S1. Bayesian Data Analysis

The following supplementary information introduces the WAMBS (When to be concerned and how to prevent the misapplication of Bayesian Statistics) checklist as a diagnostic instrument employed to evaluate prior distributions, the estimation process, and the impact of priors on the analysis of outcome measures (Figure S1). The subsequent section provides a comprehensive explanation of the WAMBS checklist and its application.

THE WAMBS-CHECKLIST

When to worry, and how to Avoid the Misuse of Bayesian Statistics

DEPAOLI & VAN DE SCHOOT (2016)

	Did you show your supervisor…?	Should you worry?	Should you consult an expert?
TO BE CHECKED BEFORE ESTIMATING THE MODEL			
Point 1: Do you understand the priors?	Table 1	YES / NO	YES / NO
TO BE CHECKED AFTER ESTIMATION BUT BEFORE INSPECTING MODEL RESULTS			
Point 2: Does the trace-plot exhibit convergence?	Table 2, column 2	YES / NO	YES / NO
Point 3: Does convergence remain after doubling the number of iterations?	Table 4, columns 2, 3 (i) and akin to Table 3	YES / NO	YES / NO
Point 4: Does the histogram have enough information?	Table 2, column 3	YES / NO	n/a
Point 5: Do the chains exhibit a strong degree of autocorrelation?	Table 2, column 4	YES / NO	YES / NO
Point 6: Does the posterior distribution make substantive sense?	Table 2, column 5	YES / NO	YES / NO
UNDERSTANDING THE EXACT INFLUENCE OF THE PRIORS			
Point 7: Do different specifications of the multivariate variance priors influence the results?	Table 4, columns 2, 3 (ii)	YES / NO	YES / NO
Point 8: Is there a notable effect of the prior when compared with non-informative priors?	Table 4, columns 2, 3 (iii)	NEVER	n/a
Point 9: Are the results stable from a sensitivity analysis?	Sensitivity analysis akin to Table 5 or Figure 4	NEVER	YES / NO
AFTER INTERPRETATION OF MODEL RESULTS			
Point 10: Is the Bayesian way of interpreting and reporting model results used? *(a) Also report on: missing data, model fit and comparison, non-response, generalizability, ability to replicate, etc.*	Text – see Appendix	YES / NO	YES / NO

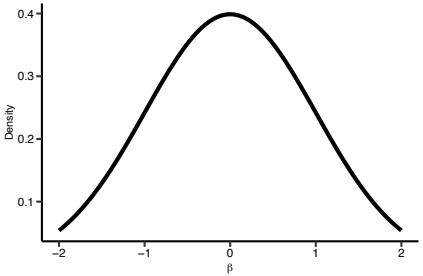
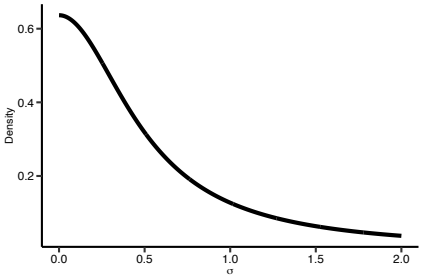
Figure S1. The WAMBS-checklist. Retrieved from Depaoli & Van De Schoot (https://pubmed.ncbi.nlm.nih.gov/26690773/) where further information about each point on the checklist can be found.

1.1 Absolute & Relative Changes in Muscle Size

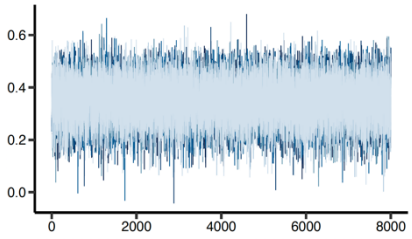
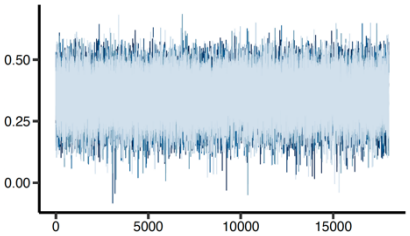
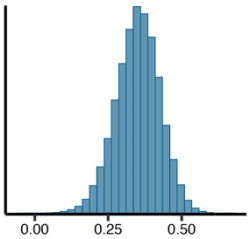
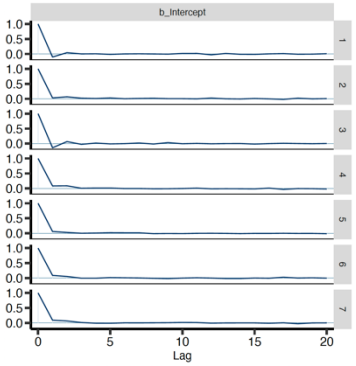
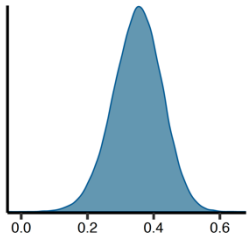
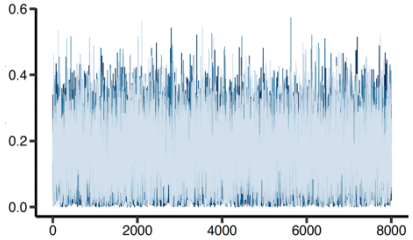
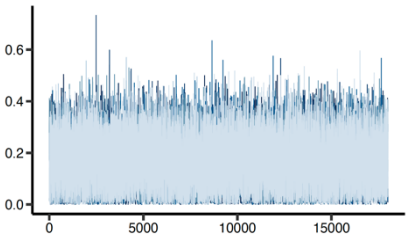
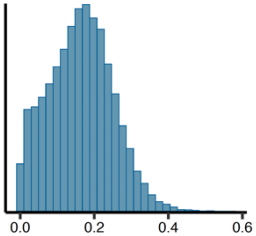
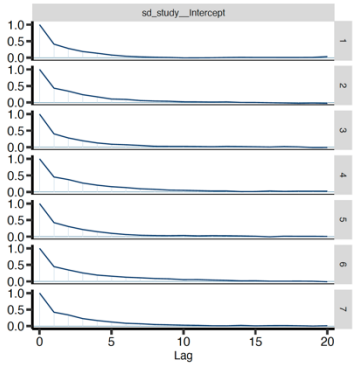
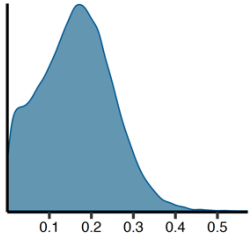
THE WAMBS-CHECKLIST
(Depaoli & Van De Schoot, 2016)

Prior to estimation	
1. Do you understand the priors?	For absolute and relative changes in muscle size from pre- to post-intervention, we will be using a weakly informative prior to reflect our weakly held belief that some effect sizes are normally distributed and that they will lie somewhere between SMD = -2.0 and 2.0. Meta-analytic results from Roberts et al. (2020) have been used to inform this assumption about the intercept parameter. For the heterogeneity (standard deviation) parameter, a conservative Half-Cauchy prior will be used as suggested by https://psyarxiv.com/7tbrm/.
Estimation diagnosis	
2. Does the trace-plot exhibit convergence?	Yes, all trace-plots exhibit convergence.
3. Does convergence remain after doubling the number of iterations?	Yes, after doubling of iterations (from 10,000 to 20,000) the trace-plots still exhibit convergence as evidenced by our calculations of relative bias *[100 x (original estimate – new estimate / original estimate)]* that show the number of iterations did not meaningfully influence the posterior estimates.
4. Does the histogram have enough information?	Yes, histogram contains sufficient information, is smooth, and is absent of any gaps or other abnormalities.
5. Do chains exhibit autocorrelation?	Yes, autocorrelations plots exhibit appropriate dependence between samples.
6. Do posterior distributions make sense?	Yes, posterior distributions are clearly cantered around one value, display a realistic estimate, and make substantive sense compared to our prior beliefs.
Influence of priors	
7. Do different variance priors influence the results?	We compared the original estimate with a model that uses different hyperparameters for the Inverse Gamma prior for the residual variance *[IG: 0.5, 0.5)]*. For absolute changes in muscle size, results are robust as evidenced by a minimum amount of relative bias. However, for relative changes in muscle size some relative bias seems to exist.
8. Is there a notable effect of the prior when compared with non-informative priors?	No, the weakly informative priors we used do not meaningfully impact the posterior estimates when compared to non-informative priors.
9. Are the results stable from a sensitivity analysis?	Yes, results from all sensitivity analyses are stable and suggest that our original model has generated robust results.
Interpretation of results	
10. Is the Bayesian way of interpretation and reporting model results used? *Also report on: missing data, model fit and comparison, non-response, generalisability, ability to replicate etc.*	Yes, inferences from all the analyses were made from posterior samples generated using the Hamiltonian Markov Chain Monte Carlo method and via the use of high-density credible intervals (HDI). Interpretations were based on the ES and associated HDI limits, along with the probability of direction (pd). We categorised ESs by qualitative thresholds (i.e., small, medium, and large) established from previous strength and conditioning interventions that have been used in research investigating muscle hypertrophy.

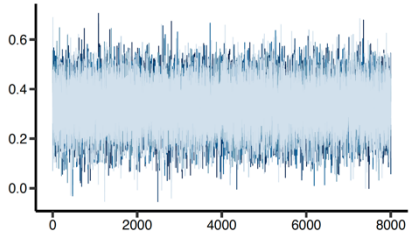
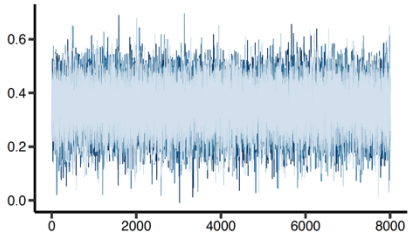
1.1.1 Prior Specification (Absolute & Relative Changes in Muscle Size)

Parameters	Distributional form	Type of prior	Source of information	Plot visualisation	Hyperparameters
Intercept	Normal	Weakly informative	Roberts et al. (2020)		N (0.0, 1.0)
Sigma	Half Cauchy	Weakly informative	Roberts et al. (2020)		N (0.0, 0.5)

1.1.2 Model Diagnostics (Absolute Changes in Muscle Size)

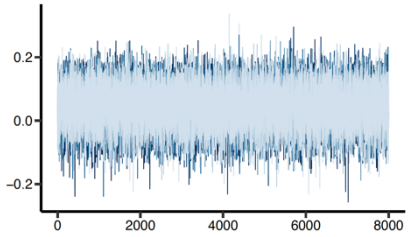
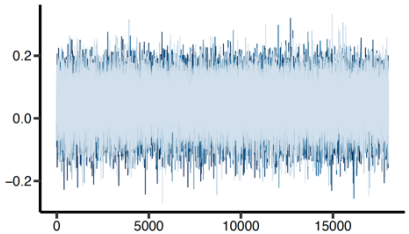
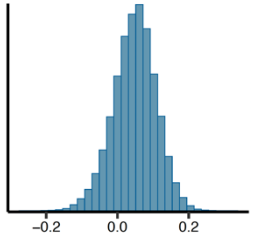
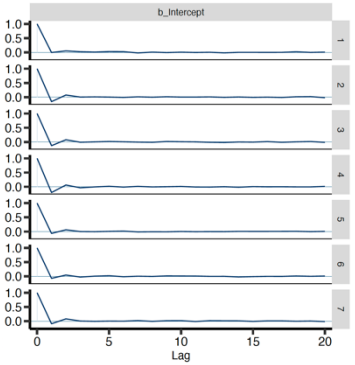
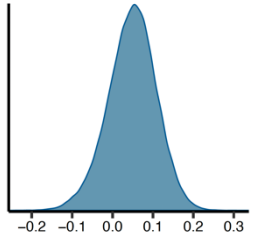
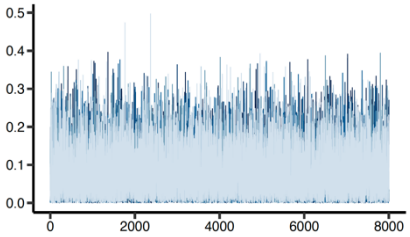
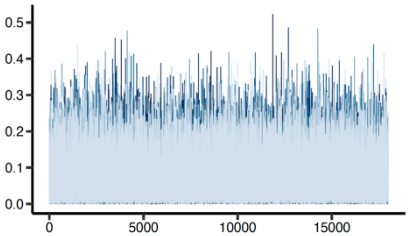
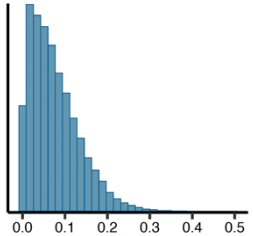
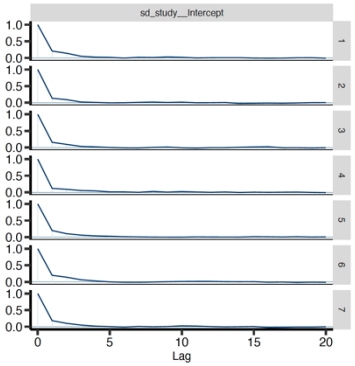
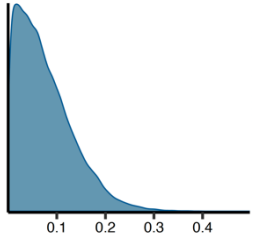
Trace plot	Trace plot (double iterations)	Histogram	Autocorrelation	Kernel density
Intercept Parameter				
	 *Relative Bias = 0%*			
Sigma Parameter				
	 *Relative Bias = 0%*			

1.1.3 Sensitivity Analysis (Absolute Changes in Muscle Size)

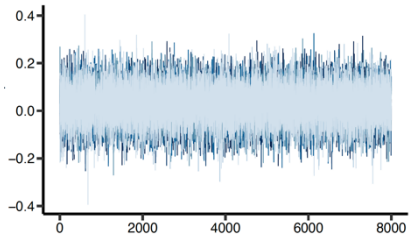
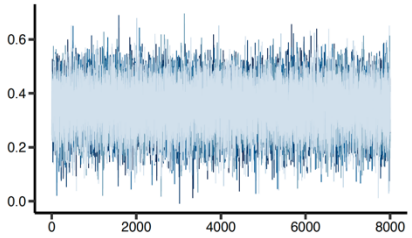
Prior comparison	Hyperparameters	Trace plot	Size of Effect (%)
Variance	IG (0.5, 0.5)		ES Estimate = 0.33 Size of Effect = 5.71%
Non-informative	N/A		ES Estimate = 0.35 Size of Effect = 0%

Size of Effect (%) = (Original Model ES – Sensitivity Model ES) / Original Model ES

1.1.4 Model Diagnostics (Relative Changes in Muscle Size)

Trace plot	Trace plot (double iterations)	Histogram	Autocorrelation	Kernel density
Intercept Parameter				
	 *Relative Bias = 0%*			
Sigma Parameter				
	 *Relative Bias = 0%*			

1.1.5 Sensitivity Analysis (Relative Changes in Muscle Size)

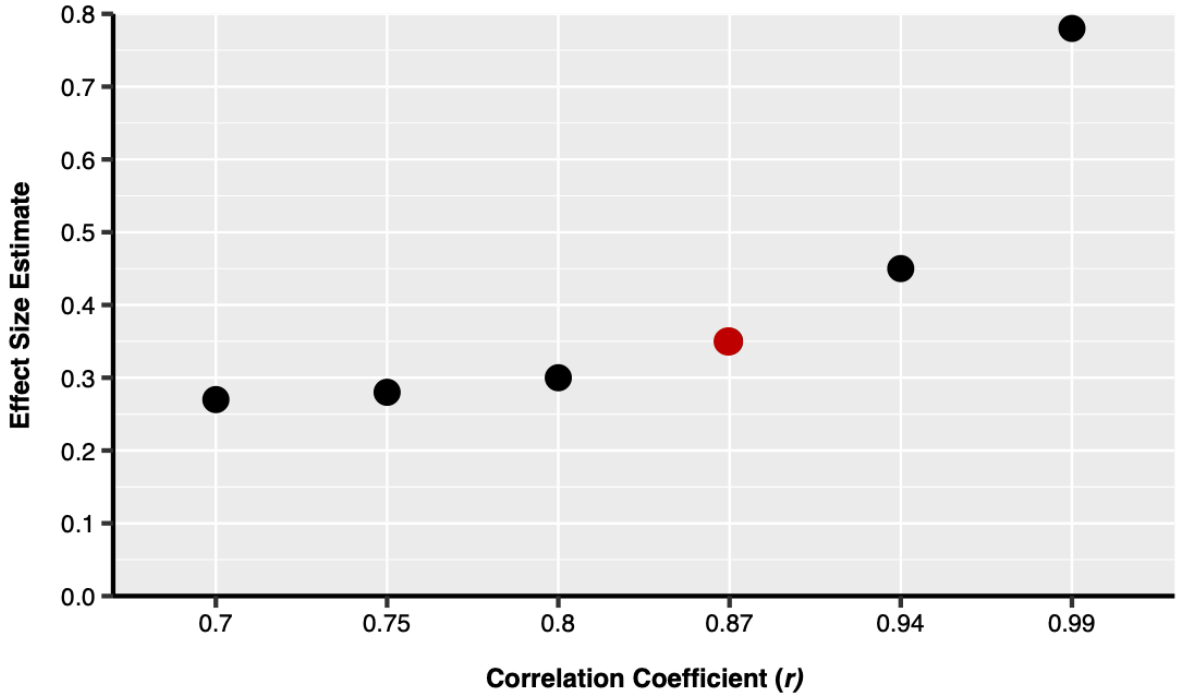
Prior comparison	Hyperparameters	Trace plot	Size of effect (%)
Variance	IG (0.5, 0.5)		ES Estimate = 0.02 Size of Effect = 60%
Non-informative	N/A		ES Estimate = 0.05 Size of Effect = 0%

Size of Effect (%) = (Original Model ES – Sensitivity Model ES) / Original Model ES

S2. Sensitivity Analyses of Correlation Coefficients

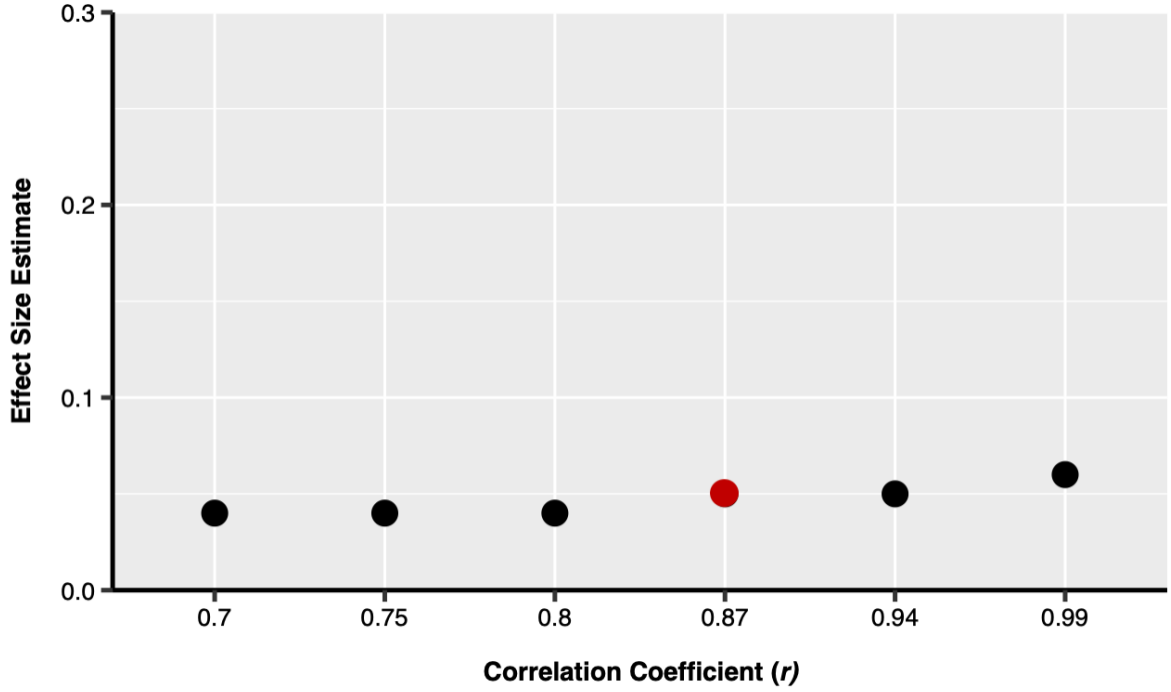
2.1 Studies Investigating Absolute Changes in Muscle Size

Figure 2.1.1 Scatter Plot of Effect Sizes Associated with r = 0.7 to 0.99



2.2 Studies Investigating Relative Changes in Muscle Size

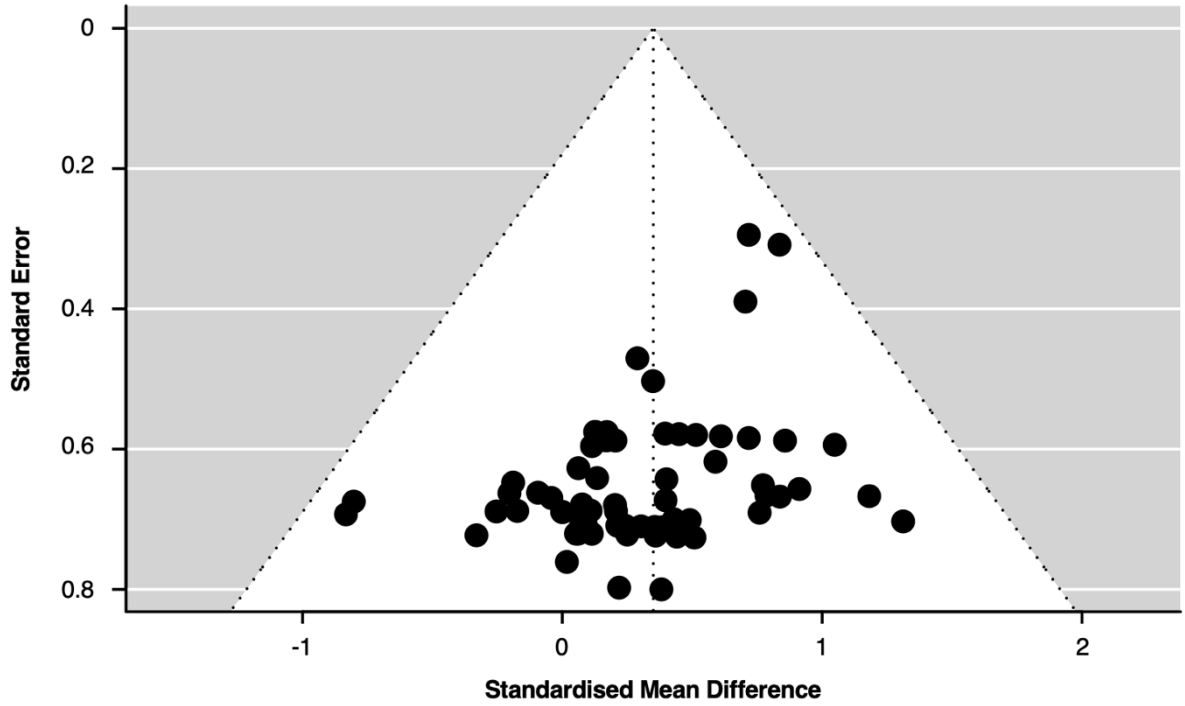
Figure 2.2.1 Scatter Plot of Effect Sizes Associated with r = 0.7 to 0.99



S3. Publication Bias

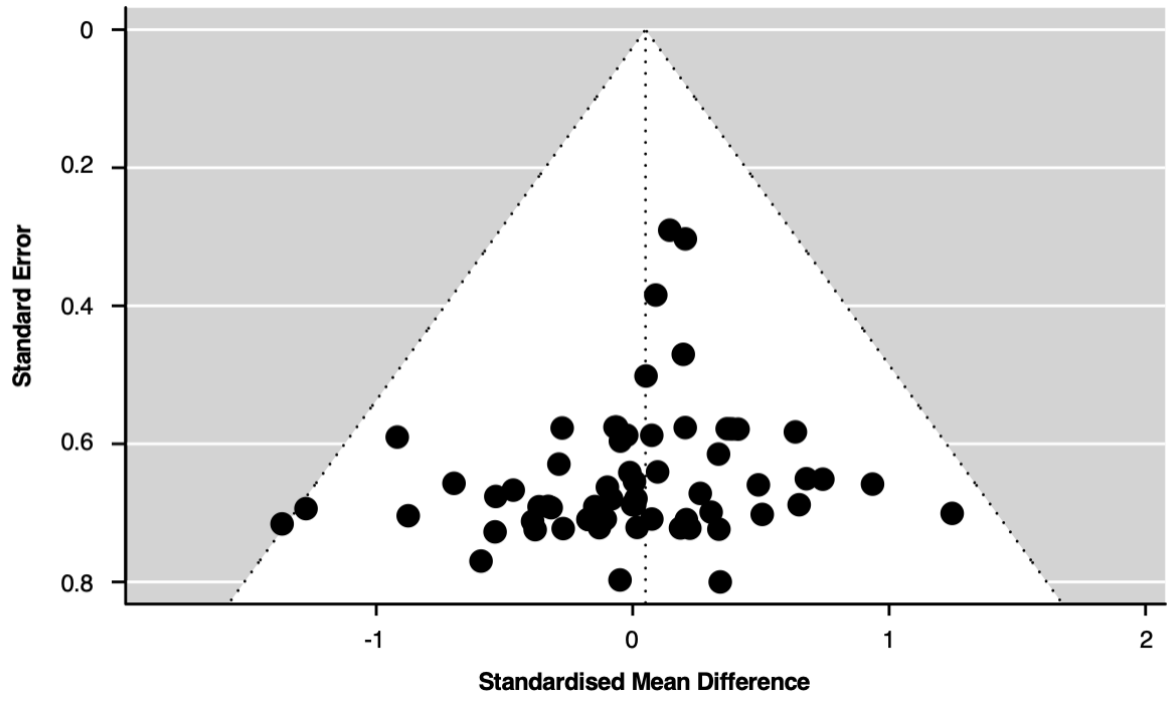
3.1 Studies Investigating Absolute Changes in Muscle Size

Figure 3.1.1 Funnel Plot of All Effects (Absolute Changes in Muscle Size)



3.2 Studies Investigating Relative Changes in Muscle Size

Figure 3.2.1 Funnel Plot of All Effects (Relative Changes in Muscle Size)



S4. Methodological Quality Assessment

Table 4.1. Methodological quality for each included study assessed using the SMART-LD tool.

Study	TESTEX Scale Item																	
	1	**2**	**3**	**4**	**5a**	**5b**	**5c**	**6a**	**6b**	**6c**	**7**	**8**	**8**	**9**	**10**	**11**	**12**	**Total**
Abe (2000)	1	1	1	1	No	No	0	0	0	0	0	1	1	1	0	1	1	9
Abou Sawan (2021)	1	1	1	1	No	No	1	0	0	0	0	1	1	1	0	1	1	10
Abou Sawan (2022)	1	1	1	1	No	No	1	0	0	0	0	1	1	1	0	1	1	10
Alway (1992)	1	1	1	1	No	No	0	0	1	0	1	1	1	1	0	1	1	11
Coratella (2018)	1	1	1	1	No	No	0	0	0	0	0	1	1	1	0	1	1	9
Cureton (1988)	1	1	1	1	No	No	0	0	0	0	0	1	1	1	0	1	1	9
Fernandez-Gonzalo (2014)	1	1	1	1	No	No	0	0	0	0	0	1	1	1	0	1	1	9
Hakkinen (1998)	1	1	1	1	No	No	0	0	0	0	0	1	1	1	1	1	1	10
Hakkinen (2001)	1	1	1	1	No	No	0	0	0	0	0	1	1	1	1	1	1	10
Hammarstrom (2020)	1	1	1	1	No	No	1	0	0	1	0	1	1	1	0	1	1	11
Hubal (2005)	1	1	1	1	No	No	1	0	0	0	0	1	1	1	0	1	1	10
Hurlbut (2002)	1	1	1	1	No	No	0	0	0	0	0	1	1	1	0	1	1	9
Ivey (2000)	1	1	1	1	No	No	1	0	0	0	0	1	1	1	0	1	1	10
Kojic (2021)	1	1	1	1	No	No	0	0	0	0	0	1	1	1	0	1	1	9
Kosek (2006)	1	1	1	1	No	No	1	0	0	1	0	1	1	1	0	1	1	11
Lundberg (2019)	1	1	1	1	No	No	1	0	0	1	0	1	1	1	0	1	1	11
McMahon (2018)	1	1	1	1	No	No	0	0	0	0	0	1	1	1	0	1	1	9
Moesgaard (2022)	1	1	1	1	No	No	1	1	0	1	0	1	1	1	0	1	1	12

Nunes (2020)	1	1	1	1	No	No	1	0	0	0	0	1	1	1	0	1	1	10
O'Hagan (1995)	1	1	1	1	No	No	1	1	0	1	0	1	1	1	0	1	1	12
Peterson (2010)	1	1	1	1	No	No	0	0	0	0	0	1	1	1	0	1	1	9
Psilander (2019)	1	1	1	1	No	No	1	0	0	0	0	1	1	1	0	1	1	10
Reece (2023)	1	1	1	1	No	No	0	0	0	1	0	1	1	1	0	1	1	10
Ribeiro (2014)	1	1	1	1	No	No	0	0	0	0	0	1	1	1	0	1	1	9
Rissanen (2022)	1	1	1	1	No	No	0	0	0	1	0	1	1	1	0	1	1	10
Schwanbeck (2020)	1	1	1	1	No	No	0	1	0	1	0	1	1	1	0	1	1	11
Walsh (2009)	1	1	1	1	No	No	0	0	0	0	0	1	1	1	0	1	1	9

Considering that all included studies involved a comparison between males and females, no randomisation procedures were required, allocation concealment was not possible, and muscle size differed at baseline, thus, criterion '2' (i.e., "randomisation specified"), criterion '3' (i.e., "allocation concealment"), and criterion '4' (i.e., "groups similar at baseline") were given one point for every study.

S5. Meta-Analysis of Muscle Fibre Type-Specific Hypertrophy

5.1 Studies Investigating Absolute Changes in Muscle Size

Figure 5.1.1 Meta-Analysis of Type I and Type II Muscle Fibre Hypertrophy

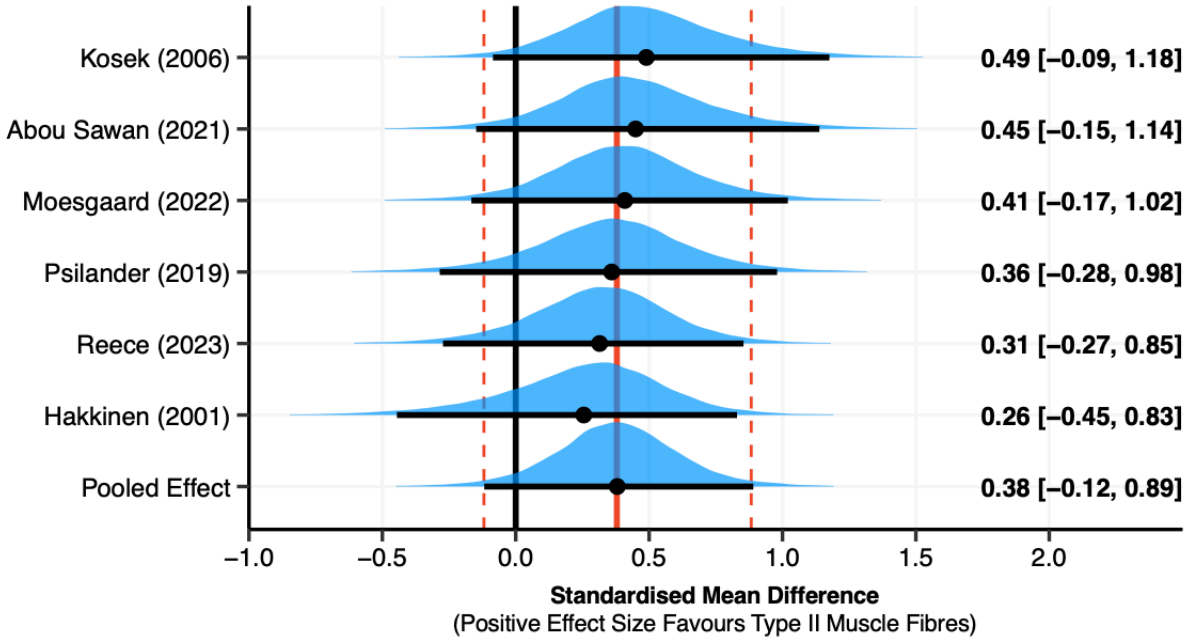
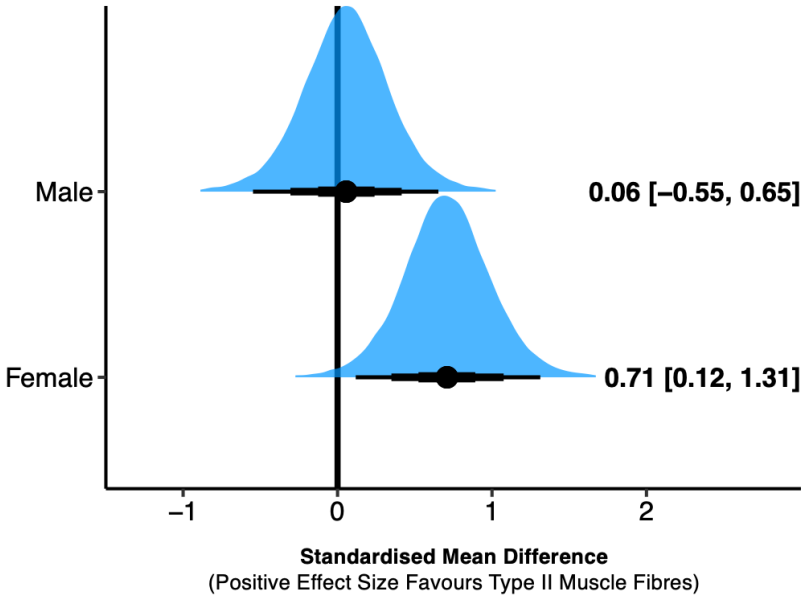


Figure 5.1.2 Sub-Group Analysis of Biological Sex Differences in Type I and Type II Muscle Fibre Hypertrophy



5.2 Studies Investigating Relative Changes in Muscle Size

Figure 5.2.1 Meta-Analysis of Type I and Type II Muscle Fibre Hypertrophy

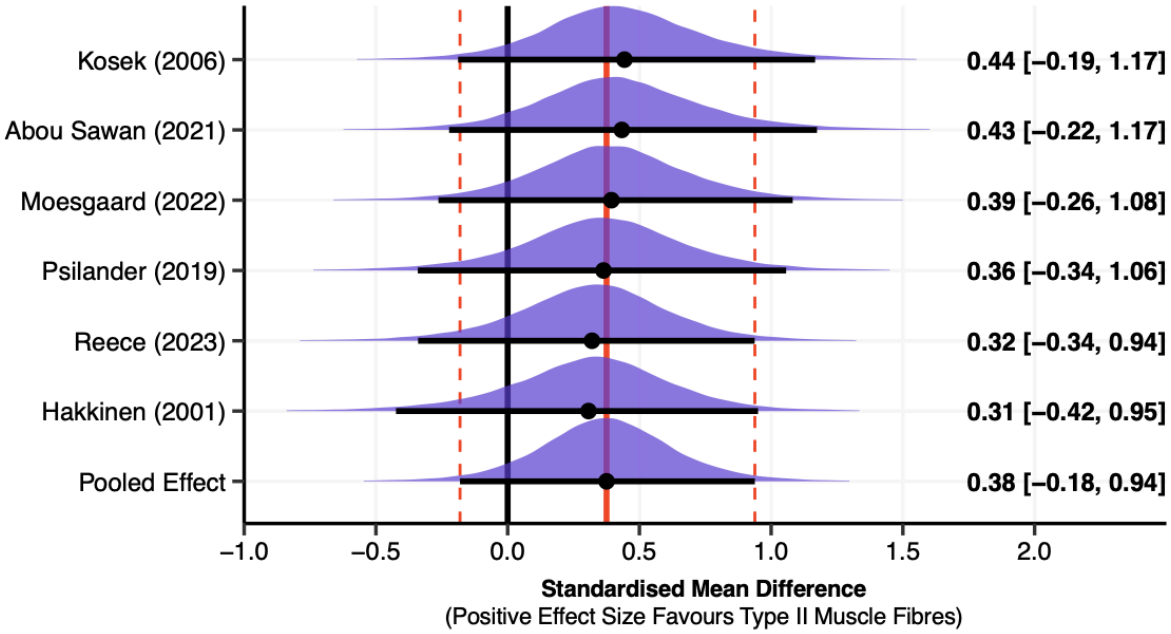
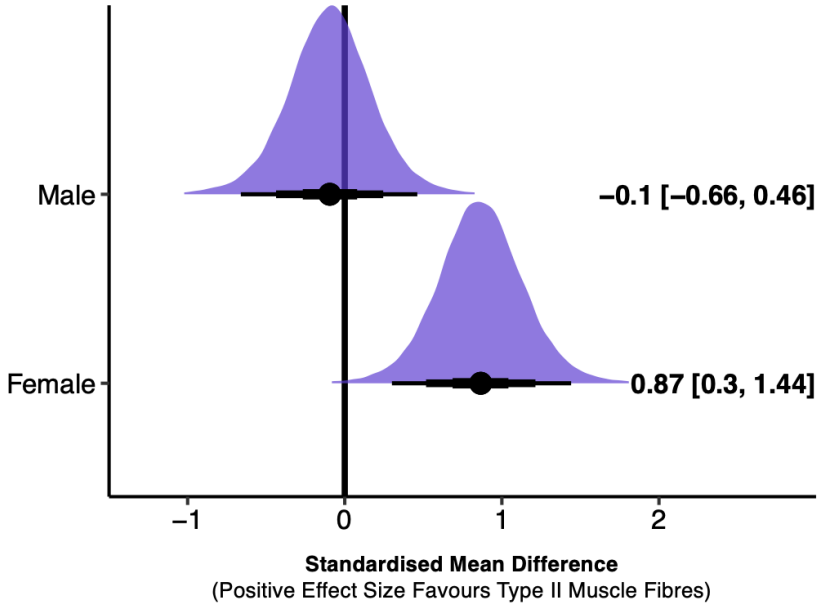


Figure 5.2.2 Sub-Group Analysis of Biological Sex Differences in Type I and Type II Muscle Fibre Hypertrophy



S6. PRISMA Checklist

Section and Topic	Item #	Checklist item	Location where item is reported
TITLE			
Title	1	Identify the report as a systematic review.	**Complete**
ABSTRACT			
Abstract	2	See the PRISMA 2020 for Abstracts checklist.	**Complete**
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of existing knowledge.	**2nd Paragraph, Introduction**
Objectives	4	Provide an explicit statement of the objective(s) or question(s) the review addresses.	**3rd Paragraph, Introduction**
METHODS			
Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.	**Section 2.4**
Information sources	6	Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted.	**Section 2.2**
Search strategy	7	Present the full search strategies for all databases, registers and websites, including any filters and limits used.	**Section 2.2**
Selection process	8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.	**Section 2.3**
Data collection process	9	Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process.	**Section 2.3**
Data items	10a	List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect.	**Section 2.5**
	10b	List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information.	**Section 2.5**
Study risk of bias assessment	11	Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process.	**Section 2.6**
Effect measures	12	Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results.	**Section 2.7**
Synthesis methods	13a	Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item #5)).	**Section 2.5**
	13b	Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions.	**Section 2.7**
	13c	Describe any methods used to tabulate or visually display results of individual studies and syntheses.	**Section 2.7**
	13d	Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used.	**Section 2.7**

Section and Topic	Item #	Checklist item	Location where item is reported
	13e	Describe any methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analysis, meta-regression).	**Section 2.7**
	13f	Describe any sensitivity analyses conducted to assess robustness of the synthesized results.	**Section 2.7**
Reporting bias assessment	14	Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases).	**Section 2.7**
Certainty assessment	15	Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome.	**Section 2.7**
RESULTS			
Study selection	16a	Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram.	**Section 3.1**
	16b	Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded.	**Section 3.1**
Study characteristics	17	Cite each included study and present its characteristics.	**Table 1**
Risk of bias in studies	18	Present assessments of risk of bias for each included study.	**Section 2.6**
Results of individual studies	19	For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g. confidence/credible interval), ideally using structured tables or plots.	**Section 3.3**
Results of syntheses	20a	For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies.	**Section 3.3**
	20b	Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (e.g. confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect.	**Section 3.3**
	20c	Present results of all investigations of possible causes of heterogeneity among study results.	**Section 3.3**
	20d	Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results.	**Section 3.4**
Reporting biases	21	Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed.	**Section 3.2**
Certainty of evidence	22	Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.	**Section 3.3**
DISCUSSION			
Discussion	23a	Provide a general interpretation of the results in the context of other evidence.	**Section 4.1-4.2**
	23b	Discuss any limitations of the evidence included in the review.	**Section 4.3**
	23c	Discuss any limitations of the review processes used.	**Section 4.3**
	23d	Discuss implications of the results for practice, policy, and future research.	**Section 4.4**
OTHER INFORMATION			
Registration and protocol	24a	Provide registration information for the review, including register name and registration number, or state that the review was not registered.	**Section 2**
	24b	Indicate where the review protocol can be accessed, or state that a protocol was not prepared.	**Section 2**
	24c	Describe and explain any amendments to information provided at registration or in the protocol.	**Section 2.1**

Section and Topic	Item #	Checklist item	Location where item is reported
Support	25	Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review.	**Statements & Declarations**
Competing interests	26	Declare any competing interests of review authors.	**Statements & Declarations**
Availability of data, code and other materials	27	Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review.	**Statements & Declarations**

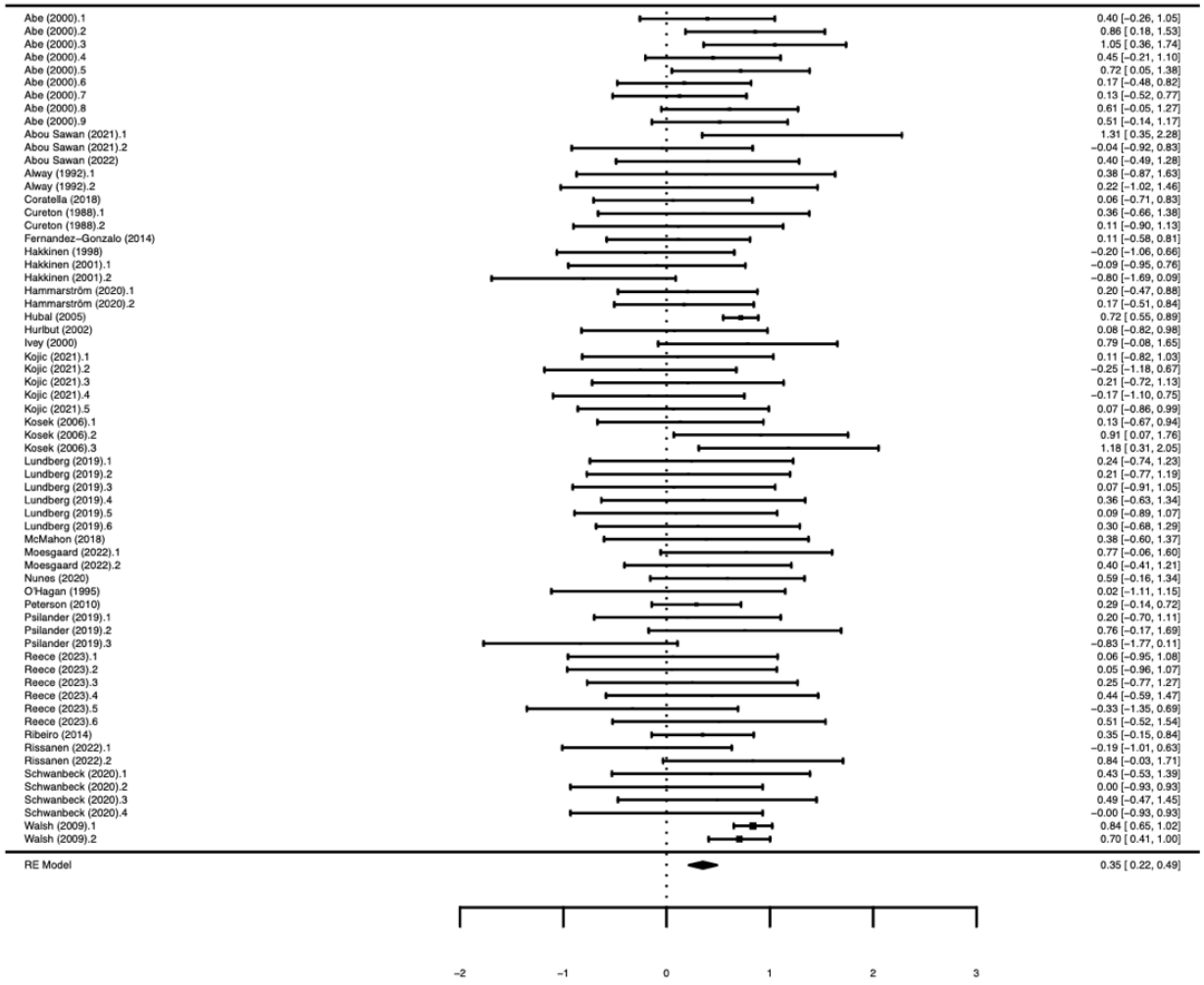
From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71. doi: 10.1136/bmj.n71

For more information, visit: http://www.prisma-statement.org/

S7. Frequentist Analysis of Primary Outcomes

7.1 Absolute Changes in Muscle Size

ES = 0.35 (CI: 0.22 to 0.49, *P* = <0.0001)



7.2 Relative Changes in Muscle Size

ES = 0.07 (CI: -0.02 to 0.15, *P* = 0.1306)