Introduction
Excessive post-noun modification, usually as adjectival prepositional phrases, occurs frequently in research writing. Occurring less frequently, and less distracting, is excessive pre-noun adjectival modification (i.e., stacked modification). The post-noun adjectival modification often occurs after a noun functioning as an object of an adverbial prepositional phrase.

Experimental sections

Part 1 – Materials and methods section: Method
Example: excessive post-noun modification
Cells were washed twice with 1 x PBS and isolated by centrifugation for 6 minutes at 1600 rpm.

Revision
Cells were washed twice with 1 x PBS and isolated by centrifugation (6 min, 1600 rpm).

Notes
The tandem post-noun prepositional phrases are details of centrifugation. Such secondary level information can be demarcated from primary by using parenthesised noun phrases. Even the details of washing could also be so reduced to the noun phrase (1 x PBS).

In the Revision, minutes can be abbreviated to min, which lacks plurality and punctuation. Furthermore, deletion seems to prompt deletion; that is, with the deletion of the prepositions and abbreviation of the units, isolated by centrifugation seems a circumlocution of simply centrifuged. The verbs in the sentence are now parallel: were washed … and centrifuged.

Part 2 – Materials and methods section: Materials
Example: excessive post-noun modification
The sample from the University of North Carolina two-phase randomised clinical trial comprised preadolescent children with increased overjet (>7 mm), in mixed dentition, a year before peak pubertal growth, and without previous orthodontic treatment.

Revision
The sample was from the University of North Carolina two-phase randomised clinical trial. The inclusion criteria were (1) preadolescent children a year before peak pubertal growth, (2) increased overjet (>7 mm), (3) no previous orthodontic treatment.

Notes
In the Example, a series of four prepositional phrases conveying primary information is torturous to comprehend in contrast to a numerical listing of noun phrases in the Revision. The enumerated listing facilitates comprehension, a facilitation that is further enhanced by combining related criteria. Furthermore, such information insight enables in mixed dentition to be self-evident for children of that age.

Part 3 – Results section: Data-based observation
Example: unnecessary post-noun modification
Skeletal muscle hypertrophy was accompanied by an acceleration of protein synthesis and an increase of A1B uptake.

Revision 1
Skeletal muscle hypertrophy was accompanied by accelerated protein synthesis and increased A1B uptake.
Revision 2
Skeletal muscle hypertrophy was accompanied by increased protein synthesis and A1B uptake.

Notes
In the two sets of tandem prepositional phrases, not only do the nouns acceleration and increase add to noun density and abstraction, but their presence each necessitates a contiguous preposition: (acceleration of; increase of). Revision 1 involves syntactic reduction of a prepositional phrase into the adjectival past participle accelerated and increased. In Revision 2, with the deletion of the preposition and the article, the subtle distinction between accelerated and increased becomes unintended.

Part 4 – Results section: Data-based observation

Example: excessive pre-noun modification
Extremely low-birth-weight infants were the primary occupants of the neonatal critical care unit.

Revision
Extremely low-birth-weight infants were the primary occupants of the neonatal critical care unit.

Notes
Three coordinated adjectival pre-modifiers will be mildly distracting to an expert in the discipline, but more so for a non-expert. In the Revision, virtual unstacking is accomplished by hyphenation, which unites the three modifiers so that they function as one unit. Low is an adjective, but birth and weight are nouns functioning adjectivally. Thus, the three pre-modifiers are adjectival in function. The fourth modifier extremely, probably a cumulative modifier (i.e., modifies low-birth-weight), as most -ly adverbs, is usually not hyphenated.

Contextual sections

Part 1 – Introduction section: Research problem pertinent background

Example: excessive post-noun modification
The inter-compartment heterogeneity, such as posterior expression of Notch, Serrate, and Wnt7a, and anterior expression of BMP-4 and Tenascin, results in an A-P asymmetry within the feather buds.

Revision
The following examples of inter-compartment heterogeneity result in an A-P symmetry within the feather buds: posterior expression (Notch, Serrate, and Wnt7a) and anterior expression (BMP-4 and Tenascin).

Notes
The examples of posterior and anterior expression are secondary information, which can be syntactically reduced from prepositional phrases into parenthesised noun phrases.

Part 2 – Introduction section: Research problem pertinent background

Example: excessive post-noun modification
During tooth morphogenesis, Syndecan-1 expression is essential for the condensation of dental mesenchyme.

Revision 1
During tooth morphogenesis, Syndecan-1 expression is essential for dental mesenchyme condensation.

Notes
In the Example the two contiguous post-noun prepositional phrases can be syntactically melded. The Revision is accomplished by transposition of the object (dental mesenchyme of the second prepositional phrase into a pre-noun modifier (dental mesenchyme) of the object of the first prepositional phrase. Thus, melding reduces the tandem prepositional phrases into one.

Part 3 – Introduction section: Research problem pertinent background

Example: excessive post-noun modification
Orthopaedic surgeons are setting arbitrary restrictions on the return to activities, with the intent of protecting the graft from injury.

Revision 1
Orthopaedic surgeons are setting arbitrary restrictions on the return to activities to protect the graft from injury.

Revision 2
To protect the graft from injury, orthopaedic surgeons are setting arbitrary restrictions on the return to activities.

Notes
The tandem prepositional phrases with the intent of protecting is narrative and wordy. In Revision 1, the infinitive phrase to protect can be used to convey intent. Repetition of the preposition to is redundant with the infinitive marker to, which is resolved by transposition of the infinitive phrase to the sentence start position.

Part 4 – Introduction section: Objective + experimental approach

Example: excessive pre-noun modification
Angiopoietin regulation of choroidal endothelial cell MM-P and MM-9 activities was investigated by gelatin zymography.

Revision
Angiopoietin regulation of MM-P and MM-9 activities in choroidal endothelial cells was investigated by gelatin zymography.

Notes
There are five pre-modifiers before activities that impede comprehension. Transposition of choroidal endothelial cells into a post-noun position separates the type of activities from their location and provides a balance between the number of pre- and post-modifiers, a balance that enhances comprehension.

Summary
The distribution of the two examples of excess pre-noun modifiers and the six examples of post-noun modifiers is equal between Experimental sections (Results) and Contextual sections (Introduction). The rhetorical severity of these examples is dissonance and possibly impeded comprehension. Revision of excess pre-modifiers can range from hyphenation (whereby the pre-noun modifiers are visually transformed into one unit) to transposition (whereby a pre-modifier is transposed to a post-modifier). In contrast, revision of post-modifiers involves a variety of syntactic options: melding of tandem appositives; parenthesis or hyphenation (whereby the pre-noun modifiers are syntactically reduced from prepositional phrases) or conversion into another syntactic unit (e.g., infinitive phrase).