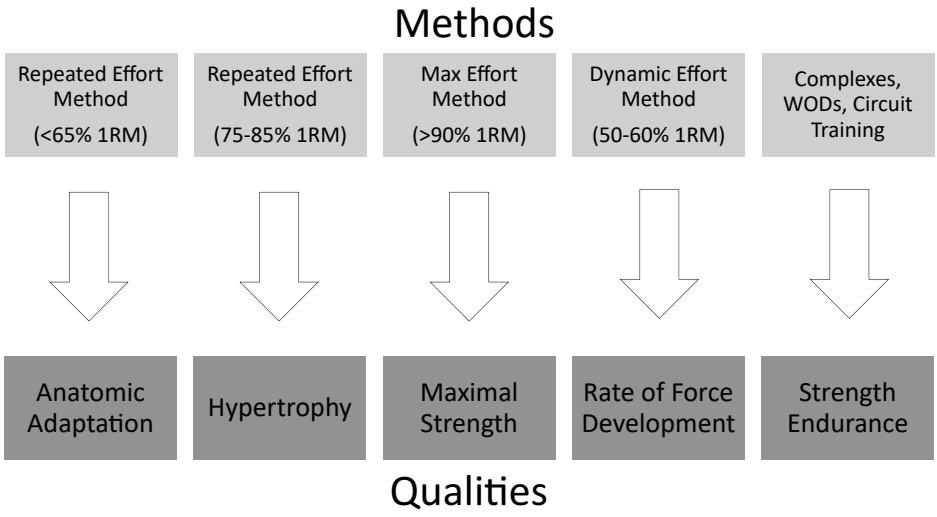


Figure 1.5 An overly simplistic causal model of methods and qualities

Unfortunately, or luckily, things are not that simple. Yes, we can use these as Small World models, representations and heuristics (which they are), rather than the factual state of the world (ontology). First, different individuals will manifest different phenomena and will demand different quality identification as a forum for action. For example, what is holding back a world-class powerlifter in the bench press of 200kg might be a lockout strength or bottom strength (and these are phenomenological qualities). Therefore, one might approach intervention with these qualities in mind. This will not be the case for your average soccer player since his bench press performance is not the ultimate goal, and the qualities manifested (and thus important) to 200kg bench press powerlifter, will not be important to him. For him, bench press in only one component of the training program aimed at qualities we identified as important (i.e. in this case the need to have upper body pushing movement in the training program). He might even ditch the bench press for something else (e.g. dumbbell bench press or loaded push-ups).

Biomechanically speaking, bench press for aforementioned powerlifter and soccer player is identical (place of things), but phenomenologically, they are very much different, especially in defining the qualities from the forum for action perspective and deciding about intervention to improve them. Expecting all the answers from biomechanics and physiology is thus example of *scientism*. It is necessary, but not sufficient knowledge.

Second, assuming that there is an associated training method or intensity zone that magically hits identified quality is a pipe dream. The causal network is very complex and at the end of the day, we do need to realize and accept the fact that we are ex-

perimenting using a case-by-case approach. There are still useful priors we can rely on (e.g. scientific studies, best practices, old school methods) as a starting point in our experimentation and updating process, but at the end of the day, we are all experimenting.

1.8 Philosophical stance(s) and influential persons

Someone more versed in philosophy than myself currently, can probably put me in a certain philosophical group or position. Here is my take on that. My current reasoning, besides being complementarist[9] is that of integrative pluralist (Mitchell, 2002, 2012), pragmatist-realist (Maul, 2013; Guyon, Falissard & Kop, 2017; Guyon, 2018; Guyon et al., 2018) and phenomenologist. I am highly influenced by the works of Robert Pirsig and his Metaphysics of Quality[10] (Pirsig, 1991, 2006), Jordan Peterson (Peterson, 1999; Peterson, Doidge & Van Sciver, 2018), Nassim Taleb (Taleb, 2004, 2010, 2012, 2018), and Gerd Gigerenzer (Gigerenzer, 2015; Gigerenzer, Hertwig & Pachur, 2015a). These philosophical stances and personas are highly influential on my approach to training (and life in general) and that will be quite visible in the chapters to come.

I do think, especially with the recent rise of *scientism* (Boudry & Pigliucci, 2017), particularly in our domain of sport performance and science, that philosophy is needed more than ever. This introductory chapter and the following one the Agile Periodization are very much philosophical and are covering my philosophical stances and positions that will serve a major element in more practical chapter later in this manual.

1.9 What is covered in Volume One and Two?

I take the *percent-based approach* to strength training, since I find it a great *prior* for being implemented concurrently with any other approach (velocity based, RPE based approach, open sets and so forth), and because it can give a *ballpark* of where

9 Complementary Training is the name of my blog (www.complementarytraining.net) that I started in 2010, with the aim of reconciling opposing concepts in training using the complementary approach (Kelso & Engstrøm, 2008).

10 You will probably read the word *Quality* numerous times in this manual

weights should be. When I was working with soccer athletes, I first tried to implement open sets (only prescribing reps) and to *teach them how to fish* by allowing them to progress and select weights themselves by keeping a training log (which was usually forgotten or slipped under treadmill). This failed miserably, since they didn't give many fucks regarding the strength training. They wanted to get it done and play *rondo*. Therefore, I decided to calculate the weights and the number of repetitions they needed to lift. You know - being a Hitler and a master of puppets. However, after that, I realized how all these equations and tables differ for a given individual, exercise, and on a daily basis.

I needed something that is prescriptive enough to avoid *fuckarounditis* and to make sure progressive overload happens over time, but also flexible enough to take into account errors and uncertainties, individual differences, and rates of improvement. That is how this manual was born.

This Volume starts with the Chapter 2 on Agile Periodization (Jovanović, 2018), which provides an outline of the concept, particularly *iterative planning* component, and how it is applied to strength training planning, objectives classification, and goals setting. Chapter 3 discusses strength training movements classification, as well as the ratios between their maximum (which can be quite useful in estimating max for novel exercise, at least until one gain more insights regarding the exercise in question and update this model). Chapter 4 discusses 1RM estimation (particularly *estimation through iteration* idea), rep max tables and how they can be useful. Chapter 5 discusses the concept of training dose. Chapter 6 discusses the planning of the strength training phase and various set and rep schemes. Chapter 7 covers the review and retrospective elements of the Agile Periodization framework.

If you want to read only one chapter, without going through all nitty-gritty details and discussions, I suggest you give a read to Chapter 6, which is the most practical chapter in this Volume.

and I think it can infer more forum for action than analytical physiological/biomechanical place of things approach. Long story short, you are a hero, embracing a journey into the unknown to bring something useful back and enlarge the known circle (which can be considered performance potential). The path of those before you can give you some direction, not exact scripts (see Figure 1.1, priors and Bayesian updating in previous chapter), which brings me to evidence-based practices.

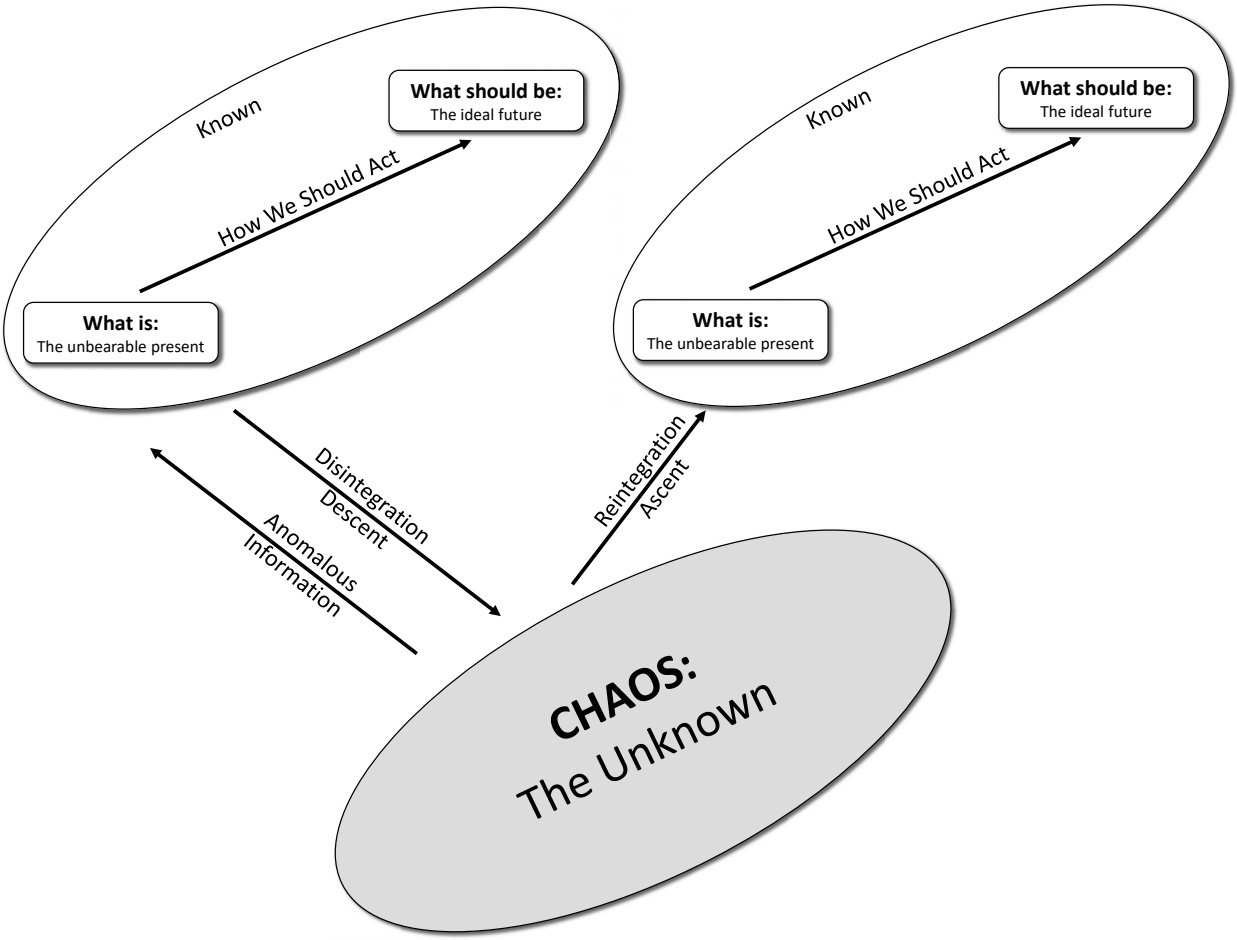


Figure 2.12 Training as Normal Story and Revolutionary Story (Regeneration of Stability from the Domain of Chaos). Modified based on Jordan B. Peterson work (Peterson, 1999)

2.9 Evidence-based mumbo jumbo

Waving evidence-based flag is a virtue signaling for certain lab coats. These *fragilistas* and *intellectuals-yet-idiots* (to use Nassim Taleb's terminology (Taleb, 2004,

2010, 2012, 2018)) prefer citing and referencing studies and meta-studies done on grade motivated student-athletes, while bitching about the *old school* and you, the unscientific practitioner as something terrible and to be avoided at tea parties (read: scientific conferences). While of course not having any *skin in the game* (Taleb, 2018): never been responsible for any particular athlete and his or her performance (except collecting data and publishing evidence-based findings)

Without being a complete dick to all lab coats, I will give them some slack and state that these sources of evidence-based knowledge represent some aspect of *prior* information (from the *known* domain, see Figure 2.12) we can use to start experimenting with. We do not have any better epistemological method than the scientific method, but assuming Small World models to be Large World, is the viewpoint I have issues with. Thus, scientific knowledge has major significance, but it is not end-all-be-all. I have represented this in the Figure 2.13 (see "Scientific literature" on the figure).

Figure 2.13 represents more complex Figure 1.2 on Bayesian updating. I have tried to combine the famous Deming's PDCA (plan-do-check-adjust) ("PDCA," 2019) loop with the iterative aspect of updating prior information with the experiment (intervention). Is/Ought gap represents the embedded and inescapable uncertainty of how interventions will work. This is especially the case in a complex domain, such as human performance and adaptation. Equally as the evidence-based practices (using scientific studies and meta-analysis to inform or shape your intervention), the *data-driven approach* should be treated as only one source of prior information in decision making and should probably change the name to "**data-informed**". These two sources of information are not fail-safe, predictable, certainty strategies - they are necessary to be considered, but far from sufficient in guarantying the desired outcomes. It is the same story with the pre-planned periodization schemes - if those fancy blocks seem to be working, then most, if not all, athletes would reach personal best, or at least seasonal best, at the major competition. Yet, that number is not very optimistic (Loturco & Nakamura, 2016). Well, if performance goals are tough to reach in individual sports, then team sports are even more notorious, uncertain and unpredictable. So, just because you are using 'evidence-based', 'data-driven' or 'Eastern European periodization' approaches, at the end of the day, you are still experimenting and gambling against unpredictable complex systems and environments. They do provide warm comfort though. If put at the right place, these strategies represent one source of prior knowledge that needs to be updated through iterations and experimentation. This is the idea that Agile Periodization embraces and focuses on wholeheartedly.

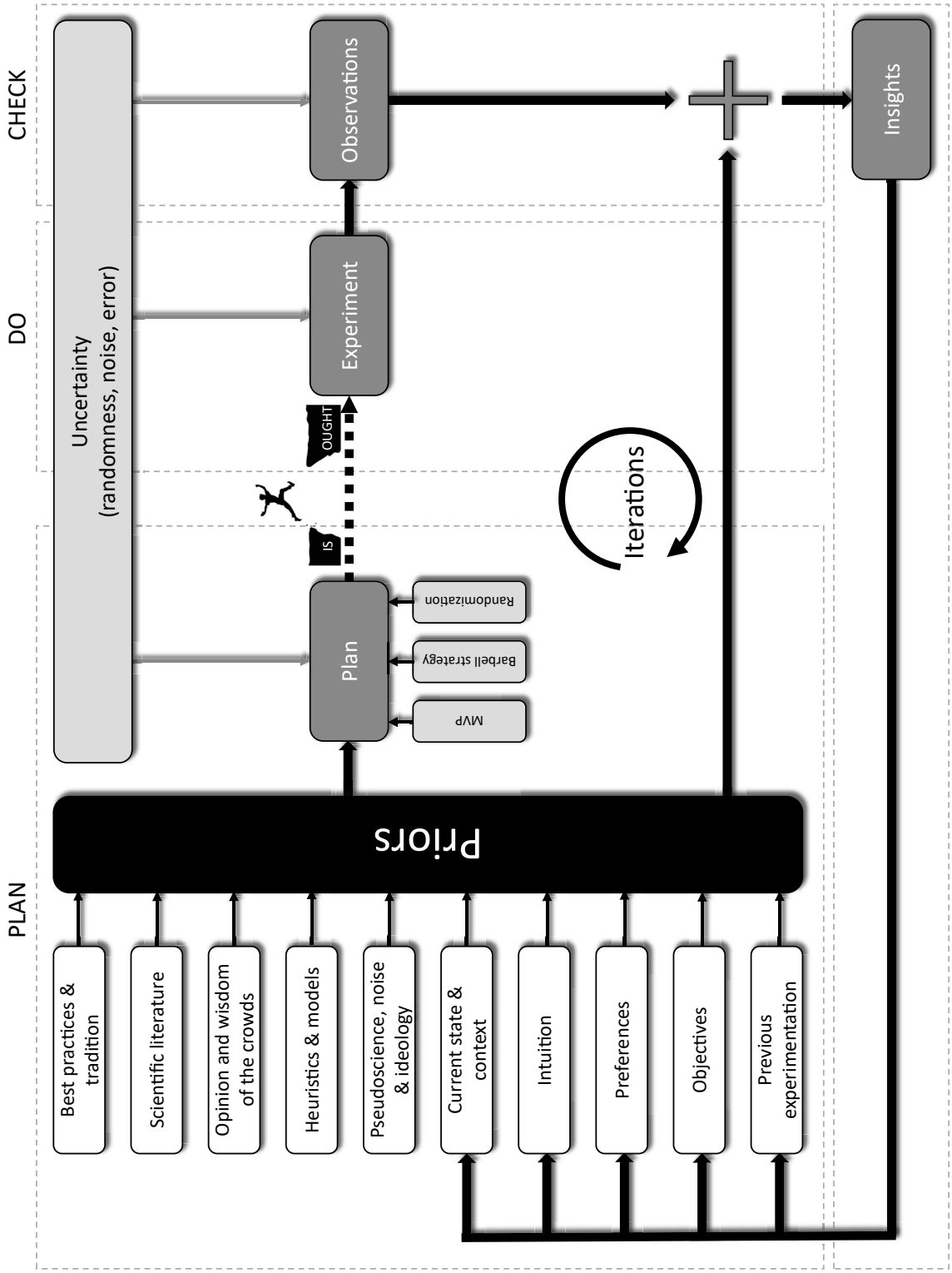


Figure 2.13 The evidence-based approach of using studies and meta-studies is just one component of the prior that needs to be updated with the iterative intervention and experiment for a particular individual and a group

2.10 Certainty, Risk, and Uncertainty

Similar to the already discussed direct versus oblique decisions and problem solving, decision making differs in predictable versus unpredictable environments (Gigerenzer, 2004, 2008, 2015; Gigerenzer & Gaissmaier, 2011; Neth & Gigerenzer, 2015; Gigerenzer, Hertwig & Pachur, 2015b). What needs to be done, is to differentiate the worlds of *certainty*, *risk*, and *uncertainty* (see Table 2.2).

Another model, with similar intentions, is Dave Snowden's *Cynefin framework* (Brougham, 2015; Berger & Johnston, 2016). Cynefin framework differentiates between certainty (obvious), risk (complicated), uncertainty (complex) with the additional domain of chaos (Figure 2.14).

Realm	Type of Problem	Type of inference	Appropriate Tool
Certainty	All options and consequences are known for certain (known knowns)	Deductive inference	Logic
Risk	All options and consequences are known, and their probabilities can be reliably estimated (known unknowns)	Inductive inference	Probability theory, statistics
Uncertainty	Ill-posed or ill-defned problems (unknown unknowns)	Heuristic inference	Heuristics, ecological rationality

Table 2.2 Three Realms of Rationality: Certainty, Risk, and Uncertainty. Modified based on Neth & Gigerenzer, 2015

The takeaway point is that different domains demand different decision making. The question is to which domain sports performance belongs to? Well, if you consult contemporary planning strategies that were highly influenced by *Taylorism* and industrial age approach to management, they belong to Complicated domain (or risk domain). In this domain, probabilities of events are known, and with certain mathematical tools (like expected utility equations), one can calculate the *optimal* choice. But, to paraphrase Nassim Taleb: "*Life is not a casino!".*

In my opinion and experience, our domain is a Complex domain. We just cannot oversee and nominate all of the potential outcomes, their probabilities, and costs.

Let me quote the description of an excellent free course "Introduction to Dynamical Systems and Chaos", by David Feldman (Feldman, 2017):

"Deterministic dynamical systems can behave randomly. This property, known as sensitive dependence or the butterfly effect, places strong limits on our ability to predict some phenomena.

Disordered behavior can be stable. Non-periodic systems with the butterfly effect can have stable average properties. ***So, the average or statistical properties of a system can be predictable, even if its details are not****.*

Complex behavior can arise from simple rules. Simple dynamical systems do not necessarily lead to simple results. In particular, we will see that simple rules can produce patterns and structures of surprising complexity."

The bold emphasis is mine and it is related to the already stated idea that we can predict the average effects and directions of intervention, but we cannot predict the details and exact values. For this reason, we combine the *prior* knowledge, expectations, and beliefs with iterative experimentation through MVP.

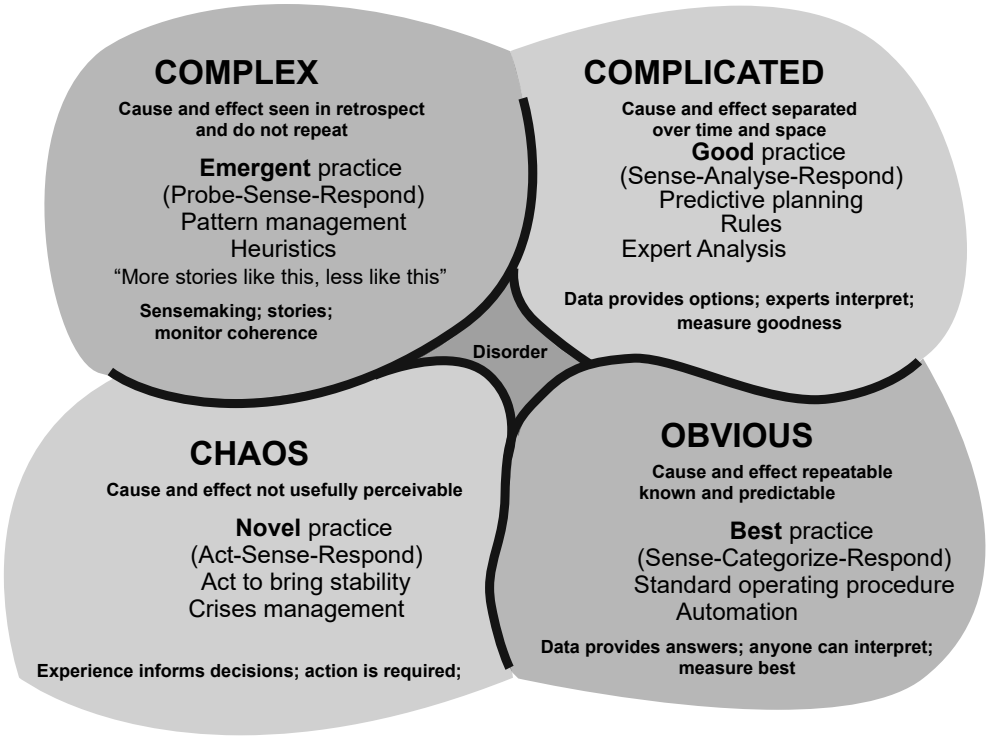


Figure 2.14 Dave Snowden's Cynefin Framework. Image modified based on the work by Dave Snowden Brougham, 2015; Berger & Johnston, 2016; Fernandez, 2016)

Please remember the previous chapter, wherein Small Worlds we are able to nominate all of the outcomes and probabilities, but they are simplifications of the Large Worlds. This process is useful, but let's not forget the distinction. This puts all these "optimal loads", "optimal progression", "optimal sequencing" approaches to turn upside down. They are insightful and useful priors we can consider but trying to find 'optimality' in complex domain is flawed and based on predictable and stable assumptions and behaviors of the system and its environment. As outlined in the Table 2.2 and Figure 2.14, Complexity (or uncertainty in the Table 2.2) domain demands the use of probing, heuristics and *satisficing* (good enough) approaches.

2.11 Optimal versus Robust

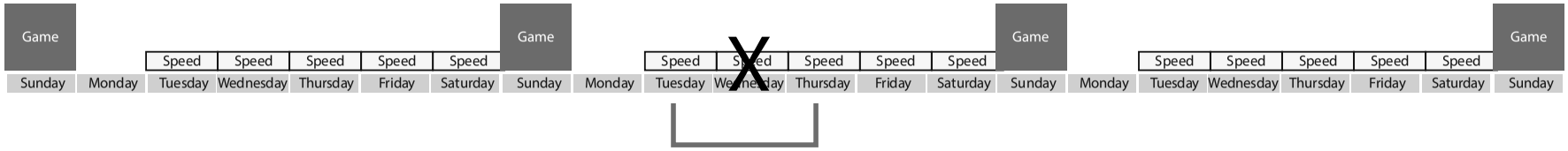
The whole analytical (physiology/biomechanics) approach utilized in contemporary planning is based on the assumed predictable behavior of the system, in which optimal decisions can be estimated. There is an optimal training load distribution, there is optimal intensity zone for developing certain qualities, there are optimal days for high loads and so forth. This is, of course, the property of the Small World, where all outcomes can be nominated and their probabilities calculated, hence optimal decision can be estimated. But this optimality revolves on the assumption that things are stable and predictable, and they usually are not. Figure 2.15 depicts an example of how optimal day to perform speed work in team sport fails miserably when faced with the unforeseen event (for example head coach not giving a shit about your speed work).

To quote Gerd Gigerenzer: "When faced with significant irreducible uncertainty, the robustness of the approach is more relevant to its future performance than its optimality." And this cannot be emphasized enough in the Complex domain. So rather than trying to figure out the 'optimal' scenario (from physiological and biomechanical perspectives), try to find the most robust scenario that will be satisficing (good enough) when assumptions break (Jovanović, 2018; Jovanović & Jukić, 2019). The concept of MVP revolves around providing the most robust plan one can rely on when the shit hits the fan and the one that preserve optionality. This is also the basis of the bottom-up approach to planning. Certain solutions might not be 'optimal' from physiological perspectives, but they will be more robust to logistical issues (such as missing sessions in Figure 2.15).

Difference between OPTIMAL and ROBUST planning strategies

OPTIMAL is the "best" solution under given constraints and assumptions of the "Small World" (model, or the map of the "Big World"). For example, the "optimal" time to do speed training in team sports, would be G+3 or G+4 (3rd or 4th day after a game).
The problem with "optimal approach" is assuming constraints will stay fixed as well as assumptions are true. But if they change, or are not true representation of the "Big World", then the "best" might also become the worst.
In the given example, the weather might be really bad, and one cannot perform sprints at optimal conditions or at all, which means that using the "optimal time" will make athletes being two weeks without speed work. This "optimal approach" soon becomes "dangerous".

ROBUST is a solution that is "good enough" under multiple conditions and assumptions. It is "satisficing" solution, rather than the "best", but it seems to be performing good enough under different conditions. Using the example above, more "robust approach" would be to "micro-load" speed over the week. If conditions change, the athletes won't be negatively affected. This solution is not "optimal", but it is "robust" to perturbations.



ROBUST > OPTIMAL

Figure 2.15 Difference between optimal and robust planning on the example of speed work in team sports

3 Exercises

What is the point of exercise classification? To impress girls with differentiating between exercises for the long and short head of the biceps muscle? To pass the biomechanics class exam?

None of this, of course. The purpose of classification is not to create a *place of things*, but a *forum for action*. Creating categories from place of things perspective always comes with two issues. First one is that creating more than needed precision with categories represent exercise in futility and a rabbit hole (e.g. why having categories of exercises for long vs. short biceps head if you do not plan to use them somehow?). There are always unlimited ways to classify exercises, depending on what criteria is being used. Besides, these criteria will be usually in some type of a conflict (later in the chapter you will see a few of those in the figures). Second issue is that, because there is a category, you will have a proclivity to use it in planning, when there is no practical significance in doing so. For example, having vertical and horizontal press category will create more proclivity do designate training *slots* for them, but they might not need special treatment (for example with *strength-generalists*, such as team sport athletes).

Therefore, the goal of the exercise classification is to help you in planning and simplifying complexity (i.e. Small World model) and to direct your decision making. It bears repeating that categories are artificial, and that border is fuzzy rather than either/or, which means that some exercises can belong to multiple groups (e.g. is split squat single leg or double leg movement?), and exercises from a particular group can differ (e.g. step-ups vs. lateral lunges - one is *vertical* and other is *lateral*, although both are single leg movements). It also bears repeating Jordan B. Peterson: "Categories are constructed in relationship to their functional significance". This means that categori-

zation will depend on the potential use, particularly if you work with *strength-specialists* (e.g. powerlifters, strongman, weightlifters, and heavy athletics like a shot put) or *strength-generalists* (e.g. everyone else that uses resistance training to help in achieving performance in something else, like team sports athletes, combat athletes or what have you).

3.1 General~Specific

Strength specialists might prefer utilizing classification based on *specificity* or how *similar* particular exercises are to competitive exercises. For example, powerlifter might classify exercises using their similarity to competitive bench press, squat, and deadlift. One common approach (Small World, or mental model) that implements this idea is a simple classification to *general exercises* and *specific exercises* (see Figure 3.1):

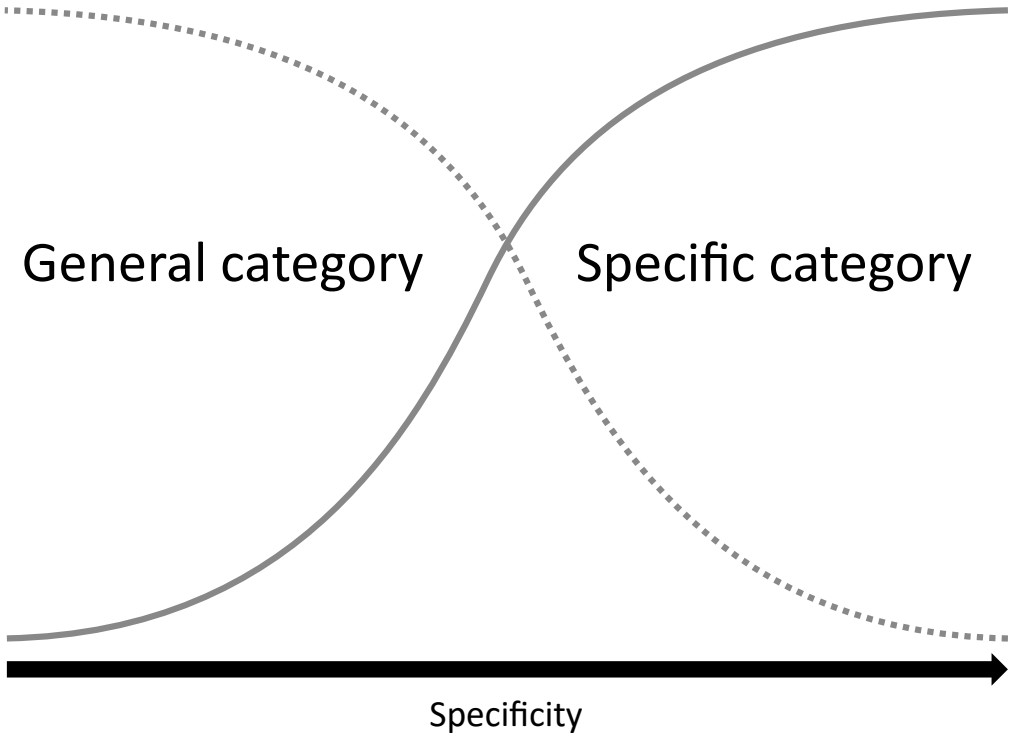


Figure 3.1 Exercise classification based on specificity into general and specific. Note the fuzzy border between the groups, rather than either/or distinction

According to Grand Unified Theory (GUT; see the previous chapter) model, general exercises usually develop some innate (latent) quality (*substance*) by providing an *overload*, and specific exercises express that potential (*form*) through the skill development and manifestation (see Figure 3.2). This dichotomous thinking (either/or: either

you overload with general mean or you transform with specific, or *develop~express* dichotomy) is quite common, although not many coaches are aware of using it. For example, improve VO2max (potential) and your running performance in the game will improve, or in a shot put improve your strength using bench press and transform it by doing a shot put.

Figure 3.2 Substance and Form of the Grand Unified Theory applied to general versus specific exercises

Keep in mind that this is also a Small World model and that different camps utilize this model (or other models) differently. For example, a shot putter (who we might consider a strength-specialist in this case) might use incline bench press to improve the *potential* and utilize shot putting to *manifest* (or transform) that potential. This apparent dichotomy of ability versus skills (or substance and form) is being used in some schools (to my knowledge in American track and field school) while being critiqued in others (for example in Bondarchuk's approach to hammer throwing (Bondarchuk & Yessis, 2007, 2010)). Another example might be the use of *specialized* exercises in Westside powerlifting school (Simmons, 2007) to target specific quality or weak links (i.e. *potential*), which will be later *converted* to competitive performance using the most specific lifts (i.e. *form*). On the contrary, Sheiko powerlifting school (Sheiko, 2018) might approach things differently (using a different Small World model) by being less dichotomous and treat specific lifts (bench press, squat and deadlift) as developmental and skill dependent, rather than just a sole manifestation of underlying potential that is being developed with specialized exercises. Again, these are all Small World representations, and as we all know, both schools of powerlifting are more than successful in developing world-class lifters. An example from soccer might involve arguing with the head coach who says: "Players never squat in a game" (referring to *form*), while you try to convey that they do need to strength train to improve underlying *potential* or *substance* (to improve performance on the pitch, but also to protect from the Downside, i.e. injuries).

One extension of this model (by including additional categories in general vs. specific continuum) is the model by Dr. Anatoly Bondarchuk (Bondarchuk & Yessis, 2007, 2010) which is quite famous and utilized in track and field circles. This model makes distinction between *competitive exercises* (CE), *specific development exercises* (SDE), *specific preparatory exercises* (SPE), and *general preparatory exercises* (GPE) (see Figure 3.3)

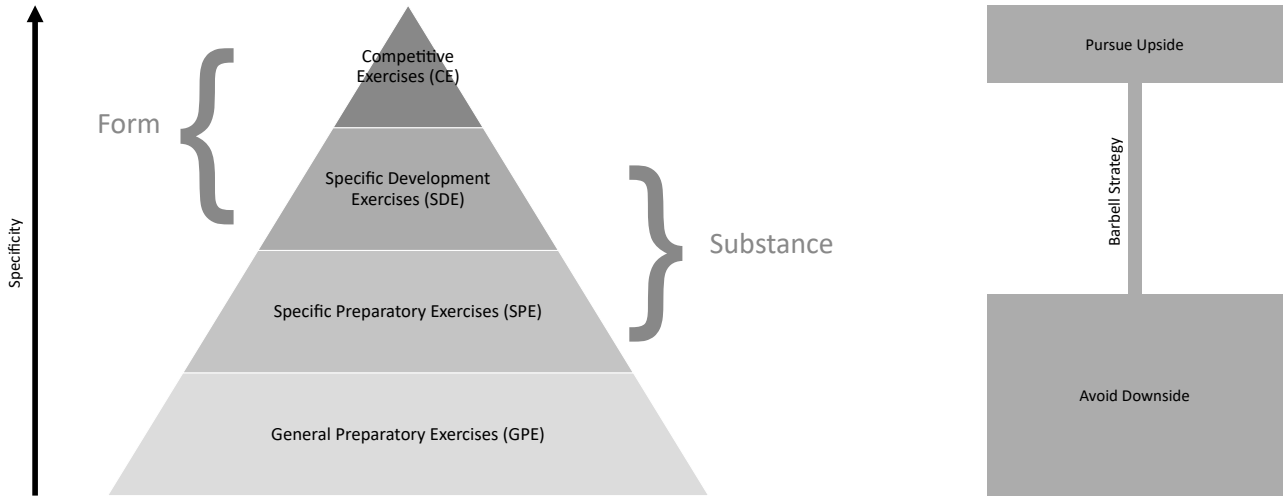


Figure 3.3 Exercise classification based on the work of Dr. Anatoly Bondarchuk (Bondarchuk & Yessis, 2007, 2010) and its relationship to the barbell strategy

In addition to GUT's substance~form complementary pair, utilization of CE and SDE exercises can be considered as *investing in the Upside* (improving performance), while utilization of the SPE and particularly GE exercises can be regarded as *protection from the Downside* (making sure you don't fuck yourself up with too specific work). For a powerlifter, this might mean doing some stability work, stretching, or horizontal and vertical pulling (should we call it *Vanilla training* - see the previous chapter) or some *aerobic conditioning* or bodyweight strength circuits (to improve *Mongoose Persistence*?; also see the previous chapter) which can all help in protecting from the Downside.

I have personally used Bondarchuk categories in my work and previous writings, and I believe they are a beneficial mental model. I have used them to help me categorize speed, power, and other strength and conditioning components, and I will continue to use them as a tool in the toolbox (i.e. multi-model thinker), particularly for strength-specialists (or athletes that compete in *cm/kg/sec* sports). The deal breaker issue I have with this model is that its categories depend on criteria we use to judge specificity. The categories of exercises might be very different for a powerlifter, as opposed to a rugby player. Criteria to judge specificity for a power lifter is similarity of the exercises to competitive lifts (bench press, squat, and deadlift). For a rugby player, criteria to judge specificity is more complex and pluralistic, since rugby competitive activity

involves plethora of qualities and movements (e.g. sprinting, acceleration, jump, ruck, maul, shoulder tackling). How do we judge specificity of strength training exercises in this case? After all, most, if not all strength exercises for team sport athletes, will be in the GPE and SPE category. That way, although very useful as a general viewpoint, Bondarchuk categorization is not very useful (lower functional significance) in team sports or for strength-generalists.

For this reason, I will utilize a few different categorizations that I have found to have the biggest *forum for action*, which will guide my decision making and help me decide what are the *big buckets* (or *planning slots*) that I have to take care of. The following categorization models are mostly aimed at strength-generalists, although they can be utilized for strength-specialists, potentially as sub-categories of the SPE and GE categories in the Bondarchuk categorization model.

3.2 Grinding~Ballistic

Grinding movements are *slow*, controlled, compound movements (e.g. squats, deadlift, bench press) with constant tension, while **Ballistic** movements are *fast* and explosive (e.g. jump squats, hang cleans) with a burst of tension followed by relaxation, and they usually involve a flight of the body or the implement (e.g. barbell or a medicine ball). Additional categories involve **Control** movements and **Other** movements.

Control movements are mostly done under Vanilla Training umbrella, for example, training for local and global stabilizers, shoulder mobility, and so forth..

Other movements represent that annoying category for exercises you do not know where they belong to.

As with any categorization, it is hard to draw a fine line between categories. Figure 3.4 illustrates this classification system with additional sub-categories that will be discussed shorty. Please keep in mind that there are numerous ways to classify and enter the rabbit hole - I have included only the categories that I think have the most *forum for action* when working with strength-generalists.

Table 3.1 contains the hypothetical (and very simplified) relationship between Grinding, Ballistic, and Control with developing Anaconda Strength, Armor Building, Arrow, Vanilla Training and Mongoose Persistence qualities.

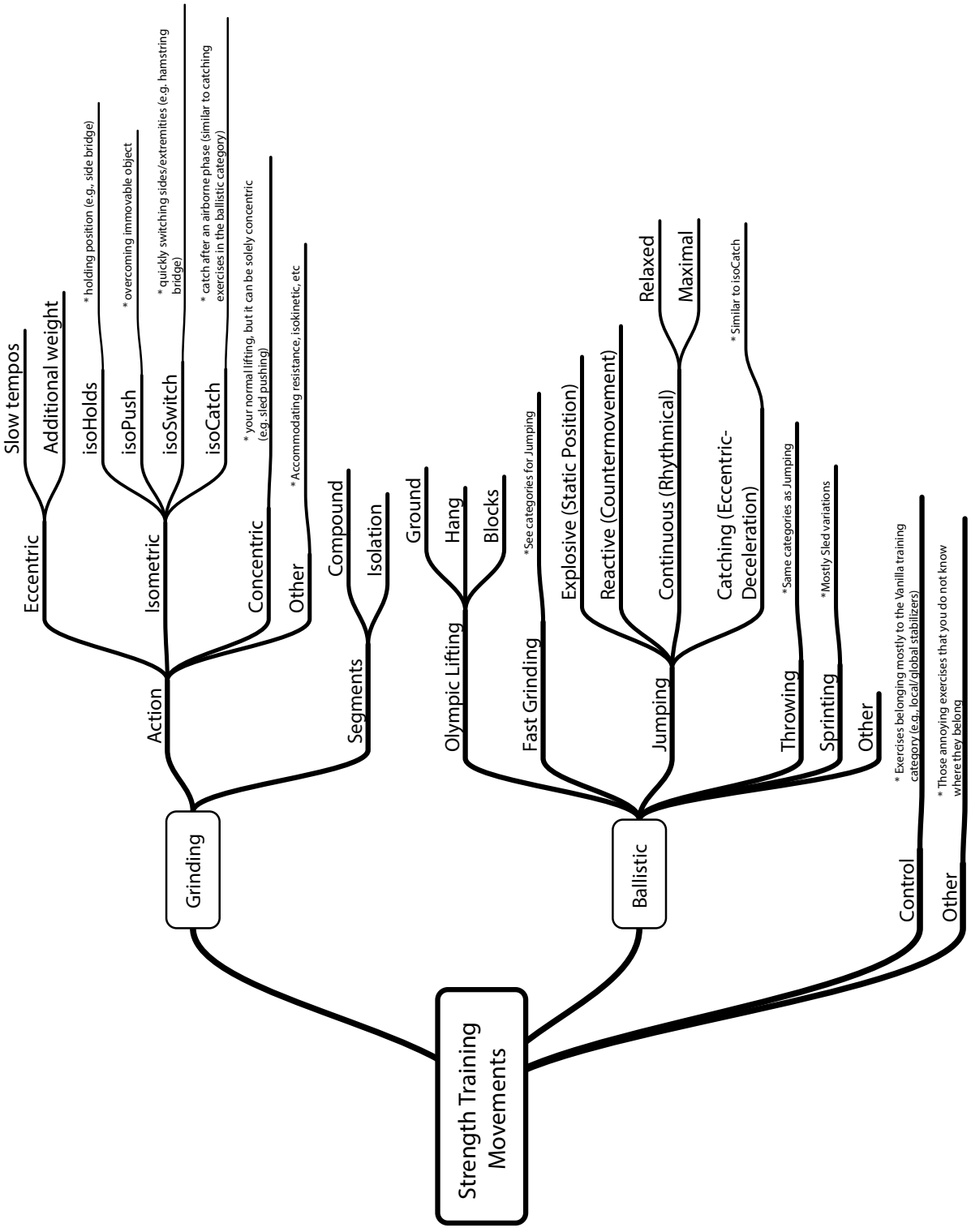


Figure 3.4 Categorization of movements based on their type

	Armor Building	Anaconda Strength	Arrow	Mongoose Persistence	Vanilla Training
Grinding	4	5	2	3	1
Ballistic	3	4	5	2	1
Control	4	2	1	3	5

Table 3.1 Certain movement categories are more aligned with development of particular qualities. The higher the number in the table, the better the alignment. In other words, certain movement categories are more suited for pursuing certain qualities. Keep in mind that this is just a speculative, highly simplified model.

3.2.1 Grinding movements

Figure 3.4 contains the sub-categories of the grinding movements that are based on two criteria: (1) muscle action, and (2) the number of segments involved. Using muscle action, we can classify grinding movements to predominantly (1) *eccentric*, (2) *isometric*, (3) concentric, and (4) other[34].

Eccentric category usually involves an emphasis on slow lowering phase (eccentric phase) or somehow adding extra weight on the lowering part (e.g. leg press with two legs, lower with one).

Isometric category involves categories coined by my colleague Alex Natera (see Figure 3.4 for details): *isoHold*, *isoPush*, *isoSwitch*, and *isoCatch*. *IsoHold* can also belong to Control movements, while *isoCatch* is very similar, if not the same to catch exercises in the ballistic category.

The Concentric category are your regular lifting movements, although specific apparatus can be used to perform movements only in the concentric range (e.g. heavy sled pushes and pulls, deadlifting and then dropping the barbell).

Other category involves, well, everything else, from accommodating resistance to using EMS (*Electric Muscle Stimulation*).

When it comes to the number of segments involved, the simplest classification involves isolated movements (e.g. chest flies, biceps curls) and compound movements (e.g. bench press, pull-ups).

34 It is always useful to have the "Other" category, in which you put the items you do not know where they belong. After the number of these items increases, it might be a time to revisit your overall classification model. Having said this, classification is also "iterative", rather than set in stone. This also means that the classifications in this book are "work in progress", rather than the final picture.

3.2.2 Ballistic movements

Figure 3.4 contains the sub-categories of the ballistic movements: (1) Olympic lifting, (2) Fast Grinding (think of *dynamic effort* squats or bench press with 50-60% 1RM (Simmons, 2007)), (3) Jumping, (4) Throwing, (5) Sprinting (mostly heavy sled towing/pushing exercises), and of course the (6) Other category.

Olympic lifting is further classified based on the starting positions: (1) ground, (2) hang or (3) blocks. Additional classification might involve catching position (e.g. full, power, muscle), but that would be an overkill for this simple *big picture* overview.

Additional sub-categories for fast grinding, jumping and throwing are categories based on movement action, and they involve (1) explosive from a static position (e.g. think of squat jumps from pause), (2) reactive (e.g. counter-movement jump or depth jump), (3) continuous (e.g. rhythmical jump squats that can be all-out, or sub-maximal rhythmical), and (4) catching oriented (e.g. jump and land).

3.2.3 Control movements

Control movements category is a bloody mess, and involves everything from *core* stuff, to BOSU ball and breathing *fuckarounditis*. Vanilla Training mostly utilizes these movements with the aim of protecting from the Downside. Control movements also have some overlap with *complex* movements category (e.g. the need to stabilize and control segments) that will be discussed next.

3.3 Simple~Complex

What can be put on top of grinding and ballistic classification (one can include control category here, but I will leave it out to simplify[35]) are simple versus complex movements. This way we get a matrix: on the x-axis, we have movement time (a long time for grinding movements, and short time for ballistic movements), and on the

35 Please beware of the "curse" of classification, particularly when using quadrants and matrix. Sometimes we are "forced" to fill in all the spots to fit the model. Remember that you can have a blank spot in your model and not everything should fit nicely. But sometimes, these blank spots can help us predict 'predict' novel things (e.g., periodic table allowed us to predict unknown elements that were discovered later), or see things from different perspective.

y-axis, we have movement complexity axis (from lower complexity to higher complexity). I like to refer to this model as *Time-Complexity Quadrants* (TCQ) (See Figure 3.5).

Movement complexity criterion of the TCQ model refers to how many segments are utilized (which demands the need for *coordination*) and whether the stability is compromised (i.e. some segment must be stabilized in order to produce movement). It might be hard to pinpoint to exact biomechanics principles behind this criterion, but from a phenomenological perspective, it is quite easy to understand the distinction (e.g. "I know it when I see it"). Movement complexity criteria can also be related to substance~form and develop~manifest complementary pairs.

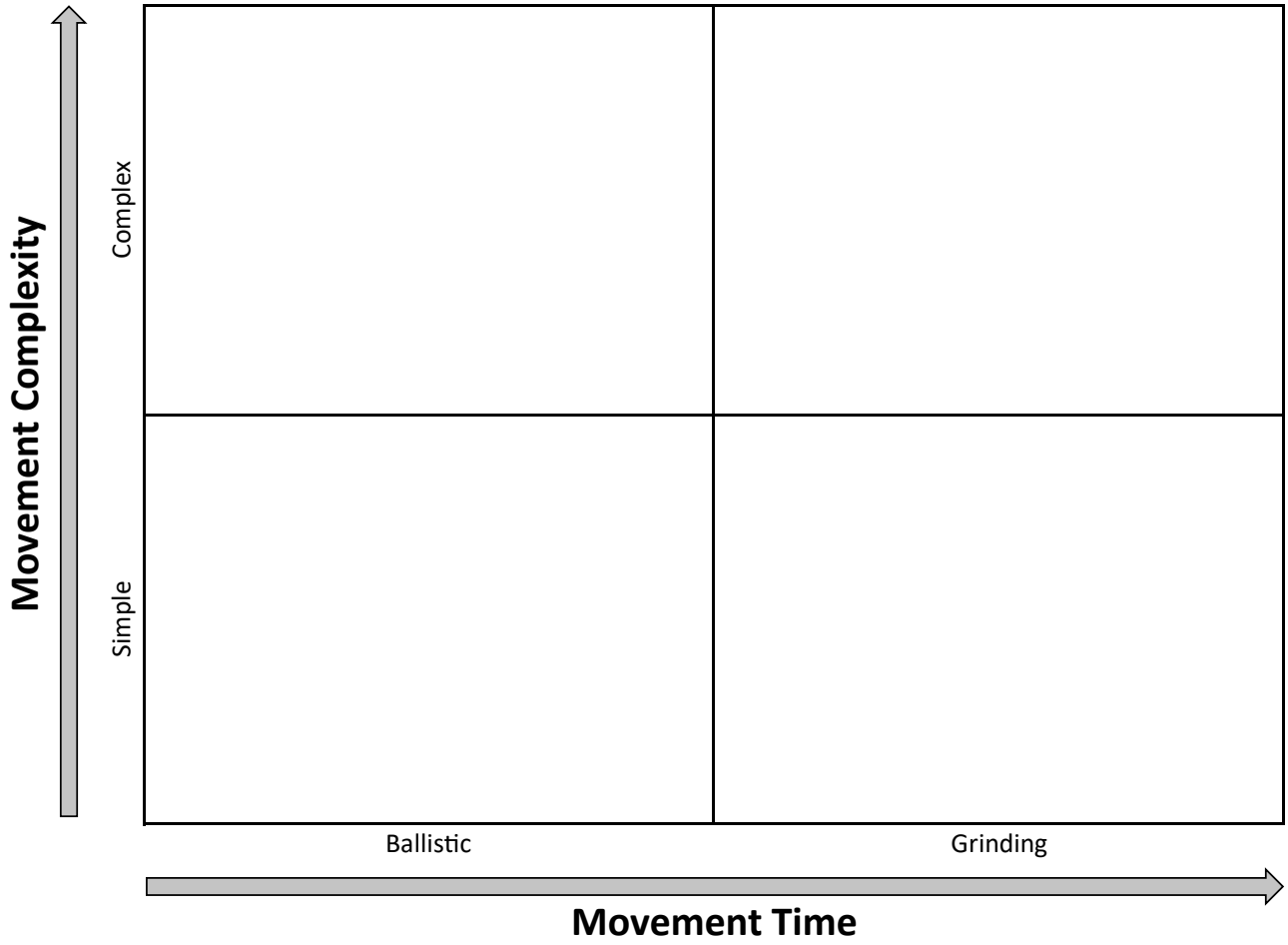


Figure 3.5 Time-Complexity quadrants

The following example might help in understanding the TCQ model. Using *upper body horizontal push* movement pattern as an example (discussed in the next section of this chapter), the following exercises can populate the TCQ quadrants (see Figure 3.6):

Grinding-Simple: Bench Press

Grinding-Complex: Standing (Split Squat) Landmine Press

Ballistic-Simple: Explosive push-up or Smith-Machine bench press throw

Ballistic-Complex: Single arm medicine ball throw

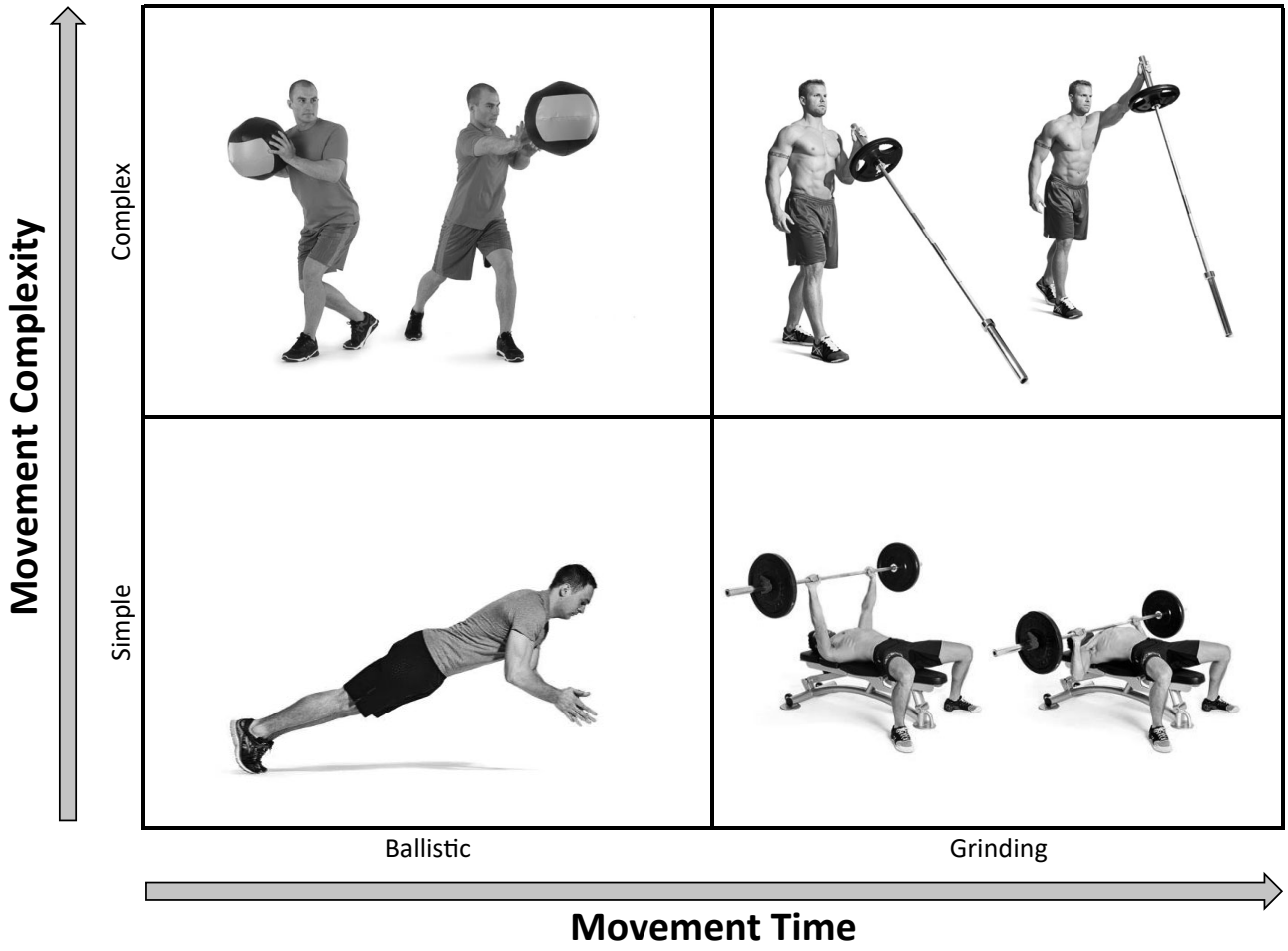


Figure 3.6 Example of TCQ exercises

Exercises from all quadrants can be represented in the training program, in a higher or lower degree, depending on the objectives, needs, season or phase, and context. TCQ model can be useful when someone starts bombarding you with fancy Instagram exercises, for which you now have a drawer to put them in and use them if and when needed.

3.4 Fundamental movement patterns

Not sure who suggested categorization to fundamental patterns first, but I guess that Ian King (King, 2002) was one of the first to write about it. Different coaches utilized different classifications of fundamental movement patterns, out of which I am most thankful to Dan John (John & Tsatsouline, 2011; John, 2013) (who added loaded carries which I am more than grateful for), Michael Boyle (Boyle, Verstegen & Cosgrove, 2010; Boyle, 2016) (mainly for his view on single leg movements), and Joe Kenn (Kenn, 2003) (whose book I consider one of the most important books written for generalist strength training). Figure 3.7 contains my current classification of the fundamental movement patterns in the lowest resolution.

Figure 3.7 Fundamental human movements (for strength training purpose)[36]

36 Different authors name these categories differently. For example, Squat category is usually named *Knee-Dominant* or *Lower Body Push*, while Hinge is oftentimes named *Hip-Dominant* or *Lower Body Pull*. You probably noticed few things that are missing, like calves, hip flexor, to name a few. These can be put in the "Other" category (since this is *low resolution* model), but if they become important aspect of your program, you are more than free to create additional categories that represent *forum for action* to you.

As mentioned multiple times through this manual, categories should be as simple as possible (lowest resolution), while still being functionally significant (provide a *forum for action*). Some of these categories could be further divided into horizontal/vertical (e.g. horizontal push, vertical push; horizontal jump, vertical jump) or double leg/single leg (single leg squatting movements, double leg squatting movements), but that can quickly become an exercise in futility (which I will do anyway). If you training philosophy and programming demand extra categories and extra precision, then please, by all means, include those categories. In my case, I needed something as simple as possible, to which I can easily reflect on in order to see if I am hitting all the major movements that I have to address[37].

It is always good to include the "Other" category. I have learned this from the "productivity movement" books and gurus. It is like the bottom drawer in which you put things you are not sure how to categorize. Once this drawer fills up too much, well, I guess it is time to use a different categorization model. It bears repeating that everything in this manual are simple heuristics and strategies that you can use as a starting point and modify to suit your needs. For example, one can put "Vanilla" training exercises (breathing drills, DNS rolling on the ground, PRI drills and so forth) into category "Other".

One can also include gymnastic movements such as falls, rolls, and various holds as special categories, which are quite useful but for now, we can leave them in the "Other" category. If these represent a major part of your training philosophy then, by all means, I encourage you to make your own categories.

Some exercises can be combined into multiple movements, and that is not worrisome, but something to keep in mind[38]. I am not trying to split hairs with 100% accurate categorization here. Remember that we are more into *functional significance* and simplicity, rather than 100% correct categorization.

Let me give you two examples. When I started working with few combat athletes, I have used these most common fundamental movement pattern that helped me create the most important training *slots* that I need to address. These categories and slots represented my *prior* beliefs and MVP. As I worked with them, I did notice that, due nature of the sport, they demanded and needed more neck strength and wrist exercises. These were at first put in the "Other" category, but as the *evidence* for importance of these exercises grow larger, I had to update my *prior* model, and include extra category that involved neck strength and wrist strength. These also became training slot that had to be addressed.

37 This represents practical application of 1/N heuristic and MVP idea

38 Remember that the categories borders are fuzzy, rather than clear cut? One exercise can belong to multiple categories, or sit just on the border

Second example involve working with female recreational athletes. One might start with fundamental movement patterns that help devising training slots and act as MVP. Within few sessions of working with them, one might soon realize that most, if not all, female recreational athletes demand special attention to the gluteal region (a.k.a. *booty*). This body region becomes functionally significant and thus demand special category and training slots.

The point of these two examples is two-fold. First, we never know up-front (particularly when we start without much experience, but even then, we need to adapt to the individual) what is needed and what needs to be addressed. We start with MVP and update as we learn and collect evidence. Second, these categories are not set in stone. They are dynamic and they change, based on identified needs, preferences, learning, and specific issues.

3.4.1 Grinding movement patterns

Figure 3.8 contains more detailed classification of the grinding movements using fundamental movement patterns.

This classification, as well as pretty much everything else in this manual, is a *work in progress*. This means that there are some questions I do not have an answer to, or I still do not know how to address certain issues, or how to classify them. This is also example of the *fuzzy* thinking, where membership to a given categories is not either 0 or 1, but a degree. Take for example single leg category in the Figure 3.8. The classification of single leg movements is very much influenced by Michael Boyle's classification (Boyle, Verstegen & Cosgrove, 2010; Boyle, 2016). As you can see in the Figure 3.8, supported single leg movements (e.g. split squats) can be considered double leg movements with a staggered stance. These things can be argued until the cows come home, so the key message *forum for action*, rather than ideally precise *place of things* (see Figure 1.1). Table 3.2 contains some example exercises for the main categories of the grinding movements.

One thing you can do, and I will come back to this later in this chapter, is to enlist all the exercises you can coach and perform (or your athletes can perform) under your constraints. You can include whatever sub-categories you prefer, if they are actionable (provide a *forum for action*) for you.

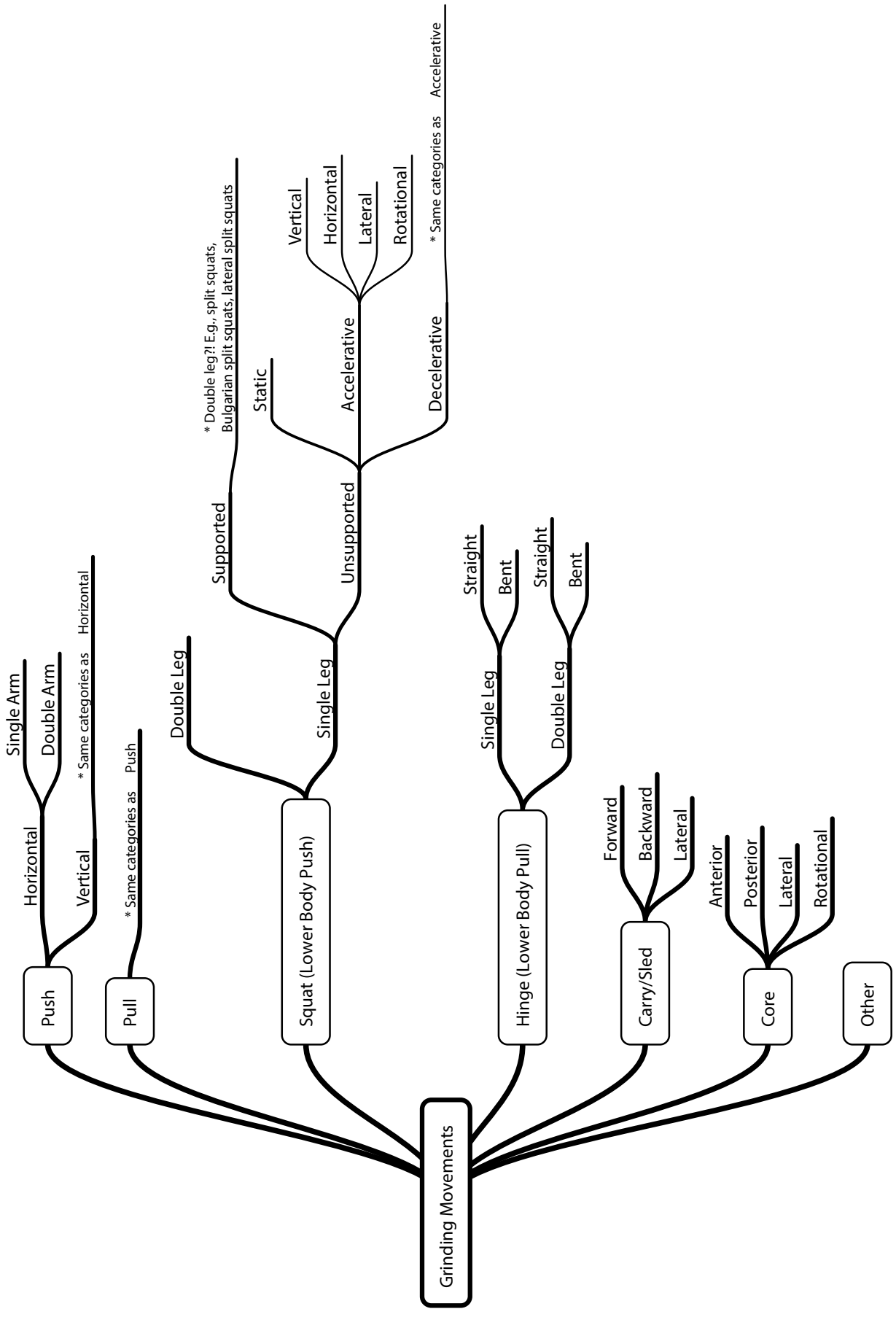


Figure 3.8 Fundamental movement patterns of the grinding movements

6 Planning (continued)

Previous chapter introduced theoretical concepts behind planning, using the dose-response Small Worlds and multiple complementary aspects of planning, culminating with the concepts of pull the floor and push the ceiling. In this chapter, these concepts will be put into more concrete and pragmatic strength training form.

The building block of this chapter will be *set and rep schemes*, that together with exercise (or mean) represent a *prescription unit* (Figure 6.1), or the smallest planning unit (i.e. *strength training atom*).

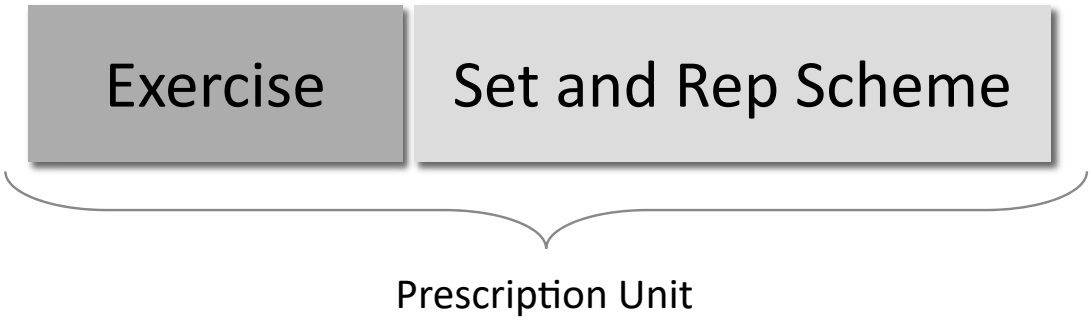


Figure 6.1 Prescription unit consists of exercises and set and rep schemes

6.1 Set and Rep Schemes: The Basics

Chapter 3 covered exercises and their classification. This chapter will delve more into set and rep schemes and combinatorics used in planning (e.g. vertical and horizontal planning, as well as divisible and indivisible strategies and other novel planning

strategies that will be discussed shortly). Before we even start with more advanced topics, let's cover the anatomy of a set and rep scheme.

6.1.1 Anatomy of a set and rep scheme

Figure 6.2 contains anatomy of a set and rep scheme. This is, of course, a simplification (Small World), but quite frequent and useful model. Each set and rep scheme consists of multiple components (i.e. sets), but what you find in most, if not all, strength training materials are the *main sets*. This is unfortunate, since set and rep scheme is much more complex and richer construct.

Figure 6.2 Anatomy of a set and rep scheme

Similarly to the discussion on active recovery means and methods in the previous chapter, I approach warm-ups differently. Rather than looking at warm-up as means to reach working temperature of the body and priming the nervous system only, one can look at warm-ups as affordance to practice and develop particular quality at the

current state of the organism. I know this is a mouthful, but it simply means addressing what can be addressed while the athlete is warming up. During the warm-up, one can perform and address different qualities that can be addressed at that particular state. For example, one might perform *Vanilla training*, like rehab, mobility, pre-hab, core, stabilization and so forth, as well as practice the main movement.

This is particularly useful in the beginning of the workout, where a given exercise is performed first. The warm-up part of the workout can be blended with the main part of the workout through the warm-ups sets of the first exercise. Let's take a bench press as an example, where 5x5 at 75% is planned as the main sets.

Warm-Up part (15-20min):

Address qualities that need to be addressed in this state of the organism

1. *Foam Roll and Breathing drills if needed (e.g. someone coming after work through city rush hour)*
2. *Ground Mobility*
3. *Core*
4. *Kettlebell or Bodyweight Circuit/Complexes*

A. Bench Press 5x5 @75% (main sets)

Warm-up sets

Empty bar x 10 reps

Band pull-a-parts x 10 + Lat Stretch with band

Bench Press 30-40% x 5, start with isoHold at the chest and work on the tightness in the bottom position

Thoracic stretch + Face Pulls

Bench Press 40-50% x 5

Hip flexor stretch if needed + YTWLs for the shoulder

Bench Press 50-60% x 5

Any extra mobility/core exercises or even explosive push-ups

Main sets...

The example above is a nice transition from the warm-up part to the first exercise, rather than the abrupt switch. The warm-up sets, particularly for the first exercises in a workout, can serve as an opportunity to address other qualities and nagging issues (i.e. weaknesses), as well as practice the quality of execution (or even variable execution, e.g. using different grip lengths, tempos, pauses, depth and so forth) of the main movement.

More complex movements, like Olympic lifting might ask for longer ramp-up to the working sets and adding extra elements in (e.g. mobility, etc). Warm-up sets can also serve as a way of checking if everything is fine and adjusting the main set accordingly. For example, I pretty much know what I can expect of the workout once I pinch the 20kg plates when loading the bar (pun intended). Other methods might involve estimating 1RM using VBT approach (e.g. using 40-60-80% 1RM and using linear regression to estimate load at particular velocity at 1RM; see previous chapter for more info). Sometimes, one feels like crap, but once the warm-up is finished, some magical energy appears, and everything is up and running. The opposite can happen too - one feels very good before a workout, but during the warm-up a few issues emerge and demand *pivoting* in the main sets, or changing the exercise, or workout altogether (e.g. discovering a weird pinch in the shoulder, and deciding to use Swiss bar or dumbbells rather than straight bar for the bench press). For this reason, warm-up sets are very important and insightful. Use them for more than just banging few reps to warm-up, use them as a probing process and adjust accordingly.

Warm-up sets can be much shorter and without any *extras* for the later exercises, since the athlete is *warmed-up*. But again, this depends on the exercises that follow. For example, if squats follow this bench press exercise, an additional lower body warm-up might be needed.

There are multiple ways to ramp warm-up sets towards working/main sets, but it usually involves doing either higher reps at the lower percentages or not. For example:

40% x 10

50% x 8

60% x 6

While it is important to warm-up and practice technique, it is also important not to create unnecessary fatigue with the warm-up sets. For this reason, it might be wise to keep the reps low (i.e. under 6) and with a lot of RIR. Thus, you should not pursue the

"burn" with warm-up sets at 40-60% by doing 10-20 reps. That is just dumb. Everything else, including jumps and number of warm-up sets is individual preference.

Also, note that some athletes prefer longer warm-ups, and some are ready to roll the instant they step into the gym. This could be genuine preference or the body need, or it could be a simple habit. It is thus possible to experiment with extending or shortening the warm-ups. I personally prefer longer smoother warm-ups and it generally takes me longer to warm up. A friend of mine and a coach of the Female Volleyball Serbian National Team, Vanja Banković, noticed that some athletes in the jump test need more jumps to reach their maximal height, whereas some do it on the first rep. It could be different CNS or whatever, but the point is that athletes do differ. One can try to change the athlete or to adapt to the athlete, of course. I just love the guys who say "Have you ever seen a lion warming up before hunting a gazelle?". I tend to answer with a counter question "Have you ever seen a lion sitting at a desk in the office for 10 hours? Me neither". Don't be a dogmatic idiot - adapt the athlete, but also adapt to the athlete. It is a complementary pair.

Also note that warm-up sets are not counted in the dose - response models. But as has been seen, they represent fruitful component of the training session and the prescription unit, which is often missed in the "Evidence-Based" lab coat models.

6.1.1.1 Pre-work sets

This part of the set and rep scheme is usually completely neglected. The first time I heard about this concept was in the excellent "Base Building" book by Paul Carter (Carter, 2013), where he suggested using *Over Warm Ups*. Over warm-ups represent warming-up *past* the weight you plan using for your main sets. In the above example of 5x5 @75%, that might involve the following:

Empty bar x 10-12 reps

40% x 5

50% x 5

60% x 3

70% x 1

80% x 1

75% x 5 x 5

Here, 80% x 1 represent over warm up set. Not sure if you noticed, but without over warm up, the first set @75% feels a bit weird, but the later sets are much better. To avoid this, and to *prime* for the main sets, over warm up sets can be used. This is usually 5-10% higher than the working sets, but it can actually be working up to your EDM or *daily-max* without too much expectation and emotional fuss. This max can be used to calculate working weights (e.g. 75% of daily max, rather than the pre-cycle 1RM).

Empty bar x 10-12 reps

40% x 5

50% x 5

60% x 3

70% x 1

80% x 1

90% x 1

100+ x 1 (find out daily-max)

75% of daily max for 5 x 5

This represents more *advanced* methodology, although it takes the problem of figuring out the EDM out of equation, as well as adjusting for individual rate-of-change and day-to-day fluctuation. It is powerful, but it is also a double-edged sword, because in order to use it frequently, one needs to learn to be relaxed and not pushing it, without an emotional drain and drama. Add multiple exercises that this needs to be done for and we have a potential problem. Thus, this is easier said than done, particularly on the bad days when daily-max might go down.

Pre-work sets might involve using overcoming isometrics (isoPush), or explosive movements as well (explosive push-ups were performed before the last warm-up set in the warm-up sets example).

Empty bar x 10-12 reps

40% x 5

50% x 5

60% x 3

70% x 1 + isoPush 6sec

80% x 1 + explosive Push ups x6 reps

75% for 5 x 5

Additional pre-work technique that can be used are *walk-outs* and *holds* and these can be over 1RM. This is particularly useful if the working sets are 90%+. These involve using very heavy weight and just holding it in the racking position or walking out with it. Not sure this would be something to use frequently, but represents a viable strategy if used sparingly and smartly.

I think that pre-work sets are a hidden gem, and I am more than thankful to Paul Carter for pointing it out to us. If used sparingly and wisely, they represent a powerful tool.

6.1.1.2 Main or Working sets

Main or working sets are bread-and-butter of the set and rep scheme. As such, they are considered in greater depth later in this chapter. For the sake of completeness, the Figure 6.3 consists of common prescription formats when it comes to set and rep schemes, particularly the main sets.

6.1.1.3 After sets

After sets represent an additional opportunity and affordance in the workout and there are different implementations that could be used. Let's cover the most common ones.

6.1.1.3.1 Plus sets

Plus sets involve finishing main sets with a set to failure (or to a particular ceiling, e.g. 10 reps max). Here is an example:

75% x 5

75% x 5

75% x 5

75% x 5

75% x 5+

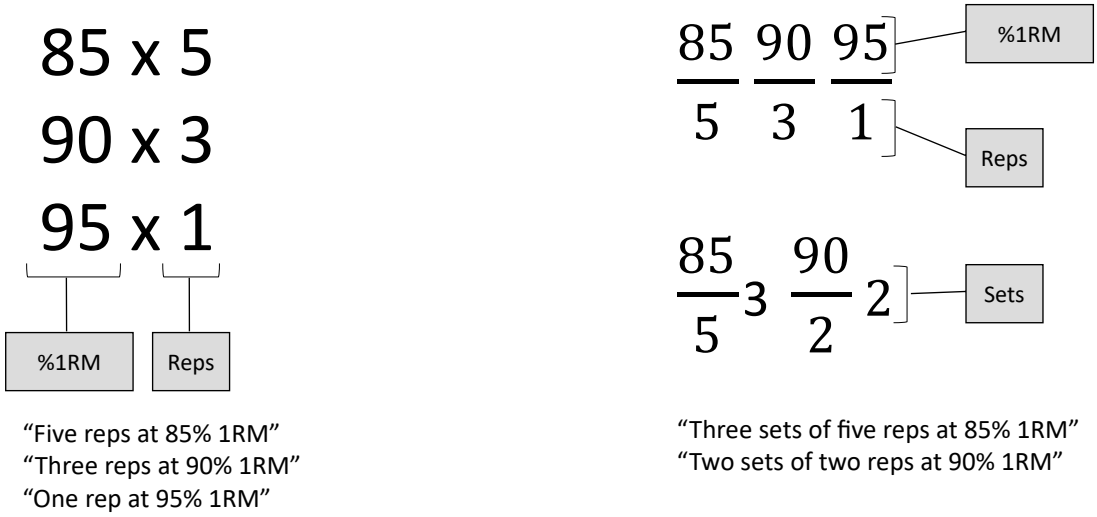


Figure 6.3 Common set and rep schemes prescription formats

The last set is a *plus set*, where athlete tries to lift as many quality (in the same manner previous sets and reps are prescribed) reps as possible (hopefully without too much mental strain and psyching up). This can be used as an *embedded* test (see reps to technical failure in the Chapter 4) and estimate of 1RM. Performance on the plus set can then be used as a source of information for updating 1RM/EDM to base percentages off for the next training phase. More about this will be covered in the Chapter 7.

6.3.5 Classification based on Methodology

Classification based on methodology represents approach more aligned with "forum for action" perspective, and classifies set and rep schemes based more on a phenomenological aspects and differences. This might include *wave loading*, *sets across*, *ramping sets*, *pyramids*, *cluster* and many others. I will present extensive classification using this approach later in this chapter.

What is important to keep in mind is the *pluralism* of the approaches of how to classify set and rep schemes. There is no single "objective" way to do it. Being equipped with multiple models and being a skeptical thinker, willing to experiment is my preferred approach. Unless you are an ideologue of course (pun intended) and in love with a particular system.

6.4 Decoupling Progressive Overload from Adaptation

Progressive overload is one of the building principles of the strength training. In simple terms, progressive overload represents the need to make training dose higher and higher[109], as one becomes stronger and stronger. This is needed to stimulate further adaptation and improvements in the performance. However, as I have explained in the previous chapter, training dose is a very complex construct, which makes progressive overload a complex construct as well. From simpler "forum for action" perspective, progressive overload is needed to *push* the adaptation.

But that is only one perspective of the progressive overload. Another one is to actually adapt your training to the adaptation experienced. In other words, adaptation *pulls* progressive overload thresholds up. As you adapt, you will have to (and you will be able to) do more (take a new training dose) to progressively overload[110]. These are the

109 In theory, this means that dose thresholds introduced in the Small World models in the previous chapter (MRD, MED, DED, MTD) are sliding, as one becomes stronger (or adapted). Training dose that was needed to move my squat from 150kg to 170kg might not be the same dose needed to improve it from 170 to 180kg. This reasoning is the example of *via Positiva,* where *via Negativa* would involve *trimming* unnecessary training dose and *removing,* rather than adding, to push/pull the adaptation further.

110 As will be explained in the next chapter, increasing 1RM from phase to phase creates an element of the progressive overload, since improved 1RM affords it. For example, 3x5 @80% when 1RM is 200kg means lifting 160kg, but if that 1RM increases to 210kg, it becomes 168kg that needs to be lifted for 3x5. Things are more complex than that, of course, but the use of the percent based approach naturally has these progressive overload elements integrated.

exact complementary pairs introduced in the "push the ceiling~pull the floor" model in the previous chapter. Progressive overload and Adaptation are embraced into a complex dance of interdependence (Figure 6.10), where progression moves the adaptation, while adaptation affords progression. It is complex circular causation (see Figure 5.15 for a circular model of dose -> response of which Figure 6.10 is simplification).

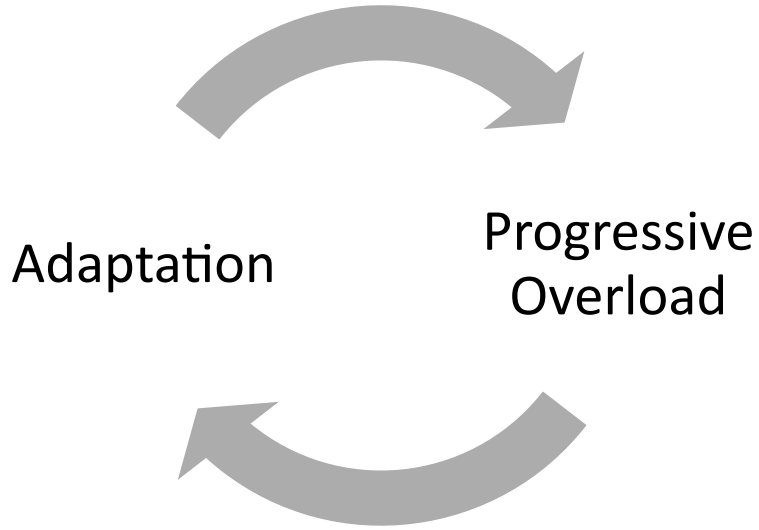


Figure 6.10 Progressive overload and Adaptation are embraced into a complex dance of interdependence

Unfortunately, this complex dance between the progressive overload and the adaptation is often bastardized and reduced to changes in week to week set and rep schemes. Figure 6.11 represents hypothetical example where the same adaptation is seen with three different scenarios. In this hypothetical example, adaptation is represented by 1RM in the back squat, while the training dose is represented by two back squat workouts a week, done for five weeks. Initial back squat 1RM in this hypothetical example is 200kg, and changes to 205kg across 5 weeks. To plan the loads using percent based-approach, initial 1RM of 200kg is used. The adaptation pattern is the same across the three scenarios. Table 6.5 contains summary metrics for all three progression scenarios.

Constant scenario involves performing the *same* workouts (3x5 with 160kg) across five weeks. Might be questionable if these workouts would be the *same* (and thus represent the same dose, but we need to stick with this Small World model), since improvements across weeks (and these improvements might be beyond simple 1RM, and might involve other improvements beyond this example, like work capacity, explosiveness and so forth) might afford one to perform reps faster, with greater depth or with shorter rest between sets.

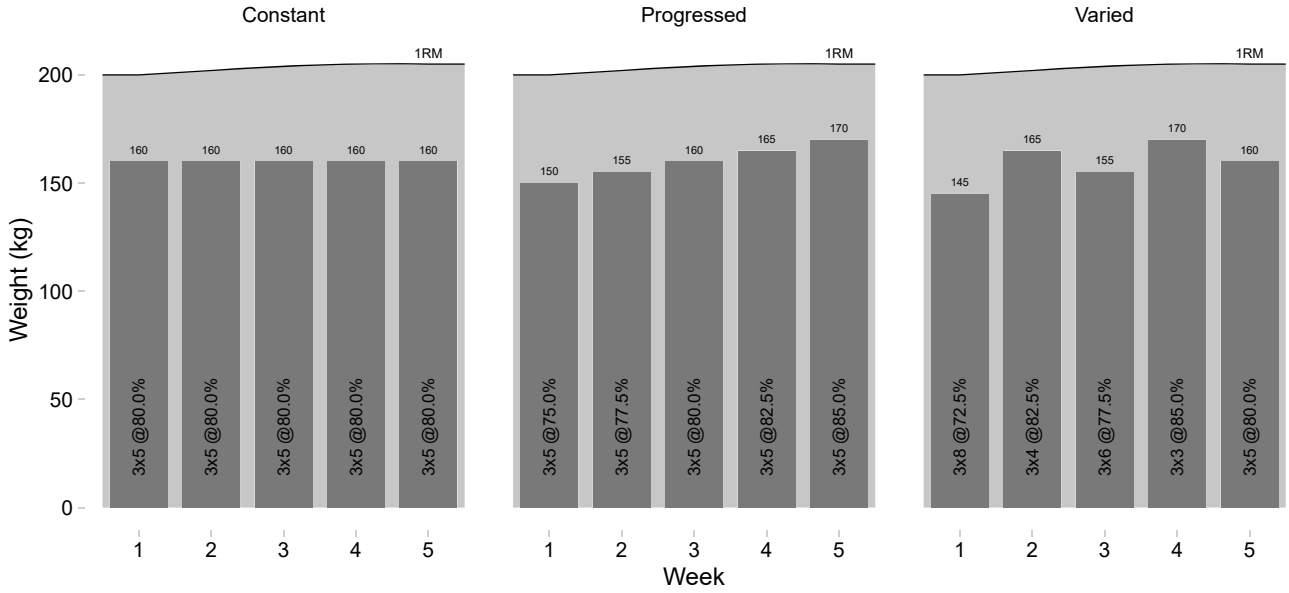


Figure 6.11 Three week to week progression scenarios that have equal total dose characteristics (see Table 6.5) as well as adaptation created (1RM in the back squat)

Progressed scenario involves performing 3x5 workout, but with progressively heavier weight, starting from 3x5 @75% (150kg) in week one, and reaching 3x5 @85% (170kg) in week five. Assuming 1RM remains the same (which is not the case, but for the sake of the argument let consider that scenario), each week involves an increase in the exertion level (expressed as RIR), cause by using heavier load for the same number of reps. Since "bastardized" concept of progressive overload is implemented in this scenario, this is believed to drive the adaptation and thus represents *a must* element in the strength training programs. This "progression" can mean different things as will be explained later in this chapter (see *Vertical planning)*.

Varied scenario involves performing three sets of different reps (8, 4, 6, 3, 5 reps), but since each set is done at the same exertion level (same RIR, at least in theory for this hypothetical example), there is no "progression" across weeks, even if there is an undulating change in weight used (145, 160, 155, 170, 165kg).

If we look at some dose metrics in the Table 6.5, we can see that all three scenarios created very similar, if not the same, training dose. The same training dose (given these metrics) equals the same training response (at least in this hypothetical example, where response is a change in the squat 1RM).

This hypothetical example hopefully demonstrated that progressive overload is a more complex topic than simply increasing or varying weights across weeks. Progressive overload happens over a longer time frame than few weeks.

Constant

Week	Sets	Reps	%1RM	Weight
1	3	5	80.0%	160
2	3	5	80.0%	160
3	3	5	80.0%	160
4	3	5	80.0%	160
5	3	5	80.0%	160

Summary	
NL	75
aRI	80%
Impulse	60.00
Tonnage	12000

Progressed

Week	Sets	Reps	%1RM	Weight
1	3	5	75.0%	150
2	3	5	77.5%	155
3	3	5	80.0%	160
4	3	5	82.5%	165
5	3	5	85.0%	170

Summary	
NL	75
aRI	80%
Impulse	60.00
Tonnage	12000

Varied

Week	Sets	Reps	%1RM	Weight
1	3	8	72.5%	145
2	3	4	82.5%	165
3	3	6	77.5%	155
4	3	3	85.0%	170
5	3	5	80.0%	160

Summary	
NL	78
aRI	78%
Impulse	60.90
Tonnage	12180

Table 6.5 Dose metrics for the constant, progressed and varied scenarios.

From the aforementioned example, it might seem that (week) progression and variation are useless concepts or noise. This cannot be further from the truth. Although *constant scenario* produces the same adaptation, this approach might be boring as hell, might increase the likelihood of chronic overload syndrome and might suffer from a lack of variability. But some athletes might prefer this variant or scenario. Some coaches actually use this approach to estimate the adaptation curves and try to predict their peak and shape which can help in planning the peak (Bondarchuk & Yessis, 2007, 2010). And as said previously, not varying the pre-planned load might not mean the manifested performance is not varied or progressed.

The *progressed scenario* might be too predictable ("Oh crap, I barely survived this workout, and for the next I need to add extra 2.5kg") and if brought too far forward, might be really 'pushing' the adaptation and cause downside rather than upside. Some

athletes prefer this type of planning, where steps are known and pre-planned ahead and they can *feel* the increase in weight ("Oh, I can see the progression from the last workout, and I like the feeling").

When it comes to *varied scenario*, some might actually prefer it, due to its variability and a lack of *predictability* (i.e. it would be harder to judge progression when reps change, as opposed when reps stay the same and athlete can clearly see things going up, or down). This strategy can also help in reducing the likelihood of suffering from boredom and chronic overload syndrome due to its waves in load (but I am speculating).

The point of this is that, after the *basic dose* and progressive overload across a longer time frame (which are necessary conditions) are taken care off, one can experiment with progressions and variations based on individual preferences, but also complex interactions with other training elements. We do not know how given variations and progressions affect adaptation for a given individual and when interacting with other training components, so these need to be experimented with.

It is important to notice that all the aforementioned scenarios (from Table 6.5 and Figure 6.11) can belong to the push and pull domains (see Figure 5.21).

6.5 Progression vs. Variation

In the West, the key word in strength planning is "progression." In the East, it is "variability."

Pavel Tsatsouline (Tsatsouline, 2014)

Although progressive overload represents increasing the training dose to push the adaptation and/or is being pulled by the adaptation itself in the long run, what is the difference between the progression and the variation in the short term[111]?

It is very hard to distinguish between the progression and the variation, but it is important to realize that both of these complementary aspects are involved in planning and represent component of the training dose (both progression and variation are necessary stimuli) (Figure 6.12).

111 Please note that progression~variation as a complementary aspect are involved both in the short term, as well as in the long term (progressive overload). For example, the saturated~distributed, complex~unidirectional as well as extensive~intensive can be traced back to changes in variability.

All 10 vertical planning progression methods will be applied to various set and rep schemes. See Volume Three of this manual for a complete list of generated set and rep schemes.

6.6.2.6.11 Combinations

The mentioned 10 vertical planning progressions represents the most common *archetypes.* The real-life vertical progressions can involve numerous combinations of these archetypes (e.g. see Set and Rep accumulation combined with Block and Block variant). It is up to your imagination and best practices to utilize what seems to be fit for a particular program.

6.7 Mladen's Methodological System of classifying Set and Rep schemes

As outlined in Figure 6.8, an additional approach to classify set and rep scheme that will be explained in this section is a "methodological" approach. The set and rep methods that follow can be applied to different rep ranges, qualities, toughness and volume variants. These will be combined with the aforementioned vertical planning progressions to generate really extensive list of set and rep schemes that can be found in Volume Three of this manual.

Table 6.27 contains a list of 12 different set and reps schemes methods. For the sake of simplicity, each utilized 4x10 (except Cluster and Cluster Wave methods) and Constant vertical planning progression.

	Progression #1		Progression #2		Progression #3		Progression #4	
Set and Rep Scheme	%1RM	Reps	%1RM	Reps	%1RM	Reps	%1RM	Reps
Plateau	59%	10	61%	10	64%	10	66%	10
	59%	10	61%	10	64%	10	66%	10
	59%	10	61%	10	64%	10	66%	10
	59%	10	61%	10	64%	10	66%	10
Step	36%	10	39%	10	42%	10	45%	10
	46%	10	49%	10	52%	10	55%	10
	56%	10	59%	10	62%	10	65%	10
	66%	10	69%	10	72%	10	75%	10
Reverse Step	66%	10	69%	10	72%	10	75%	10
	56%	10	59%	10	62%	10	65%	10
	46%	10	49%	10	52%	10	55%	10
	36%	10	39%	10	42%	10	45%	10
Ascending Wave	59%	10	61%	10	64%	10	66%	10
	63%	8	65%	8	68%	8	71%	8
	68%	6	70%	6	73%	6	75%	6

Table 6.27 Mladen's Methodological System of classifying Set and Rep schemes

Continues on the next page

	Progression #1		Progression #2		Progression #3		Progression #4	
Set and Rep Scheme	%1RM	Reps	%1RM	Reps	%1RM	Reps	%1RM	Reps
Descending Wave	68%	6	70%	6	73%	6	75%	6
	63%	8	65%	8	68%	8	71%	8
	59%	10	61%	10	64%	10	66%	10
Ascending Ladder	62%	2	65%	2	68%	2	70%	2
	62%	3	65%	3	68%	3	70%	3
	62%	5	65%	5	68%	5	70%	5
	62%	10	65%	10	68%	10	70%	10
Descending Ladder	62%	10	65%	10	68%	10	70%	10
	62%	5	65%	5	68%	5	70%	5
	62%	3	65%	3	68%	3	70%	3
	62%	2	65%	2	68%	2	70%	2
Traditional Pyramid	59%	10	61%	10	64%	10	66%	10
	63%	8	65%	8	68%	8	71%	8
	68%	6	70%	6	73%	6	75%	6
	63%	8	65%	8	68%	8	71%	8

Table 6.27 Mladen's Methodological System of classifying Set and Rep schemes

Continued from the previous page

	Progression #1		Progression #2		Progression #3		Progression #4	
Set and Rep Scheme	%1RM	Reps	%1RM	Reps	%1RM	Reps	%1RM	Reps
Reverse Pyramid	68%	6	70%	6	73%	6	75%	6
	63%	8	65%	8	68%	8	71%	8
	59%	10	61%	10	64%	10	66%	10
	63%	8	65%	8	68%	8	71%	8
	68%	6	70%	6	73%	6	75%	6
Light-Heavy	62%	10	65%	10	68%	10	70%	10
	52%	5	55%	5	58%	5	60%	5
	62%	10	65%	10	68%	10	70%	10
	52%	5	55%	5	58%	5	60%	5
	62%	10	65%	10	68%	10	70%	10
Cluster	66%	8 (5x3)	69%	8 (5x3)	72%	8 (5x3)	75%	8 (5x3)
	66%	8 (5x3)	69%	8 (5x3)	72%	8 (5x3)	75%	8 (5x3)
	66%	8 (5x3)	69%	8 (5x3)	72%	8 (5x3)	75%	8 (5x3)
	66%	8 (5x3)	69%	8 (5x3)	72%	8 (5x3)	75%	8 (5x3)
Cluster Wave	66%	8 (5x3)	69%	8 (5x3)	72%	8 (5x3)	75%	8 (5x3)
	69%	7 (4x3)	71%	7 (4x3)	74%	7 (4x3)	77%	7 (4x3)
	71%	6 (6x2)	74%	6 (6x2)	76%	6 (6x2)	79%	6 (6x2)

Table 6.27 Mladen's Methodological System of classifying Set and Rep schemes
Continued from the previous page

7.3.3 Interlude: On Individualization

In one ideological sense, individualization is about creating "equal playing field", or making sure everyone is training at similar individual potential. What does "equal playing field" mean here?

Imagine we have N=15 athletes, with a range of 85 - 110kg 1RM in the bench press. The average of this group is around 100kg (SD = 7.5kg). The first *method* of *equality* (or creating equal playing field) would be to make everyone lift 3x5 with 80kg over few weeks. The external load is equal for every individual (since everyone is lifting 80kg for 3 sets of 5), but is the *internal load* and hence stimuli the same for everyone? 3x5 with 80kg might be too much for some individuals and too little for the others.

Therefore, we decide to use *relative intensity*, where load is selected based on individual 1RM. The second method uses percentages of 1RM to prescribe, e.g. 3x5 @80%. This is much better because we take into account individual differences (or individual potential). Since everyone is lifting relative to their 1RM, have we achieved equal playing field? Hold your horses, my liberal social justice warrior friend. Although much improved in making things more equal, 80% of 1RM still might be too much for an individual to do for 5 reps with, or it might be too little. One solution could be to create individualized rep-max tables (which might be a pipe dream if we use many exercises, particularly with strength-generalists). Other solution would be to allow for some flexibility in prescription, by introducing variance in the system by giving some rep or load ranges (e.g. 3x4-6 @75-85%). Perfect? Not really, but much better.

Even with flexible prescription, a few individuals might experience the set as very unpleasant, since they might be very tall, or prefer smaller number of reps in a set. So, to make the equal playing field even more equal, we decide to use a method number three, which is even more individualized by prescribing using RIR (e.g. 3x5 w/2RIR or 3x80% w/2RIR)[136]. We do this since we believe that individual subjective feeling is the construct that needs to be targeted with *equality*. Since everyone is training at the equal *potential* (potential in this case being the same RIR at the same reps or %1RM), we must be creating same stimuli (dose) and hence we can expect same response? Sorry to disappoint, but no.

The *equality* methods above are mostly related to the repetition level (or a single

136 We can also use VBT, or velocity drop metrics to stop the set at, say, 10-20% drop in mean velocity. But why 10%? Why 10% for all the athletes?

set), but what if someone needs to do more or fewer sets? Everything else being equal, one needs 5 sets and other needs only 2 sets. So, the SJW in us needs to set another *equality* normalization level. We might measure *fatigue accumulation* construct across the sets, with some proxy metrics, like increase in RIR rating (e.g. first set 8RIR, second 8RIR, third 9RIR, done), drop in reps at the same RIR rating (first set 5 reps @8RIR, second set 5 reps @8RIR, third set 4 reps @8RIR, done), drop in average set velocity and so forth. These are usually called *Fatigue Percents* (Tuchscherer, 2008, 2016), and will be explained after this interlude. So now, besides *equalizing* individual sets, we also equalizing multiple sets. This is done by performing sets until reaching a particular metric with the aim of individualizing training dose. For example, repeating sets of 5 w/2RIR until reaching 5% fatigue level. This way we assume that everyone is training at an equal individual potential by auto regulating dose based on stress (i.e. fatigue experienced).

Figure 7.27 depicts the methods above with hypothetical Pre and Post scores.

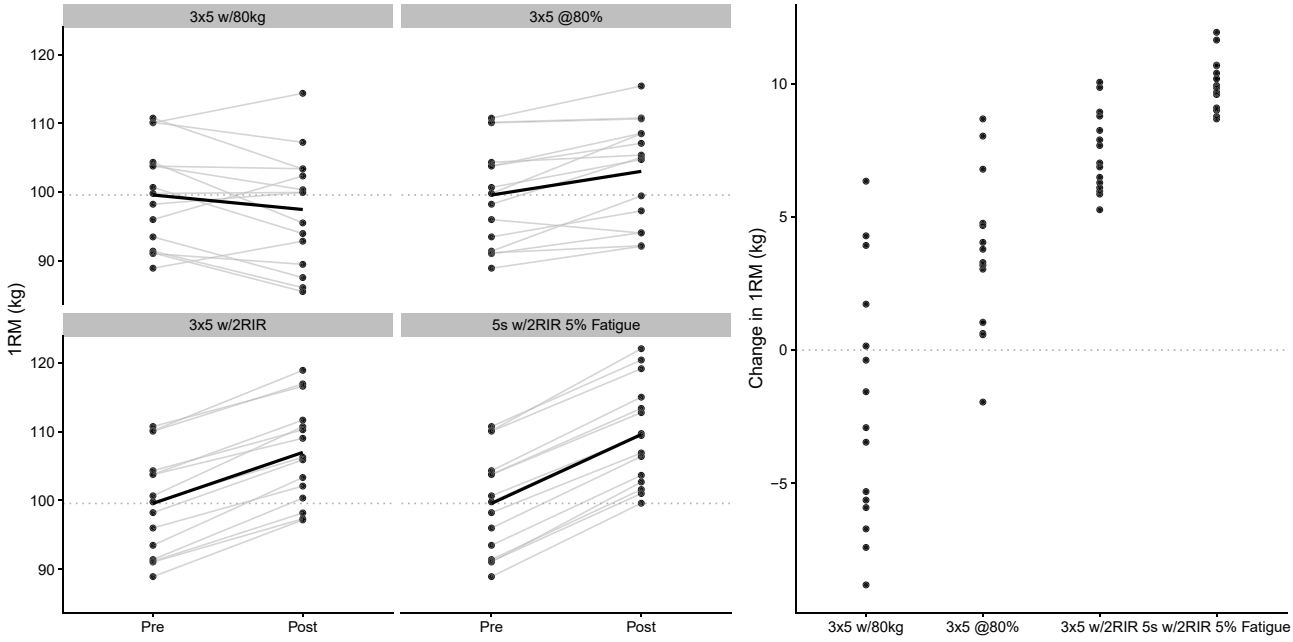


Figure 7.27 Hypothetical methods of individualizing by creating equal playing field. Each dot represents one athlete's bench press 1RM. Left panel depicts Pre and Post score, while the right panel depicts the change in score (Post - Pre)

Our belief here is that by individualizing the training, we create equal playing field and hence we get higher training effects, as well as lower inter-individual differences in response. Figure 7.28 and Figure 7.29 depict this theoretical idea.

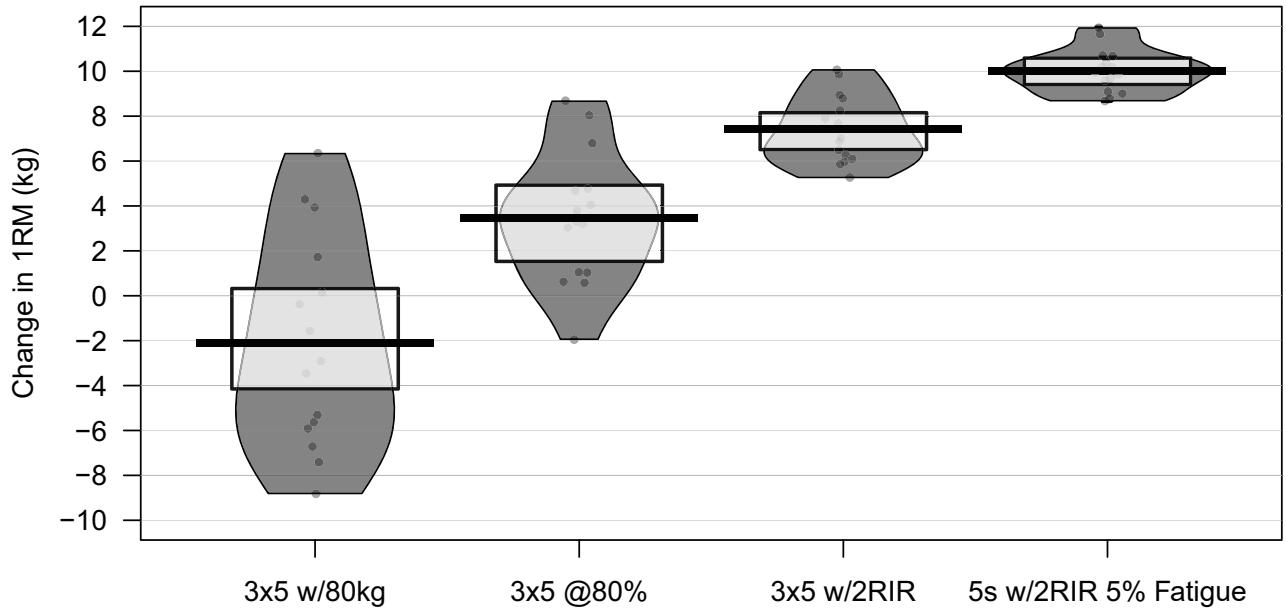


Figure 7.28 Depicting hypothetical change scores (Post - Pre) when using different methods of individualization. In theory, by individualizing the effects should be better, and inter-individual variation should be smaller

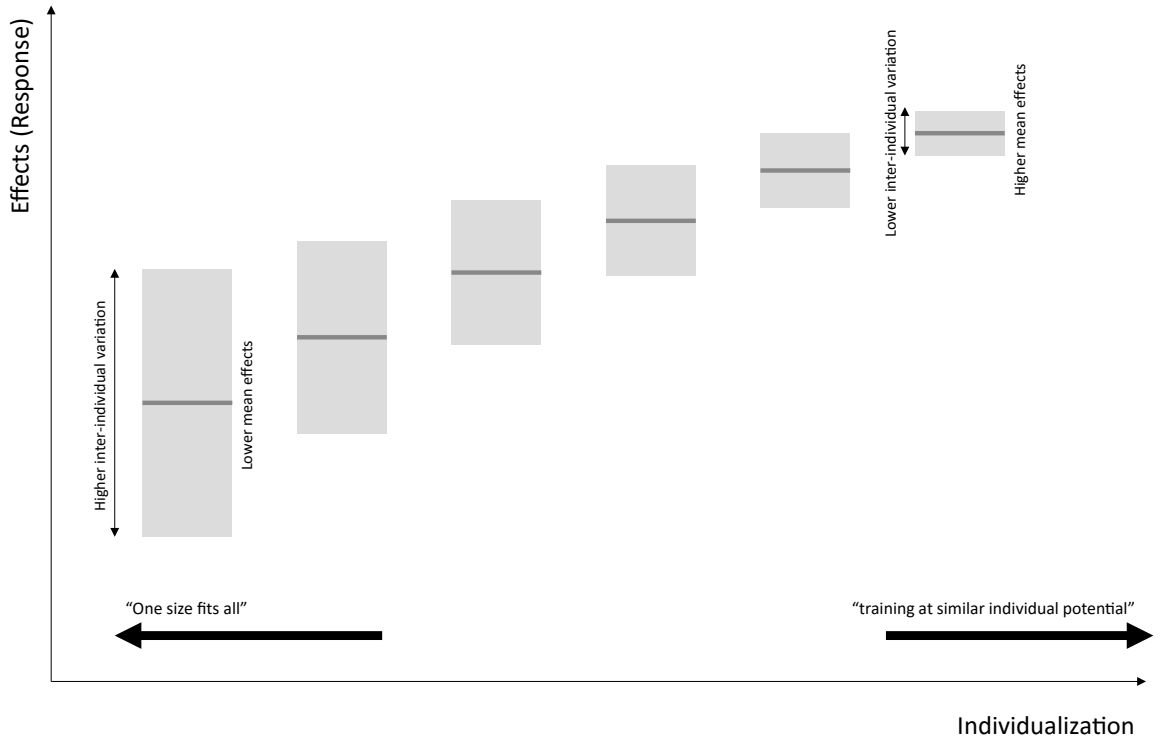


Figure 7.29 In theory, individualizing more improves the overall effect, and reduces the inter-individual variation. In theory...

This is great in theory, same as with other left wing and progressive ideas, but fails in practice. Why is that? First, there are unlimited number of variables that one

can use as proxies to *equalize* or create equal playing field. In all of the methods above, we used individualization principle. We can also continue by individualizing the rest time, range of motion, exercise selection, you name it. We can also use different metrics to represent those constructs (e.g. stress created by sets can be measured by drop in average velocity, increasing in RIR ratings, increase in ammonia production, drop in EMG, just to name a few). Hence, it is *impossible* to create an equal playing field, since equality can be represented with unlimited number of variables that need *equalization*, and by balancing one, we create havoc somewhere else. Very much similar to the progressive ideologues and SJW types. But even more important, how the hell do we know that we have *maximized individual response,* by equalizing individual dose metrics? What if doing "5s at 2RIR until 5% Fatigue" is epitome of self-regulating dose and creating an equal playing field, but one slacks? Or if ne needs higher levels of dose than *equalized* dose to progress? What if someone prefers something else? What if that same workout creates bigger soreness for a few athletes, which affects the next session? What if someone suffers from fuckarounditis and needs a *whip* every now and then? What if we cannot manage workout like that in the group setting due to the facility and equipment limitation? Why do we think that dose created by "5s at 2RIR until 5% Fatigue" is actually equal to everyone? Or it will create similar responses? Why do we actually want similar responses in the first place?

The point is that we do need to strive for individualization but *keep it real* and understand that there are numerous assumptions in the equalization process and models. We do need some *bias* in the program and understand that at the end of the day, even with individualization, we are still experimenting. If we go back to the Figure 1.1, the aim of individualization is in *forum for action*, particularly with the group settings, by making sure everyone survives the workout and performs at similar individual potential or current ability. At the end of the day, we are still wrestling with uncertainty. This is about *satisficing* (good enough) individualization, rather than ideological or place-of-things individualization.

Rather than utilizing SJW definition of individualization, I prefer another one (see Figure 7.30). It is not about training at equal individual potential, as much as it is about *reaching* full (or better yet, satisficing) potential while avoiding the downsides. Surely, making sure that one is not killed in the workout by using dose individualization is a step forward, but it is not the end goal. Most likely, there is a tipping point where this *equal playing field* becomes detrimental or exercise in futility.

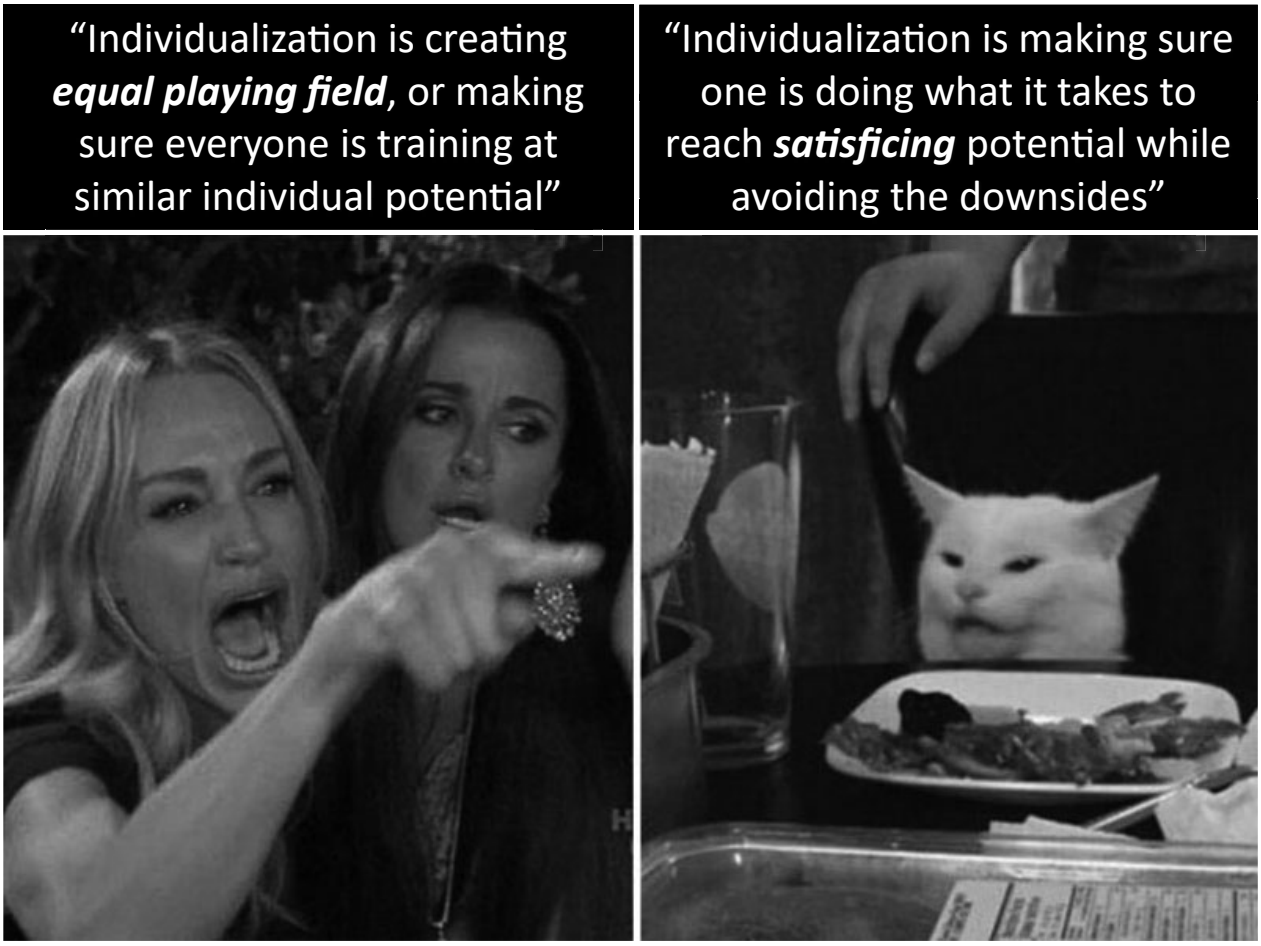


Figure 7.30 Better definition of individualization

7.3.4 Back to the Set Level

Besides individualization, by utilizing relative prescription in trying to match athlete's current ability (stable level of adaptation and current state), Review and Retrospective also deals with making sure that what is actually prescribed is being realized. For example, if a hard workout is planned, one wants to make sure a hard workout is actually done. This doesn't mean following a program to the letter, but acknowledging program constraints and bias, while providing for some variance to take into account errors in the prescription and current ability of the athletes.

For example, if program calls for 80% 1RM, one way to make sure that 80% is actually used, is to either use predicted or estimated 1RM (done with LV profile or using RIR equation), VBT prescription by using velocity associated with 80% 1RM from

About

Mladen Jovanović is a Serbian Strength and Conditioning Coach and Sport Scientist. Mladen was involved in the physical preparation of professional, amateur and recreational athletes of various ages in sports, such as basketball, soccer, volleyball, martial arts, tennis and Australian rules football. In 2010, Mladen started the Complementary Training website and in 2017 developed the scheduling and monitoring application, the AthleteSR. He is currently pursuing his PhD at the Faculty of Sports and Physical Education in Belgrade, Serbia.

Twitter: @physical_prep
Instagram: @physical_prep
Facebook: www.facebook.com/complementarytraining/
Website: www.complementarytraining.net
Email: coach.mladen.jovanović@gmail.com