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**ATTRITION RATES IN U.S. WOMEN'S ARTISTIC GYMNASTICS BY
LEVEL**

BY

KAYLEIGH SWIFT

A thesis submitted in partial fulfillment of the requirements
for the Honors in the Major Program in Sports and Exercise Science
in the College of Education and Human Performance
and in The Burnett's Honors College
at the University of Central Florida
Orlando, Florida

Fall Term, 2016

Thesis Chair: Thomas J. Fisher, Ph. D.

Abstract

The purpose of this study was to evaluate the rates of attrition at each level within US Women's Artistic Gymnastics. Using USA Gymnastics membership information, this thesis explored trends within raising and falling membership rates by level and the potential predictive information this can offer gyms, coaches, parents and athletes. Until this study, previous research had only looked at the causes of attrition. The results of this study provided insight into when this attrition will be most likely to occur. This will assist in preparing coaches, parents and athletes to make informed decisions in regards to the training and commitment necessary in pursuing a future in competitive gymnastics. It also informs the gym on attrition within their program, which offers opportunities to better cater the program to the athletes, including additional coach's education at these levels. After reviewing the current and past number of athletes participating, it was concluded that attrition peaks for athletes going into Level 5. A significant drop in athletes from Level 4 occurs, and the trend continued, at a smaller degree, as the number of athletes drops at each level through Level 10.

Acknowledgments

I would like to thank my committee; Dr. Thomas Fisher, Dr. Anna Valdes and Dr. Sherron Roberts, for taking the time to be a part of this thesis development.

First and foremost, I would like to acknowledge Dr. Thomas Fisher, my thesis chair. Thank you for being my guide on this journey. You have introduced me to my own potential and a stronger version of myself that I would not have known otherwise.

I also cannot leave out Dr. Sherron Roberts, my personal cheerleader. I would like to thank her for making herself unselfishly available to assist me in this process. Something I would not have even begun without her enthusiasm and assurance.

Finally, Dr. Anna Valdes. Thank you for sharing in this. I valued your personal input, as I know we share a passion for this sport.

Dedication

For my children, Jason and Elise, for being my motivation. Thank you for dealing with not so glamorous dinners, late nights, and last minute adventures. Most of all, thank you for sharing this with me.

For my parents and grandparents who supported and prayed for me throughout this achievement.

God has placed an amazing support team around me, without it, I would not be this far.

And for David Love, my mentor, my coach, my friend, my family, for always pushing me out of the box and out of my comfort zone. Thank you for helping me to grow.

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Introduction

Background

Although the entire complexity and beauty of women's gymnastics is far beyond what can be portrayed here in this study; it is important to have a basic understanding to appreciate the information presented here. To begin, USA Women's Artistic Gymnastics has various levels of participation and competition (USA Gymnastics, 2016). They are divided into three major parts: Recreational, Compulsory, and Optionals. The requirements for each level are listed in Table 1 below.

	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7	Level 8	Level 9	Level 10
Age	4	5	6	7	7	7	7	8	8	9
Score in Previous Levels	N/A	N/A	N/A	75% Skill Efficiency	31.00	31.00	31.00	31.00	34.00	34.00

Table 1 Requirements for Junior Olympics Levels 1-10

Recreational gymnastics consists of Levels 1 through 3. At this level, athletes are being introduced to the sport and the main point of focus is skill development. Recreational competition is optional and may be done within the club as an introductory event or some states may offer sanctioned events. Competition at this stage is becoming more popular within gyms, as parents are wanting to introduce their child at a young age. To participate in Level 1, a gymnast must be at least four years old. Then, to advance to Levels 2 and 3, a gymnast must have reached ages five and six, respectively, and have met all skill requirements.

Once 75% efficiency has been met in Levels 1-3 and an athlete has reached her seventh birthday, she may move on to Compulsory Levels 4 and 5. These levels cannot be skipped, an athlete must compete and meet a score requirement of 31.00 out of 40.00 (10 points maximum

per event) at the previous level before moving up. Routines, up to this point, are uniform for each level across the nation. A gymnast in Level 4 in Florida will perform the same routine for each event as a gymnast in New York or California. Competitive opportunities are provided up to the state championships for these levels.

Levels 6 through 10 are considered the Optionals. Levels 6 and 7 require the gymnast to be seven years old with competitive scores of 31.00 in the previous level. Level 6 is the only level a gymnast may skip. Competition goes up to the state championships for these levels. Level 8 and 9 have an age requirement of eight years old, a competitive score of 31.00 (34.00 for Level 9) and individual event score of 8.5 per event. Level 10 is the last level in the Junior Olympic program and requires an athlete be at least nine years of age, along with scores of 34.00 and individual event scores of 8.5 per event. Routines at these levels are not uniform and will vary by gymnast, with minimum and maximum skill requirements established for each level and event. At Level 8 competition advances to regional, at Level 9 it advances to East and West, and finally, at Level 10, gymnasts have the opportunity to compete on a national stage.

Like most sports, there are specific times of year these competitions will take place. Competition season generally starts in September and goes through March. Teams will often hold try outs around April and May after the previous season has concluded. This allows time for the gymnasts to learn, and practice, their routines before the start of the next competition season.

In the 2013 season, a new program called Xcel was introduced. This program has five divisions: Bronze, Silver, Gold, Platinum, and Diamond. This program was developed to accommodate those young athletes who enjoy competing in gymnastics, but, either do not want to commit to the time required in the Junior Olympic program, or may be struggle to achieve

skills required to move to the next level. The athletes who chose to participate in Bronze and Silver, are typically those you would find in a recreational gymnastics program. Former competitive gymnasts would be more likely to enter into the Gold, Platinum, or Diamond division (USA Gymnastics, 2016). The requirements for each level are shown in Table 2 below.

	Bronze	Silver	Gold	Platinum	Diamond
Age	5	6	7	8	9
Previous Experience	Level 1/2 (not required)	Level 2/3 (not required)	Level 3/4/5/6 (not required)	Level 4/5/6/7/8	Level 7/8/9
Score				31.00	31.00

Table 2 Excel Program Requirements

The requirements for Bronze include a minimum age of five years old and Junior Olympic experience in Levels 1 or 2. Silver requires an athlete be six years of age and experience in Levels 2 or 3 and Gold requires an athlete to be seven years of age and experience in Levels 3,4,5 or 6. If a gymnast is entering with no previous competitive experience, they may enter into Bronze, Silver or Gold at the coach's discretion. To enter the Platinum division an athlete must have reached their eighth birthday and have competitive experience in Levels 4, 5, 6,7, or 8. This level also requires a prerequisite score of 31.00 overall, out of 40.0, in the Gold division. Diamond, the last division, requires an athlete to be nine years of age, have competitive experience at Levels 7, 8, or 9 and an overall score of 31.00 in the Platinum division. It is also possible for a young gymnast to move back and forth from the Junior Olympic and Xcel program. Junior Olympic members may choose to compete in the Xcel's spring competition season which would normally be their off season. This is up to the athlete and their goals (USA Gymnastics, 2014).

Problem to Be Researched

In 2008, USA Gymnastics reported a total of 68,797 athletes that participated in Women's Artistic Gymnastics. At the beginning of the Compulsories in Level 4, where competition starts, participation included 21,766 young women. At the start of Optionals in Level 7, that number dropped to 7,623 and by the end at Level 10 only 1,684 girls were participating. Only 79 athletes of the almost 69,000 participants were competing at the Elite level (USA Gymnastics, 2009). Attrition is a natural occurrence within youth sports. As discussed in Gould's attrition model the reasons for withdrawal can vary from social conflicts, such as time commitments, to satisfaction, and injury. Women's gymnastics is no different, in that attrition happens for these same various reasons. However, women's gymnastics does require a specialization and commitment at a young age. The average age on the 2016 US Women's Gymnastics Olympic team is 19. The young woman training and preparing for the next Olympic games, may only be 15. These commitments include time, monetary and can require moving to a different state to find qualified coaches.

Table 3 below, shows the time commitment and cost from Levels 1 through 10 in the Junior Olympic program.

	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7	Level 8	Level 9	Level 10
Time	4hrs	6hrs	6hrs	12hrs	12hrs	20hrs	20hrs	20hrs (+)	20hrs (+)	20hrs (+)
Cost	\$195	\$220	\$220	\$350	\$350	\$450	\$450	\$475	\$475	\$475

Table 3 Time Commitment and Cost of Levels 1-10

At Level 3, gymnasts are committed to six hours a week (two hours a day, three days a week) of training (MGA Gymnastics, 2016). At Levels 4 and 5, when Compulsory's begin, a six

or seven year old girl will jump up to 12 hours (three hours a day, four days a week) of training a week. Notice that the time commitment has doubled at this point. Then, Levels 6 and 7 add an additional day, requiring four hours a day for five days a week, totaling up to 20 hours a week. Once a gymnast approaches the Elite level, workouts can take up to three hours, twice a day, six days a week, totaling up to 36 hours a week in training (USA Gymnastics, 2016). In

Understanding Attrition in Female Competitive Gymnastics, (Johns, 1990), 76 former female competitive gymnastics were surveyed concerning their reasons for withdrawal. The results showed that 65.6% cited time consumption, while 40.8% cited injuries. As the young athletes become older the desire for social time becomes greater. As the time commitment increases, an athlete will evaluate the cost of sacrificing social time with peers for the gym and competitive goals.

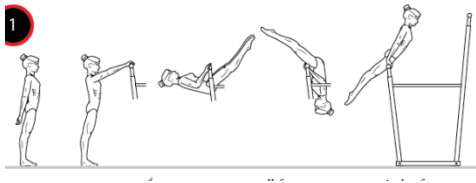
Not only the time commitment, but the monetary commitment should be considered as well. Level 1 athletes start at around \$195.00 per month for 12 months, or as long as they remain at that level. Then Levels 2 and 3 go up to around \$220. As an athlete advances through the levels and more training is required, the cost, of course, increases. At Levels 4 and 5, going into Compulsory's, there is a jump to \$350.00 and again for Optionals, at Levels 6 and 7, to \$450.00. Finally, at Levels 8, 9, and 10 the cost can be up to \$475.00 or more. These prices can, of course, vary by gym and state. The prices quoted above are representative of the Central Florida market in 2016. These prices, like most things, may fluctuate with the economy and demand. It must also be considered that this is only the cost for the training gym, there are also: uniforms, competition fees (\$75 for compulsories and up to \$125 by Level 9), travel expenses, and annual membership dues (\$54 due August 1st each year) (National Women's Program Committee,

2015). Orlando Metro Gymnastics (2016) charges an additional \$250.00 for six months out of the year to cover competition and traveling fees. Taking all of the fees into consideration may play a part in an athlete's decision of overall worth to stay within the sport.

Another important factor to look at is the difficulty of the skills at each level. To advance a gymnast must achieve and master skills of the previous level. This mastery includes skills from the uneven bars, balance beam, vault, and the floor exercise. The following shows a breakdown of the progressing uneven bar skill requirements, for each level, found in the *Junior Olympic Compulsory Program* handbook for Women's Artistic Gymnastics by the USA Gymnastics Committee (2013). Text in the italic font throughout the routine explanations are reader friendly additions that have been added in.

Level 1

1. Mount: Back hip pullover



- Grasp bar with hands "shoulder width" apart and pull chin to bar with elbows pressed firmly into torso while hips round and legs are lifted over bar
- Shift hands and straighten arms arriving in a fully extended front support at completion of skill

2. Cast



- Initiate from an extended body position, arms straight

- b. Compress to a pike position (*body bent forward more than 90 degrees at the hips while the legs are kept straight.*) with arms straight and a slight shoulder shrug
- c. Open hips aggressively to a tight straight position while maintaining a slight forward shoulder lean over bar

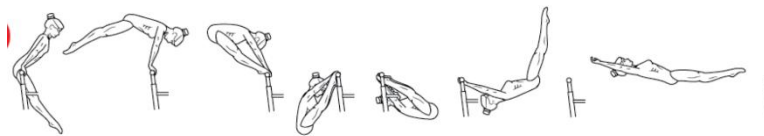
3. Back hip circle



- a. As the body comes back to the bar lean backwards and round hips as the body returns toward bar to enable the body to rotate and invert
- b. Rotate the wrist to the top of the bar during the completion of the circle
- c. Finish with straight arms and extended body shape

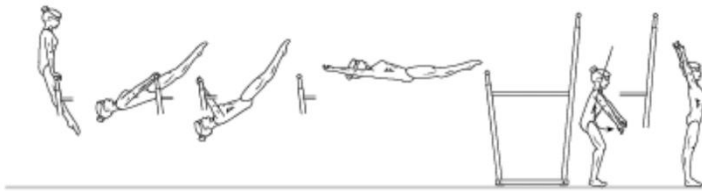
4. Cast, straddle on, sole circle dismount, or, underswing dismount

Straddle on sole circle:



- a. Execute a cast with the shoulders slightly in front of bar
- b. Push down against the bar and elevate the hips
- c. Place the balls of the feet in a straddle position on the bar outside of, but close to, the hands
- d. Maintain neutral head position
- e. Keep pressure on the bar with the feet by pushing the ankle through high relevé (*pointed*) as the body falls backward and downward
- f. Arms remain straight throughout with an open shoulder angle and hollow chest position
- g. Release the feet from the bar as the hips rise and continue movement to extension through hips and shoulders
- h. Maintain a tight straight body position in flight and execute a safe landing position

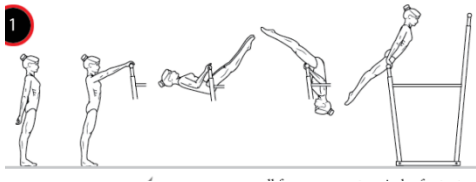
Underswing:



- Initiate from front support with shoulders extended and upper body hollow
- Lean shoulders back and continue motion as hips rotate under, seat tight, keeping head neutral throughout
- Move through an inverted "candle" position and then shoot legs up and out by aggressively opening and extending from the arms and shoulders
- Body remains tight and extended to safe landing position

Level 2

1. Mount: Back hip pullover



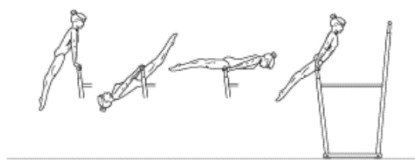
- Grasp bar with hands "shoulder width" apart and pull chin to bar with elbows pressed firmly into torso while hips round and legs are lifted over bar
- Shift hands and straighten arms arriving in a fully extended front support at completion of skill

2. Cast



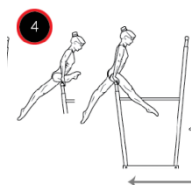
- Initiate from an extended body position, arms straight
- Compress to a pike position (*body bent forward more than 90 degrees at the hips while the legs are kept straight*) with arms straight and a slight shoulder shrug
- Open hips aggressively to a tight straight position while maintaining a slight forward shoulder lean over bar

3. Back hip circle



- Cast to extended body shape with straight arms
- Lean backwards and round hips as the body returns toward bar to enable the body to rotate and invert
- Rotate the wrist to the top of the bar during the completion of the circle
- Finish with straight arms and extended body shape

4. Single leg cut forward



- Shift weight to left arm in front support
- Release right hand and swing right leg through to rest between hands
- Regrasp bar and "elevate" body to an extended stride support

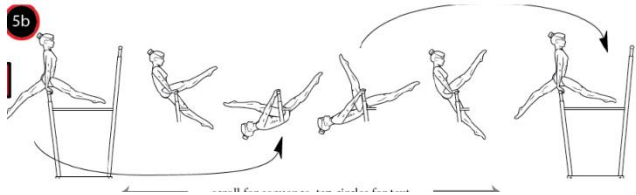
5. Forward stride circle, or, single leg basket swing

Forward stride circle:



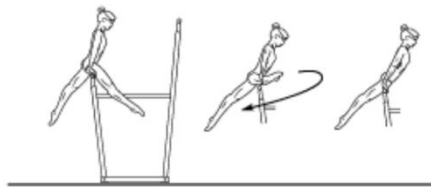
- Initiate in an extended stride support with front leg lifted off of bar, legs in a wide separation (*split*), head neutral
- Circling begins by stretching front leg forward and keeping the thigh of the back leg against the bar, split position of the legs is maintained throughout circle
- Shift the wrists and push down to an extended stride support as the last phase of the circle occurs

Single leg basket swing:



- From a stride support press the bar down and lift the body upward off the bar to a clear stride support position
- Lean the shoulders to initiate a fall backwards to execute a Single leg basket swing
- At the end of the backward pendulum swing, reverse direction and swing forward and upward, pull downward on the bar while maintaining straight arms and legs
- As the swing nears completion, shift the hands to the top of the bar to finish in a clear stride support. (hooking the right knee is also acceptable)

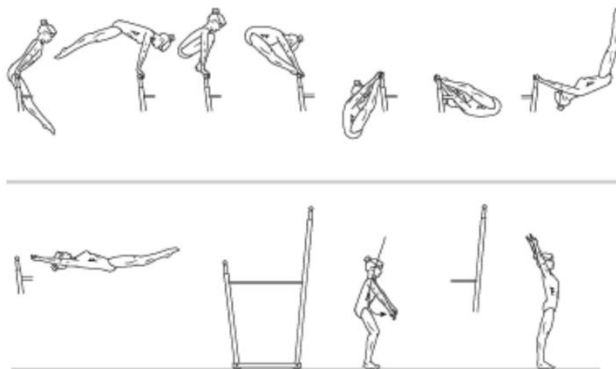
6. Single leg swing backwards



- Shift weight to left arm in front support
- Release right hand and swing right leg back through, to front support
- Regrasp bar and "elevate" body to front support

7. Cast, squat-on, pike sole circle dismount, or, cast, underswing dismount

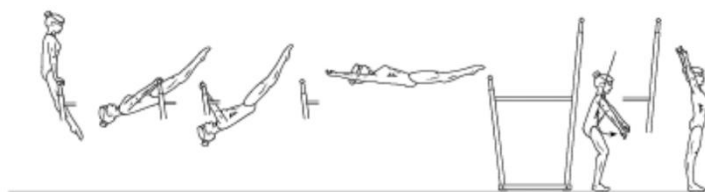
Pike sole circle:



- Execute a cast with the shoulders slightly in front of bar

- b. Push down against the bar and elevate the hips
- c. Bend the legs and place the balls of the feet on the bar in a tuck position between the hands to execute a Squat-on.
- d. Immediately straiten the legs, applying pressure to the bar by pulling it against the bottom of the feet while rising up onto the balls of the feet (relevé).
- e. Swing backward-downward-forward-upward, continuing to press the feet against the bar. Maintain straight arms and hollow chest throughout.
- f. Head remains neutral with the arms near the ears.
- g. As the hips rise, release the feet from the bar and press the bar backwards to achieve an extended body position.
- h. Release the hands and maintain a tight straight body position in flight and execute a safe landing position.

Underswing:

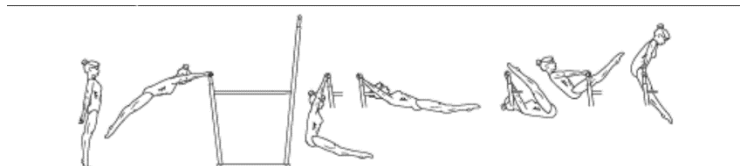


- a. Initiate from front support with shoulders extended and upper body hollow
- b. Lean shoulders back and continue motion as hips rotate under, seat tight, keeping head neutral throughout
- c. Move through an inverted "candle" position and then shoot legs up and out by aggressively opening and extending from the arms and shoulders
- d. Body remains tight and extended to safe landing position

Level 3

1. Mount: Glide swing and return; back hip pullover, or, straddle or pike glide kip

Straddle/Pike glide kip: (optional)



- a. Jump to bar in a hollow extended position

- b. Maintain pressure on bar by keeping round chest and extended shoulders as the glide is initiated
- c. Hips and lower back must maintain round shape through the bottom of the glide
- d. Hips and shoulders extend and begin to rise in the forward phase of glide (no arch/extended hollow shape)
- e. The rise of the hips and shoulders continue as the legs begin to pike (*body bent forward more than 90 degrees at the hips while the legs are kept straight*) to the bar
- f. A forceful opening of the hips with the legs traveling up the bar (kipping action) occurs at the top of the swing when the hips begin to change direction
- g. The arms forcefully pull down as a reaction to the kicking motion and continue to facilitate a "sit-up" action of the upper body
- h. Wrist rotate to front of the bar as the body becomes "weightless" from kicking action
- i. Finish position is a hollow shape with shoulders slightly in front of the bar

2. Front hip circle, small cast, return to front support



- a. Begin in an extended body position with legs against bar and initiate forward fall by lifting the heels and pressing the shoulders forward
- b. Maintain a stretched, extended position until body is horizontal to the floor Pike (*body bent forward more than 90 degrees at the hips while the legs are kept straight*) is initiated by a "chasing" motion of the upper body to the lower body as the heels continue to circle
- c. Wrist rotation around the bar occurs simultaneously with the piking motion of the circle just past "horizontal"
- d. Circle is completed in a pike position (*body bent forward more than 90 degrees at the hips while the legs are kept straight*) with arms straight, shoulders forward and the hands slightly on the front side of the bar

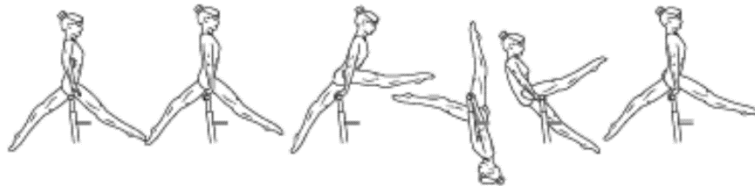
3. Cast, single leg squat through



- a. Begin with a cast to a shoulders extended position slightly over low bar
- b. Maintain straight tight back leg while front leg tucks to "squat through" position
- c. Finish clear of the bar with legs split wide and upper body extended, head neutral, arms straight throughout

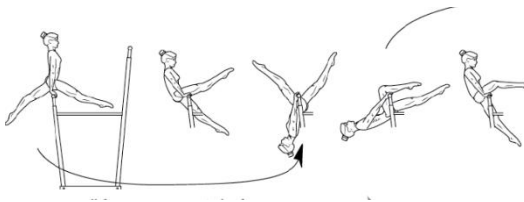
4. Forward stride circle, or, single leg basket swing

Forward stride circle:



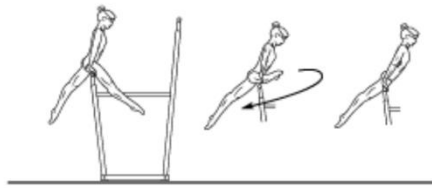
- a. Initiate in an extended stride support with front leg lifted off of bar, legs in a wide separation (split), head neutral
- b. Circling begins by stretching front leg forward and keeping the thigh of the back leg against the bar, split position of the legs is maintained throughout circle
- c. Shift the wrists and push down to an extended stride support as the last phase of the circle occurs

Single leg basket swing:



- a. From a stride support press the bar down and lift the body upward off the bar to a clear stride support position.
- b. Lean the shoulders to initiate a fall backwards to execute a Single leg basket swing.
- c. At the end of the backward pendulum swing, reverse direction and swing forward and upward, pull downward on the bar while maintaining straight arms and legs.
- d. As the swing nears completion, shift the hands to the top of the bar to finish in a clear stride support. (HOOKING THE RIGHT KNEE IS ALSO ACCEPTABLE.)

5. Single leg cut backward



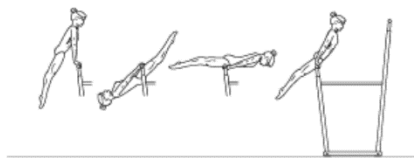
- Shift weight to left arm in front support
- Release right hand and swing right leg back through, to front support
- Regrasp bar and "elevate" body to front support

6. Cast



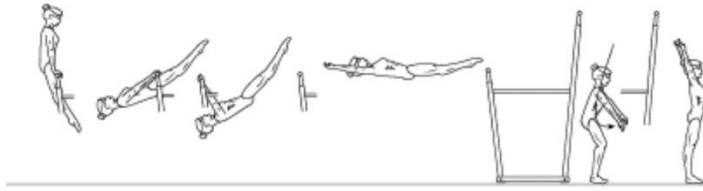
- Initiate from an extended body position, arms straight
- Compress to a pike position (*body bent forward more than 90 degrees at the hips while the legs are kept straight*) with arms straight and a slight shoulder shrug
- Open hips aggressively to a tight straight position while maintaining a slight forward shoulder lean over bar

7. Back hip circle



- Cast to extended body shape with straight arms
- Lean backwards and round hips as the body returns toward bar to enable the body to rotate and invert
- Rotate the wrist to the top of the bar during the completion of the circle
- Finish with straight arms and extended body shape

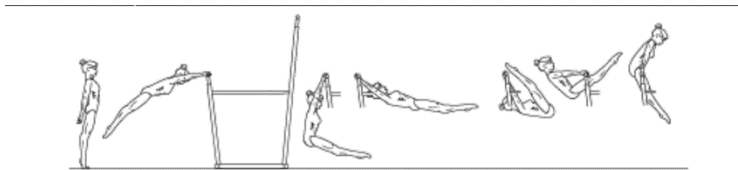
8. Underswing dismount



- a. Initiate from front support with shoulders extended and upper body hollow
- b. Lean shoulders back and continue motion as hips rotate under, seat tight, keeping head neutral throughout
- c. Move through an inverted "candle" position and then shoot legs up and out by aggressively opening and extending from the arms and shoulders
- d. Body remains tight and extended to safe landing position

Level 4

1. Mount: Straddle or pike glide kip

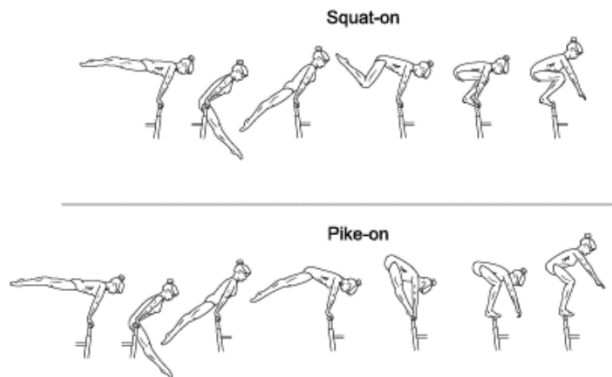


- a. Jump to bar in a hollow extended position
 - b. Maintain pressure on bar by keeping round chest and extended shoulders as the glide is initiated
 - c. Hips and lower back must maintain round shape through the bottom of the glide
 - d. Hips and shoulders extend and begin to rise in the forward phase of glide (no arch/extended hollow shape)
 - e. The rise of the hips and shoulders continue as the legs begin to pike (*body bent forward more than 90 degrees at the hips while the legs are kept straight*) to the bar
 - f. A forceful opening of the hips with the legs traveling up the bar (kipping action) occurs at the top of the swing when the hips begin to change direction
 - g. The arms forcefully pull down as a reaction to the kipping motion and continue to facilitate a "sit-up" action of the upper body
 - h. Wrist rotate to front of the bar as the body becomes "weightless" from kipping action
 - i. Finish position is a hollow shape with shoulders slightly in front of the bar
2. Cast to horizontal and return to front support



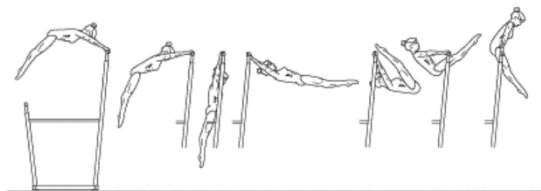
- Initiate from an extended body position, arms straight
- Compress to a pike position (*body bent forward more than 90 degrees at the hips while the legs are kept straight*) with arms straight and a slight shoulder shrug
- Open hips aggressively to a tight straight position, horizontal to the bar, while maintaining a slight forward shoulder lean over bar

3. Cast, squat-on, or, pike-on



- Execute a cast with the shoulders slightly in front of bar
- Push down against the bar and elevate the hips
- Bend the legs (or keep straight *for pike*) and place the balls of the feet on the bar in a tuck (or pike) position between the hands to execute a Squat-on or Pike-on

4. Jump to long hang kip



- From the squat or tuck position on the low bar, immediately jump up to grasp the high bar while maintaining a straight and hollow body position
- With the legs together swing the body downward, forward and upward near horizontal

- c. At the completion of the forward swing, quickly lift the feet to the bar and pull the bar up the legs to the hips.
- d. While pulling downward, shift the hands to the top of the bar to end in front support.

5. Cast to horizontal



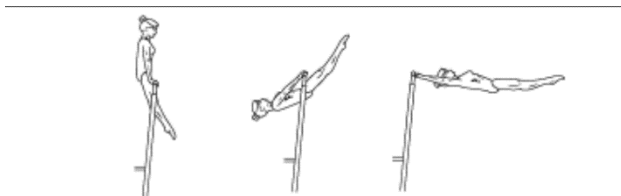
- a. Initiate from an extended body position, arms straight
- b. Compress to a pike position with arms straight and a slight shoulder shrug
- c. Open hips aggressively to a tight straight position, horizontal to the bar, while maintaining a slight forward shoulder lean over bar

6. Back hip circle



- a. Cast to extended body shape with straight arms
- b. Lean backwards and round hips as the body returns toward bar to enable the body to rotate and invert
- c. Rotate the wrist to the top of the bar during the completion of the circle
- d. Finish with straight arms and extended body shape

7. Underswing, first counterswing



- a. Initiate from front support with shoulders extended and upper body hollow
- b. Lean shoulders back and continue motion as hips rotate under, seat tight, keeping head neutral throughout

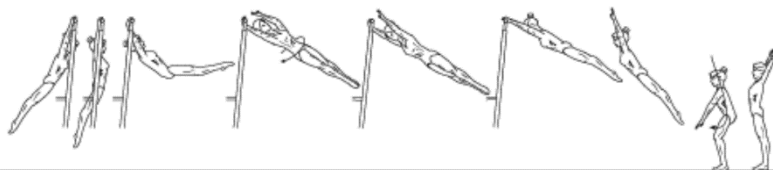
- c. Move through an inverted "candle" position and then shoot legs up and out by aggressively opening and extending from the arms and shoulders
- d. Continue to press the bar backwards. Swing downward, leading slightly with the heels to execute a counterswing.

8. Tap swing forward, second counterswing



- a. Maintain the hollow-body position as the body begins the downward-forward swing
- b. As the feet pass the low bar, relax the hollow-body position to a slight arch
- c. Maintain this position through vertical (under the bar) and aggressively kick forward-upward with the legs/feet together to execute a tap swing forward with a hollow-body position, finishing with the feet the level of the high bar
- d. Execute a second counterswing by swinging downward, leading slightly with the heels and hips rising a minimum of 30 degrees below the level of the high bar

9. Tap swing forward, 1/2 turn dismount

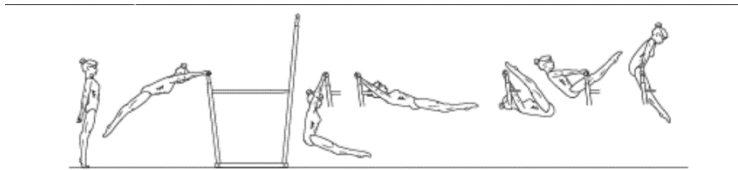


- a. Maintain a hollow-body position as the body begins the downward-forward swing
- b. As the feet pass the low bar, relax the hollow-body position to a slight arch
- c. Maintain this position through vertical (under the bar) and aggressively kick forward-upward with the legs/feet together swinging to a minimum of 45 degrees below horizontal while maintaining a hollow-body position
- d. Kick in the direction of the turn, leading with the toes, knees, hips, then shoulders in a sequential order
- e. Initiate the 1/2 turn (180 degrees) after the body reaches a minimum of 45 degrees below horizontal, releasing the bar with one hand and turning toward the hand remaining on the bar
- f. The head remains neutral, with the focus on the toes in the initial phase of the turn
- g. During the final stage shift the focus to the high bar where the free hand will make contact

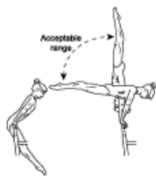
- h. Immediately push against the bar and release, maintaining a tight body and landing in a safe position
(USA Gymnastics, 2001)

Level 5

1. Mount: Straddle or pike glide kip



- a. Jump to bar in a hollow extended position
 - b. Maintain pressure on bar by keeping round chest and extended shoulders as the glide is initiated
 - c. Hips and lower back must maintain round shape through the bottom of the glide
 - d. Hips and shoulders extend and begin to rise in the forward phase of glide (no arch/extended hollow shape)
 - e. The rise of the hips and shoulders continue as the legs begin to pike to the bar
 - f. A forceful opening of the hips with the legs traveling up the bar (kipping action) occurs at the top of the swing when the hips begin to change direction
 - g. The arms forcefully pull down as a reaction to the kipping motion and continue to facilitate a "sit-up" action of the upper body
 - h. Wrist rotate to front of the bar as the body becomes "weightless" from kipping action
 - i. Finish position is a hollow shape with shoulders slightly in front of the bar
2. Cast to above horizontal



- a. Initiate from an extended body position, arms straight
- b. Compress to a pike position with arms straight and a slight shoulder shrug
- c. Open hips aggressively to a tight straight position, horizontal to the bar, while maintaining a slight forward shoulder lean over bar

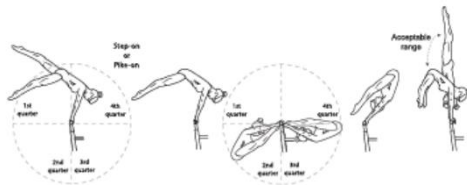
3. Clear hip circle to above horizontal, or, backward sole circle to clear front support, or, backward stalder circle to clear front support

Clear hip circle to above horizontal:



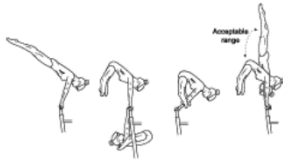
- a. Lean backwards and round hips as the body returns toward bar to enable the body to rotate and invert
- b. Push the bar towards the lower thighs as the circle continues
- c. As the hips rise, pull on the bar, opening the shoulder angle slightly and rotate the wrist to the top of the bar during the completion of the circle
- d. Finishing with a clear support with the body extended a minimum of above horizontal and shoulders leaning slightly forward over the bar. Maintaining straight arms and legs throughout

Backward sole circle to clear front support:



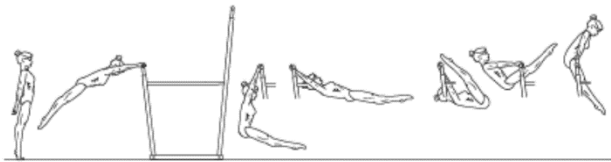
- a. Following the cast, push the shoulders open while bringing the feet to the bar, initiating the circle
- b. On the downswing, place the balls of the feet on the bar, between the hands in the pike (*legs together and straight*) position, or, outside and next to the hands in a narrow straddle
- c. Maintain straight legs with the head neutral throughout the circle
- d. As the hips rise in the upswing, pull on the bar, opening the shoulder angle, taking the feet off the bar prior to clear front support
- e. Shift the hands to the top of the bar to finish in clear front support

Backward stalder circle to clear front support:



- Following the cast, push the shoulders open while bringing the feet to the bar, initiating the circle
- Close the hip angle on the downswing bringing the feet outside of the arms to achieve a compressed, inverted straddle position, with rounded torso at the bottom of the circle
- Maintain a neutral head and rounded torso throughout the circle
- As the hips rise in the upswing, pull on the bar, opening the shoulder angle
- Shift the hands to the top of the bar to finish in clear front support

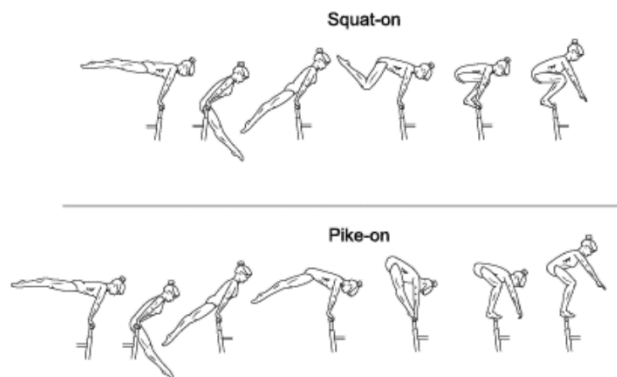
4. Straddle or pike glide kip



- Jump to bar in a hollow extended position
- Maintain pressure on bar by keeping round chest and extended shoulders as the glide is initiated
- Hips and lower back must maintain round shape through the bottom of the glide
- Hips and shoulders extend and begin to rise in the forward phase of glide (no arch/extended hollow shape)
- The rise of the hips and shoulders continue as the legs begin to pike to the bar
- A forceful opening of the hips with the legs traveling up the bar (kipping action) occurs at the top of the swing when the hips begin to change direction
- The arms forcefully pull down as a reaction to the kipping motion and continue to facilitate a "sit-up" action of the upper body
- Wrist rotate to front of the bar as the body becomes "weightless" from kipping action
- Finish position is a hollow shape with shoulders slightly in front of the bar

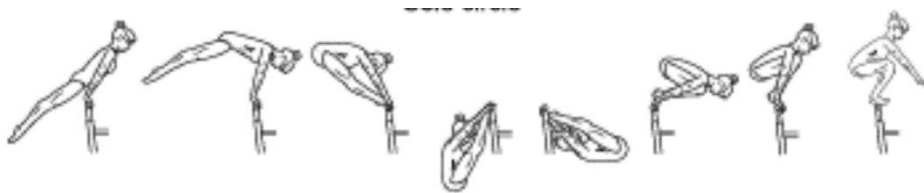
5. Cast, squat or pike-on, or, cast, 360 backward sole circle

cast, squat or pike-on:



- Execute a cast with the shoulders slightly in front of bar
- Push down against the bar and elevate the hips
- Bend the legs (or keep straight *for pike*) and place the balls of the feet on the bar in a tuck (or pike) position between the hands to execute a Squat-on or Pike-on

cast, 360 backwards sole circle:



- Execute a cast with shoulders slightly in front of the bar
- Use either, squat or pike-on technique to begin
- Keep pressure on the bar with the feet by pushing the ankle through high relevé (*pointed*) as the body falls backward and downward
- Arms remain straight throughout with an open shoulder angle and hollow chest position
- Complete full circle around the bar and finish with support on the feet

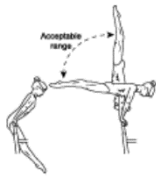
6. Jump to long hang kip



- From the squat or tuck position on the low bar, immediately jump up to grasp the high bar while maintaining a straight and hollow body position

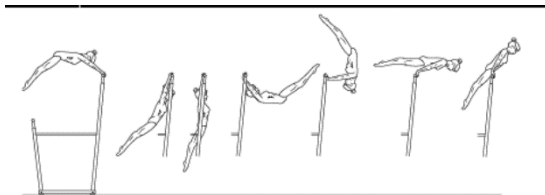
- b. With the legs together swing the body downward, forward and upward near horizontal
- c. At the completion of the forward swing, quickly lift the feet to the bar and pull the bar up the legs to the hips
- d. While pulling downward, shift the hands to the top of the bar to end in front support

7. Cast to above horizontal



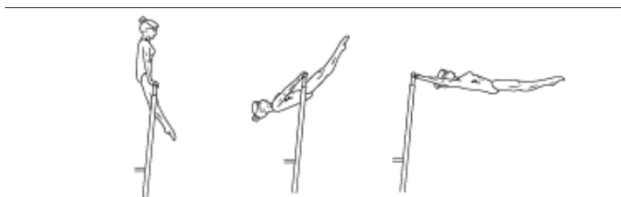
- a. Initiate from an extended body position, arms straight
- b. Compress to a pike position with arms straight and a slight shoulder shrug
- c. Open hips aggressively to a tight straight position, above a horizontal position to the bar, while maintaining a slight forward shoulder lean over bar

8. Long hang pullover



- a. Open the shoulder angle to push backward, maintaining a hollow body position as the downward-forward swing begins
- b. As the feet pass the low bar relax the hollow position to a slight arch
- c. Maintain this position through vertical (under the bar) and aggressively kick forward-upward and over the high bar
- d. As the hips rise up and over the bar, maintain an over grip and shift the hands to the top of the bar

9. Underswing; first counterswing



- a. Initiate from front support with shoulders extended and upper body hollow
- b. Lean shoulders back and continue motion as hips rotate under, seat tight, keeping head neutral throughout
- c. Move through an inverted "candle" position and then shoot legs up and out by aggressively opening and extending from the arms and shoulders
- d. Continue to press the bar backwards. Swing downward, leading slightly with the heels to execute a counterswing

10. Tap swing forward; second counterswing



- a. Maintain the hollow-body position as the body begins the downward-forward swing
- b. As the feet pass the low bar, relax the hollow-body position to a slight arch
- c. Maintain this position through vertical (under the bar) and aggressively kick forward-upward with the legs/feet together to execute a tap swing forward with a hollow-body position, finishing with the feet the level of the high bar
- d. Execute a second counterswing by swinging downward, leading slightly with the heels and hips rising a minimum of 30 degrees below the level of the high bar

11. Tap swing forward to flyaway dismount (tuck, pike or stretched)



- a. Maintain a hollow-body position as the body begins the downward-forward swing
- b. As the feet pass the low bar, relax the hollow-body position to a slight arch
- c. Maintain this position through vertical (under the bar) and aggressively kick forward-upward with the legs/feet together to a hollow-body position with the head neutral focusing on the toes
- d. As the feet approach the level of the high bar, release the bar with an open shoulder angle maintain a neutral head position. The body continues to rise to execute a flyaway dismount, with salto (*flip*) performed at minimum of high bar height in a tuck (*bent knees to chest*), pike (*straight legs to chest*), or stretched (*straight body*) position

- e. If tuck or pike extend the hips (and knees) quickly in preparation for landing in a safe position. If performing a stretched flyaway, maintain a straight-hollow body position throughout

Level 5 marks the end of the Compulsory levels. Through the levels here, there is not only an increase in skill difficulty, but in the amount of skills to be performed. The Level 1 routine begins the basic outline, with additional skills being added at each level. Some skills are just replaced with a more challenging version, such as the squat through in Level 3 which replaces the single leg cut forward from Level 2. A noticeable difference in routines takes place within Level 4 when the routine requires five new skills including a jump from the low bar to the high bar, and the kip which proves difficult for many gymnasts. It could be predicted that this level will show a higher rate of attrition due to its more daring skills within the routine. Also, in Level 5, the flyaway skill is regarded as one of the skills young gymnasts are most afraid of. The flyaway dismount differs from the Level 4 dismount in that, the Level 4, $\frac{1}{2}$ turn dismount is essentially more of a release after the turn where the gymnast will just drop to the mat. In the flyaway move, the gymnast is releasing at the highest point in the upswing momentum and then performing the salto (flip) in the air, before landing safely on the mat. The increasing skill demands, along with the jump in time and cost at the beginning of Compulsories should most definitely be considered when looking at withdrawal at this point.

Levels 6 through 10 are the Optionals. The routines are more variable at this stage in competition and offer guidelines of minimal and maximal skill difficulty verses a blanket routine. There are eight groups of elements with each category in its own group as follows:

Group 1- Mounts

Group 2- Casts and Counterswings

Cast- A swing movement on the bars that finishes in clear support on the hands only.

Counterswing- A backward swing on the bars.

Group 3- Underswings, Clear Hip Circles

Clear Hip Circles- From a front support, the gymnast moves 360 degrees around the bar with her hips close but not touching it.

Group 4- Giant Swing Backwards

Backwards Giants- skill in which a gymnast rotates 360 degrees, face first, around the bar while in a fully extended position.

Group 5- Giant Swings, Circles Forward

Forward Giants- skill in which a gymnast rotates 360 degrees, back first, around the bar while in a fully extended position.

Group 6- Stalder Circles

Stalder Circle- 360-degree swing around the bar with piked body and straddled legs.

Group 7- Circle Swings Hechts

Circle Swings- skills involving a 360-degree swing around the bar.

Hechts- Release move where the gymnast will release the bar at the top of the swing to fly over the current bar or to the opposite bar and regrasp.

Group 8- Dismounts

Each group has a chart of skills divided by difficulty, and thus point value, denoted by A, B, C, D, and E. The skills go up in difficulty with A being the lowest and E, the most challenging. As the level of competition increases the requirement for difficulty of skills change. In Level 6, as seen below, only an A skill is required. Then, in Level 7, one B skill is required and in Level 8, a minimum of two B skills, by Level 10 a gymnast is required to do a minimum of C skills. This is to ensure that routines include increasingly more difficult skills as the levels go up. Charts for

each group listed above with the requirements for each level as listed below can be found in the *Women's Artistic Gymnastics Junior Olympic Code of Points* book, written by the USA Gymnastics Committee (2014).

Level 6

1. One cast to a minimum of horizontal
2. Minimum one bar change
3. One 360 clear circling element from Groups 3, 6, 7 (Clear Hip Circles, Stalder Circles, Circle Swings, Hechts)
4. Dismount, minimum 'A'

Level 7

1. One cast to minimum 45 from vertical
2. \ 3. Two 360 clear circling elements (same or different) one minimum 'B', one from Groups 3, 6, 7 (Clear Hip Circles, Stalder Circles, Circle Swings, Hechts)
4. Salto/Hecht dismount, minimum 'A'

Level 8

1. Minimum one bar change
2. \ 3. Two 'B' elements, same or different; one with flight, OR, element with minimum 180 long axis turn.
 - One 360 circling element from Groups 3, 6, 7 (Clear Hip Circles, Stalder Circles, Circle Swings, Hechts)
4. Salto or Hecht dismount minimum 'A'

Level 9

1. Minimum two bar changes
2. One flight element, minimum 'B'
3. Second (different) flight element (minimum 'C'), OR, one element with long axis turn of greater than or equal to 180. (minimum 'C')
4. Salto or Hecht dismount, minimum 'B'

Level 10

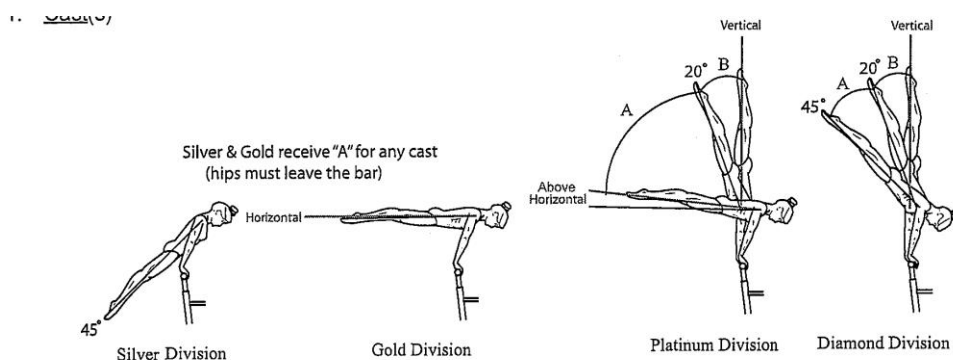
1. Flight element, min 'C', excluding dismount
2. Second (different) flight element, minimum 'B', excluding dismount
3. Element with long axis turn, minimum 'C'
4. Salto or Hecht dismount, minimum 'C'

(USA Gymnastics Committee, 2014)

At Level 10, the Junior Olympic Program ends. At this point a gymnast will either have moved on to competing at the collegiate level, been accepted onto the national team, or, will have stopped competing altogether. A noticeable increase in difficulty is shown again here within the Optionals (Levels 6 through 10). More noticeable skills include Hechts which require release and flight between bars. While this skill is optional in Levels 6 and 7, in Level 8, it becomes required. As the skills increase in complexity the reality of injury becomes more probable. Psychological factors, such as fear, can also become a new hurdle in the training process. Coaching can become as much about training the athlete mentally as it does physically. When considering attrition of these levels in the Optionals, the increase in time and skill demand should, yet again, be taken into consideration. However, in addition, these levels will also find a

challenge in obtaining skilled and qualified coaches. This may require an athlete to move if competing at the upper levels is being considered.

With the start of the Xcel program, gymnasts who enjoyed competing but were experiencing difficulty advancing, or, are conflicted about the increasing time and financial demands with the Junior Olympic program, now had another option aside from withdrawal. Since the Xcel program focuses on skill execution and not difficulty, an athlete is able to create their own unique routines that highlight the skills they do well. Without the demands of perfecting new skills, an athlete may not be required to put in as many hours in weekly practice. This also allows those who are having difficulty obtaining a specific skill, required for advancement within the Junior Olympic program, an option to stay competing in the Xcel program. In this program the athlete can showcase a unique routine developed to complement their skill level. Similar to Optionals in the Junior Olympic program, each division in Xcel has special requirements that have to be met for each routine. For example: the image below shows the difference in height of casts at each division for Xcel. (USA Gymnastics, 2014, p. 36)



Silver only requires a 45-degree angle, while Gold requires a cast be at least horizontal.

Likewise, Platinum is even higher with an A level cast being anywhere from above horizontal to 20 degrees from vertical, and B level is anywhere from vertical to 20 degrees below. Then

Diamond shows an A level casts at a minimum of 45 degrees, to 20 degrees from vertical and B level anywhere between vertical and 20 degrees below. Fear of, or difficulty in, achieving the increasingly more difficult skills can influence the time in which they will withdrawal from the sport. Overall, the Xcel program will, in the least, allow an option for athletes to continue who enjoy the sport of gymnastics, but have reservations about ongoing, required commitments. This could have the effect of a reduced total attrition rate within US Women's Gymnastics.

Time commitments, cost, and complexity of the skill requirements at each level play a possible role in determining whether a gymnast will continue or eventually withdrawal. Lindner, Caine, and Johns (1991) did a study comparing future drop outs to current competitive gymnasts. It was found that mainly age and social factors could differentiate the drop outs from those who continued to compete. An athlete, coach, or parent will want to understand trends in attrition related to their specific sport. Knowing the rates of withdrawal at each level will offer worthy insight for someone who is considering making the necessary commitments to competitive gymnastics. Understanding which levels show the highest rate of attrition can prepare a coach, parent, or athlete to make an informed decision to remain or forego advancement in the levels of women's gymnastics.

Initial Review of Literature

The initial review of literature revealed mainly a focus on causes of attrition within youth gymnastics, both men's and women's. These studies revolved around the social exchange theory, which, in psychology, is essentially a cost-benefits analysis of a given situation. In gymnastics, this is related to the effort, time, cost, and risk of injury in exchange for being a competitive athlete. The most common reason cited for withdrawal was time restraints (Johns, 1990). The second highest cause was injury; however, it was noted that the athletes' injuries were not "career ending," but rather the injury caused the athlete to then evaluate the time and effort involved in being able to return to full participation. In Johns study, 76 former competitive female gymnasts were surveyed on their reason for withdrawal with 10 dropouts having semi-structured interviews.

Return from injury can also bring along other psychological factors that can affect a gymnast's decision in continuing with her sport. Chase et al. (2005) stated issues with self-efficacy is particularly seen after injury when attempting to return to participation, saying: "At this point, avoidance behavior emerges and negative self-talk begins to ruminate" (p. 466). How the athletes perceive themselves can therefore be a predictor in their success. Those who feel confident in their ability to perform will likely continue in their sport. Through interviewing ten female competitive gymnasts aged twelve through seventeen who had experienced injury at some point in their career, Chase found the greatest factor in fear of injury is the difficulty in returning.

Participation motives were also used to predict dropouts among gymnasts. When looking at athletes with intrinsic versus extrinsic motivators, those with the former were more likely to

stick with their sport. Intrinsically motivated athletes will assess their competence within the sport based on self referenced standards, including: effort, skill improvement, and learning. On the other hand, those that are extrinsically motivated will measure their competence based on norm referenced criteria such as, outperforming others and displaying superior ability (Duda & Nicholls, 1992, p. 293). Ryska, et al. (2002) concluded, “Comparison of mean group differences indicated that dropouts tended to be older than participants, and were more motivated to participate in competitive gymnastics for situational (e.g., 'get out of the house') and social recognition reasons (e.g., 'be popular with others'). On the other hand, participants continued their competitive gymnastics for reasons of fitness (e.g., 'stay in shape'), team atmosphere (e.g., 'like the team spirit'), and personal challenge (e.g., 'learn new skills')” (Ryska, Hohensee, Cooley, & Jones, 2002, p. 203). The intrinsic attraction to competition and the desire to learn, motivate the athlete through the ability to achieve competence. It would be assumed that an athlete exhibiting these intrinsic qualities would be more likely to work through training difficulties that would otherwise result in attrition. In spite of this Klint (1986) examined the motives of 106 competitive, recreational and former gymnasts and established that there was no support for a relationship between motives for participation and withdrawal.

The last predictor analyzed was a survival based on performance characteristics. While most studies focus on psychological factors, in this study, 243 gymnasts were assessed for anthropometric, physical and motor characteristics. After the initial scores were recorded the athletes were monitored for five years. The goal was to determine survival as well as characteristics that would influence drop out. At the end of the study, Pion (2005) concluded that gymnasts with a score less than 68 on the assessment for motor skills were 129% more likely to

drop out than those with a score above 68 (Pion, 2015, p. 938). Based on this study, you would be able to assess a young gymnast's strength and abilities relative to their training age and determine their likelihood for success. This could be important, knowing the early commitment and specialization required for gymnastics.

While these studies look to the causes of attrition both psychological and physical, a lack of research on the current trends persists. With an analyses of current trends on attrition broken down by level we may begin to see where some of these influences take a stronger hold. As a gymnast advances, the time commitments, skill level, and risk for injury or burn out all increase. The move from Recreational to Compulsories, or, Compulsories to Optionals may hold more of a multidimensional complexity that would increase attrition rates at those specific transitions. By being aware of these trends, coaches, athletes, and parents will be capable of making a well informed decision to continue (and be prepared to work through the predicted difficulties), or, withdrawal with assurance.

Methods and Procedure

In order to retrieve data including the membership numbers of gymnasts at each level, an email was sent to USA Gymnastics Member Services in request. Responding was, USA Gymnastics Member Services Vice President, Cheryl Jarrett, who provided membership data with the notation that members were not tracked by level until 2013. Once received these numbers were graphed and analyzed for trends, specifically looking at which level shows the highest risk for withdrawal. AAU (Amateur Athletic Union) was contacted as well, but they were unable to provide any data at the time. In the beginning of the study, it was assumed that these organizations would have data and information relevant to the withdrawal rates within their organization. Unfortunately, this was not the case. Uncovering this information became much more difficult. Also, the Compulsory and Junior Olympic Code of Points, which are the guidelines for routines and scoring in the USA Gymnastic organization, are not readily available either. These required purchasing of an app that made the retrieval and transfer of information a much more arduous process. This being the case, the goal of this study became shifted from its initial quest to focusing on creating a foundation in which future studies may be based off of.

The purpose of this thesis uncovered the current trends in attrition rates within the various levels of women's competitive gymnastics. Previous studies have aimed to discover the causes of attrition; however, before this study there was little to no information available on current rates of withdrawal throughout the Recreational, Compulsory, and Optional levels. In looking at withdrawal trends; parents, coaches and athletes will understand when the risk for attrition is greater. This will prepare a parent or athlete in making decisions on the necessary commitments gymnastics requires. For a coach, this information will allow them to be more prudent with

athletes at levels with higher withdrawal rates. This information may even cause a gym to consider further coaches' education. Fears and skill difficulties play into attrition and a different focus on coaches' training may better prepare them for athlete success when it comes to the psychological factor, thus reducing attrition. While previous studies sought the "why", this one aimed to reveal the "when". With such early specialization required, parents, coaches, athletes and gyms will surely benefit from this insight.

Results

First, looking at Figure 1.0 and Figure 2.0 on the history of overall athletes within the USA Gymnastics program there was a clear increase in participation overall.

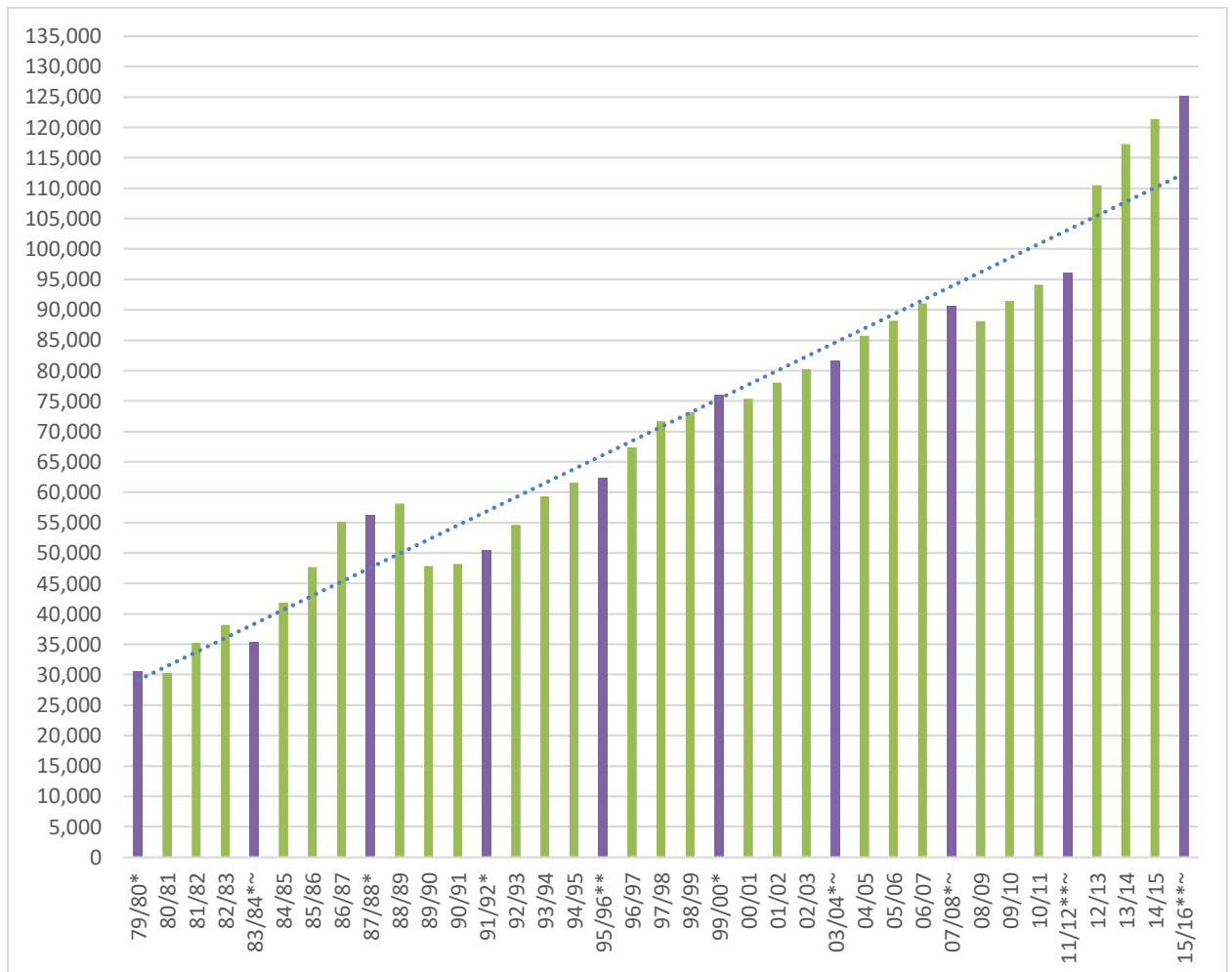


Figure 1 History of Overall Membership in USA Gymnastics

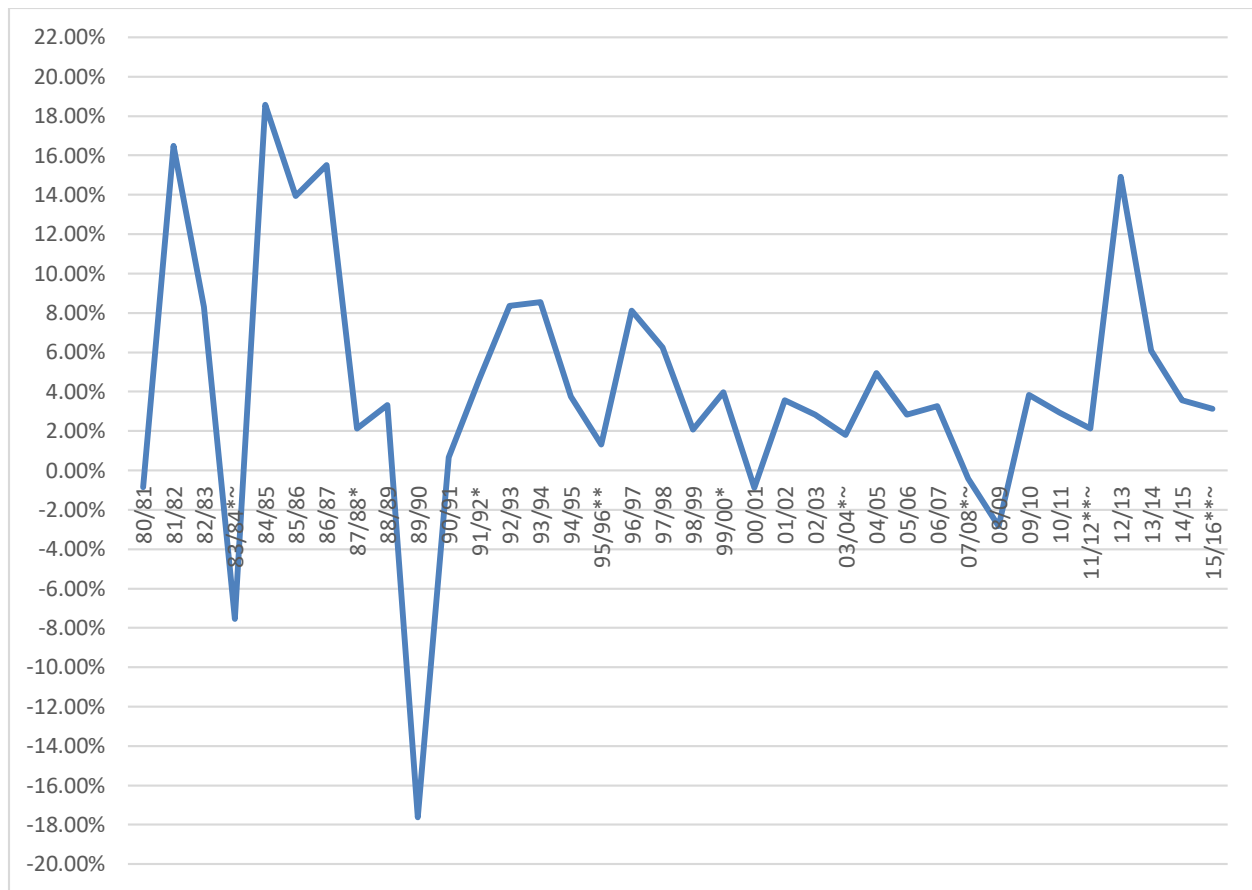


Figure 2 Percent change in Overall USA Gymnastics Membership

In 1979, there were 30,532 athletes. In 2016, there was a reported 125,216 athletes. This is a 410.11% increase in athletes over 37 years, however, as the graph shows, it was not a strict or steady increase each year. The largest percentage of increase was in 1984/1985 at 18.56%, where membership went from 35,314 in 1983/1984 (a 7.54% drop from 38,195 in 1982/1983) to 41,869. While an increase of interest in the sport of gymnastics could happen for various reasons, it would be worthwhile to note that 1984 was an Olympic year and more specifically the year Mary Lou Retton received a Gold medal in the All-Around, the USA Women's team received a Silver medal and the USA Men's team placed first to receive a Gold medal (USA Gymnastics, 2016). Just five years after, in the 1989/1990 season, we see the largest percentage in the

decrease of athletes at -17.61%. The number of athletes fell from 58,142 in the 1988/1989 season, to 47,903 in 1989/1990. While many factors may have affected this, it can be noted that the Nintendo Gameboy was first introduced in 1989.

Olympic years have been noted on Figure 1, by using an alternate color, for the years 1980, 1984, 1988, 1992, 1996, 2000, 2004, 2008, 2012, and 2016. In Olympic years 1984, 1988, 1992, 1996, 2004 and 2012 there was a rise in the number of USA Gymnastics athletes in the season directly following. For Olympic years 1980, 2000, and 2008, the following season showed a decrease in the number of athletes. In 1980 the Olympics held in Moscow were boycotted, in 2000 the women's team left with a bronze medal, and in 2008 USA Gymnastics took home a total of ten medals (2 gold, 2 silver, 2 bronze). Certainly not the worst performances, such as in 1988, when the USA gymnastics team brought home only one medal, a bronze in balance beam, yet still showed an increase of 3.32% the following season.

Overall, only six seasons of the 37 reported show a decrease in membership (1980/1981, 1983/1984, 1989/1990, 2000/2001, 2007/2008, 2008/2009). While particularly successful Olympic winnings may increase the popularity, and thus the number of participating athletes in the following season, that did not seem to always be the case. As a whole, however, participation in USA gymnastics rose an average of 4.33% per season from 1979 to 2016.

In Figures 3 and 4 the membership rates are shown by level for USA Women's gymnastics.

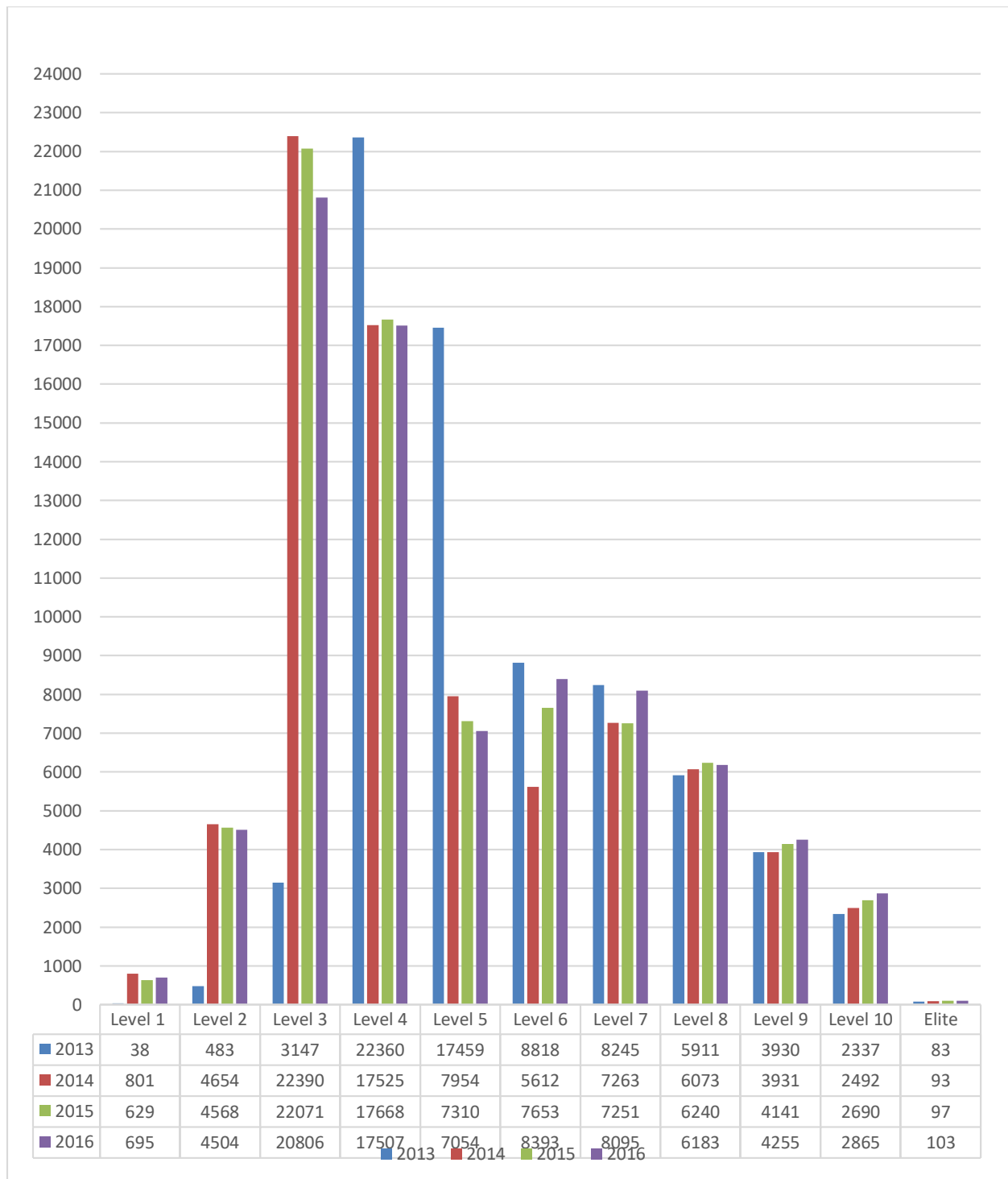


Figure 3 Women's Gymnastics Membership by Level

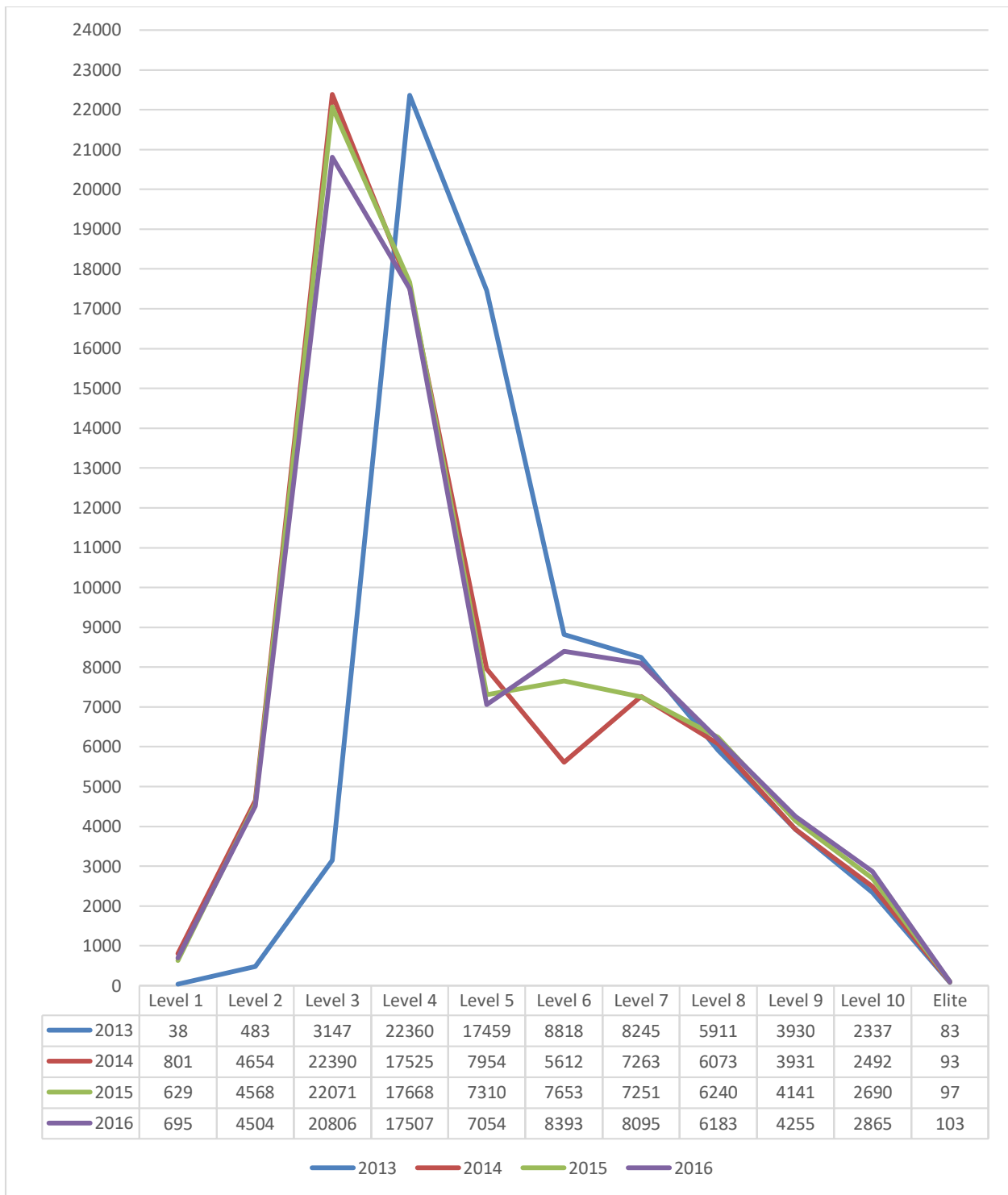


Figure 4 Women's Gymnastics Membership by Level

These numbers were provided by USA Gymnastics Member Services Vice President Cheryl Jarrett, who noted the tracking of memberships by level nationally only began with their new system in 2013. Previous to this, it was only tracked at the state level. As the chart shows, there is a noticeable difference in participation for Levels 1 through 6 in 2013 compared to following years 2014, 2015, 2016. This is due to changes in the women's program made in August 2013 for the 2013/2014 season. These changes included, combining the previous Level 1 and 2 into what is now the current Level 1. The previous Level 3 is the new Level 2, Level 4 is now Level 3, Level 5 is now Level 4 and Level 6 is the new Level 5 (USA Gymnastics, 2013). Considering these shifts, participation at each level was consistent year to year. The graph shows that there was a clear increase in participation through Levels 1 to 3. There were six and a half times more participants in Level 2 than in Level 1, going from an average of 540 to 3,552. In Level 3 there were almost five times more participants than Level 2, jumping up to 17,103. At this point the attrition began to take place. The first drop in participation took place at Level 4, with the largest drop at Level 5. Participation went from an average of 18,765 at Level 4 to almost half of that with a 47% decrease to 9,944 in Level 5. During Levels 5 through 10 there was a steady average decrease in participation at each level of approximately 23% to 36%. In a study by Martin, Polster, Jackson, Greenleaf, and Jones (2008) it was determined that gymnasts associate fear with the balance beam and uneven bars more than the other events. More specifically Level 5 and 6 gymnasts feared the flyaway skill (a dismount from the high bar where the gymnast swings forward, releases, and performs a back flip off of the bar) most. Then in Level 7 and 8 gymnasts feared flyways and giants (skill in which a gymnast rotates 360 degrees around the bar while in a fully extended position). Fear, and difficulty, of skills at these higher levels should be taken into

consideration in regards to causes of attrition at these higher levels. Consideration should also be given to the coaching in the Optional levels where attrition is taking place. Both the availability of qualified coaches and the ability of the coaches to successfully teach more complex skills, should be taken into account. As mentioned above, along with the more complex skills comes fear. A coach's ability to not only train the athlete in these difficult skills but to also assist in overcoming fear may affect the overall decision to withdrawal.

For a parent, coach, or athlete, Level 4 athletes advancing to Level 5 would be the peaking point to be aware of withdrawal. Cheryl Jarrett, with USA Gymnastics, summed this up as a response to the difficulty in achieving the skill of kipping (movement from a position below the equipment to a position above, usually on the uneven bars) that many young female gymnasts face. As discussed in Johns (1990) the causes for attrition can vary from social (time constraints) to injuries. These Levels (4 through 10) where attrition takes place have both increases in time demands (From 9 hours at Level 3, to 12 hours at Level 4, and 16 hours at Level 6) and possibility of injury as skills become more complex (Jump to high bar at Level 4, and release moves in Level 6). An important consideration should be made in regards to fear as well. As Chase (2005) concluded, fear of injury (and the difficulty in returning to training) can affect the gymnast's decision in continuing to participate. Future studies should look into these different causes of attrition and how they relate to the withdrawal at each level.

In Figures 5 and 6, the rates of participation for the Xcel program are shown.

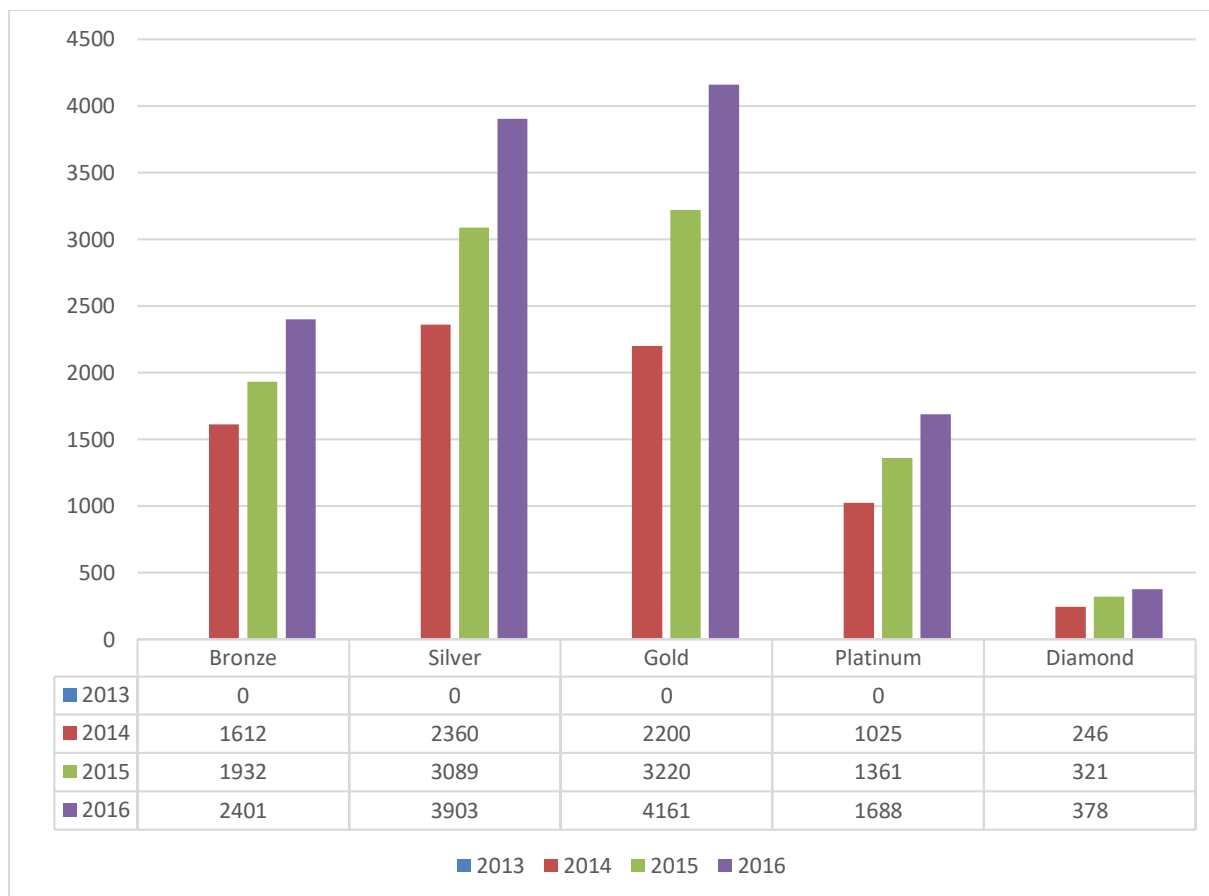


Figure 5 Women's Gymnastics Xcel Membership

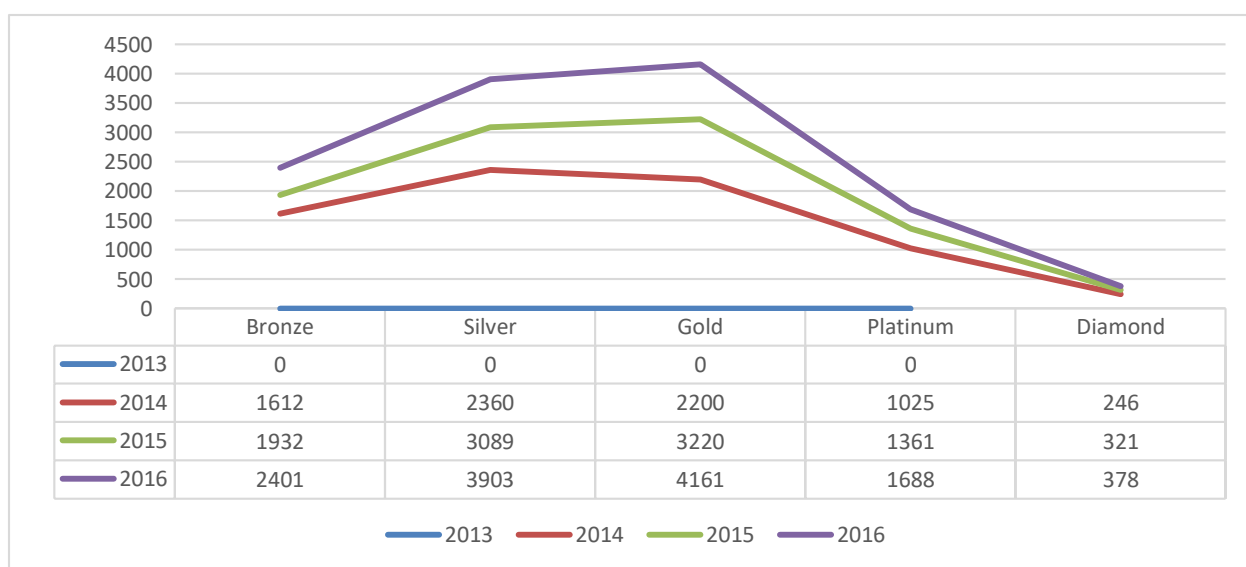


Figure 6 Women's Gymnastics Xcel Membership

In a fashion similar to the Junior Olympic program, the rates of participation increased through the first two divisions, and around midpoint of the program the rates began to fall as attrition took place. The Bronze division had an average of 1,981 members, increasing by 57% to 3,117 in the Silver division. This could be due to the minimum age requirement increasing to six years old, or possibly gymnasts who have competed in Junior Olympics for a year or two and decided they want a less structured and demanding approach. Then in the Gold division, there was an increase once again of 2% to 3,193. There may have only been a slight increase at this division because of the increase in minimum skills requirements such as, a now required dismount from the high bar on the uneven bar event, that can cause fear for some. It can also be presumed this division is comprised of the withdrawals that are taking place at Levels 3, 4, 5, and 6 in the Junior Olympic program, which limits the amount of participants who would qualify. Moving on to the Platinum division, there was a large decline in membership, of 57%, to an average of just 1,358 members. Again, the withdrawal can be likened to increasing skill difficulty with a kip (a move where the gymnast goes from a swing below the bar to above, with bar at the hips, through a single forceful leg swing while keeping the arms straight) now required on the uneven bars. Also, there are now prerequisite score requirements from the previous division. Age may also be a factor. The minimum age at this division is eight years old, however, some may be several years older and the desire for more time for social activities can play a role in attrition. Finally, Diamond is the last division in the Xcel program and also had the least amount of members with an average of only 315 members. This division requires previous experience of Levels 7, 8 and 9 in Junior Olympics which undoubtedly has an effect on the low memberships in Xcel due to the low participation at these levels in the Junior Olympics. Another factor to consider is that

withdrawal at these levels may be due to injuries, because of skill difficulties, which would prevent continuance into an Xcel division. Like the Platinum division, the drop in Diamond division can also be linked to age requirements (minimum nine years old) and desire for more social time.

While membership decreased throughout the divisions, the overall membership rates for the Xcel program grew. In 2014, the first year of record, there were 7,443 athletes participating. The following year there was an increase to 9,923 and again to 12,531 athletes in 2016. This growth can be attributed to the growth of the program since it was first developed in 2013. A guide, “How to start an Xcel program”, was published by USA Gymnastics to inform gyms of the benefits and processes of offering this program in their facility.

With popularity of this program increasing there will likely continue to be a rise in membership within the Xcel program. This rise will help to offset some of the attrition from the overall USA Women’s Artistic Gymnastics program. Although attrition is likely to still occur in a similar fashion since the difficulty of skills increases at each division. The attrition can stem from fear of performing these new skills, injury, or inability to achieve the new skill. In some cases, it is simply a social factor that typically relates to an athletes age and desire to do more things outside of sports. These factors can all explain the increased withdrawal throughout the higher divisions.

Conclusion

It was clear that attrition began at Level 4, peaked at Level 5 and continued through to Level 10. The causes of withdrawal may vary from cost or social (with time demands), to injury or fear. The latter being due to the increases in skill difficulties within the higher levels. However, in the process of gathering information for this study, it was both surprising and disappointing that there was such a lack of data available. Since the memberships only began being tracked by level three years prior to this study, there was limited data available. The levels also experienced a shift, as well as a new program introduction. As a consequence, further research and tracking of this data is suggested. What this study aimed to do though, was create a foundation by which future studies may be based off of. With the data collected and analyzed, this study has made it readily available allowing future studies to build on the findings.

APPENDIX A: DEFINITIONS

Cast- A swing movement on the bars that finishes in clear support on the hands only.

Counterswing- A backward swing on the bars

Glide- A forward swing on the low bar that finishes with the body extended.

Kip- Movement from a position below the equipment to a position above, usually on the uneven bars, parallel bars or high bar.

Pike Position- Body bent forward more than 90 degrees at the hips while the legs are kept straight.

Release- Leaving the bar to perform a move before re-grasping it.

Salto- Flip or somersault, with the feet coming up over the head and the body rotating around the axis of the waist.

Tuck- A position in which the knees and hips are bent and drawn into the chest; the body is folded at the waist.

Twist- Not to be confused with a salto, a twist occurs when the gymnast rotates around the body's longitudinal axis, defined by the spine

APPENDIX B: FIGURES AND TABLES

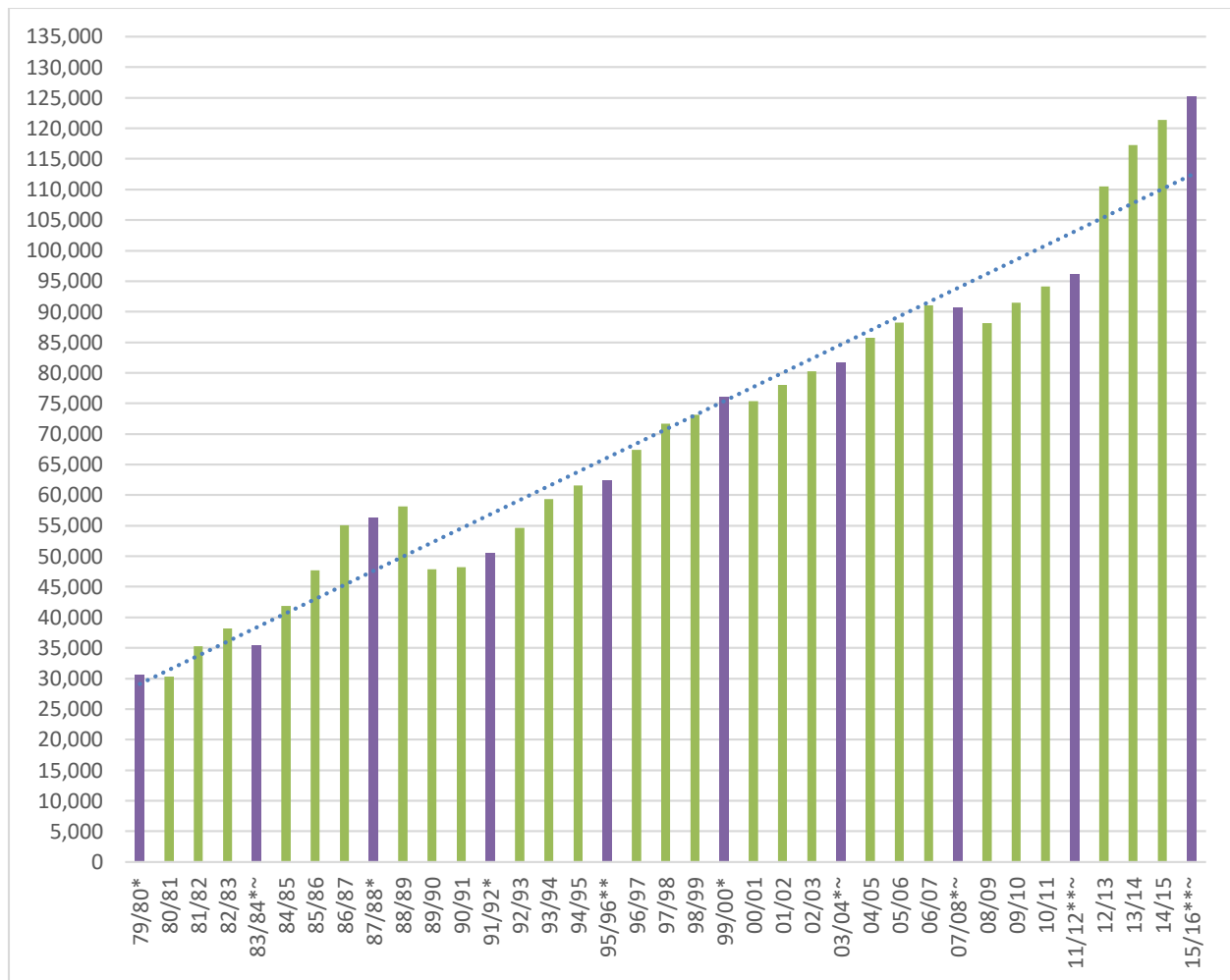


Figure 7 History of Overall Membership in USA Gymnastics

Season Yr.	Athletes	% of change
79/80*	30,532	
80/81	30,275	-0.84%
81/82	35,264	16.48%
82/83	38,195	8.31%
83/84*~	35,314	-7.54%
84/85	41,869	18.56%
85/86	47,704	13.94%
86/87	55,103	15.51%
87/88*	56,276	2.13%
88/89	58,142	3.32%
89/90	47,903	-17.61%
90/91	48,221	0.66%
91/92*	50,454	4.63%
92/93	54,666	8.35%
93/94	59,335	8.54%
94/95	61,565	3.76%
95/96**	62,377	1.32%
96/97	67,431	8.10%
97/98	71,649	6.26%
98/99	73,138	2.08%
99/00*	76,046	3.98%
00/01	75,367	-0.89%
01/02	78,043	3.55%
02/03	80,260	2.84%
03/04*~	81,710	1.81%
04/05	85,755	4.95%
05/06	88,190	2.84%
06/07	91,059	3.25%
07/08*~	90,686	-0.41%
08/09	88,111	-2.84%
09/10	91,479	3.82%
10/11	94,168	2.94%
11/12**~	96,167	2.12%
12/13	110,519	14.92%
13/14	117,230	6.07%
14/15	121,406	3.56%
15/16**~	125,216	3.14%

Table 4 USA Gymnastics Membership Numbers

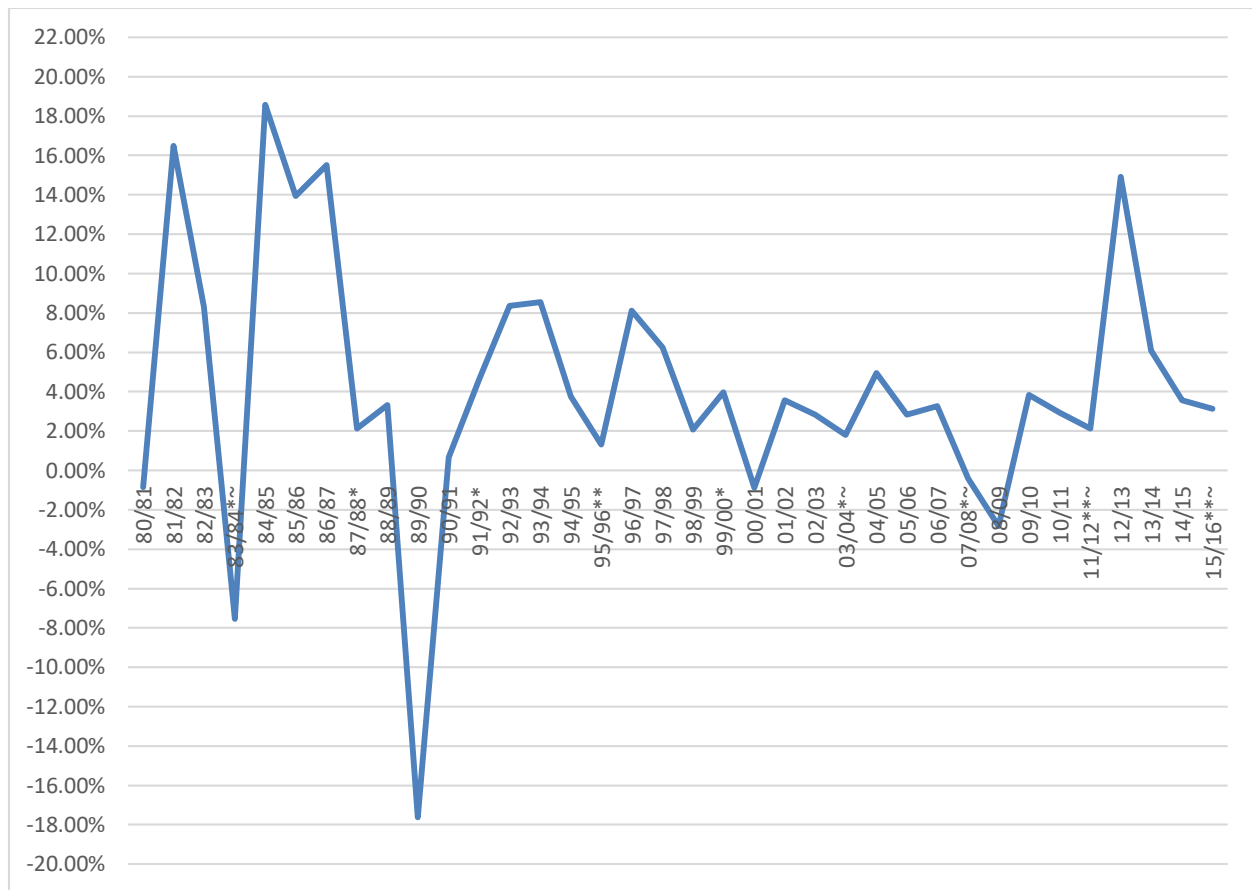


Figure 8 Percent change in Overall USA Gymnastics Membership

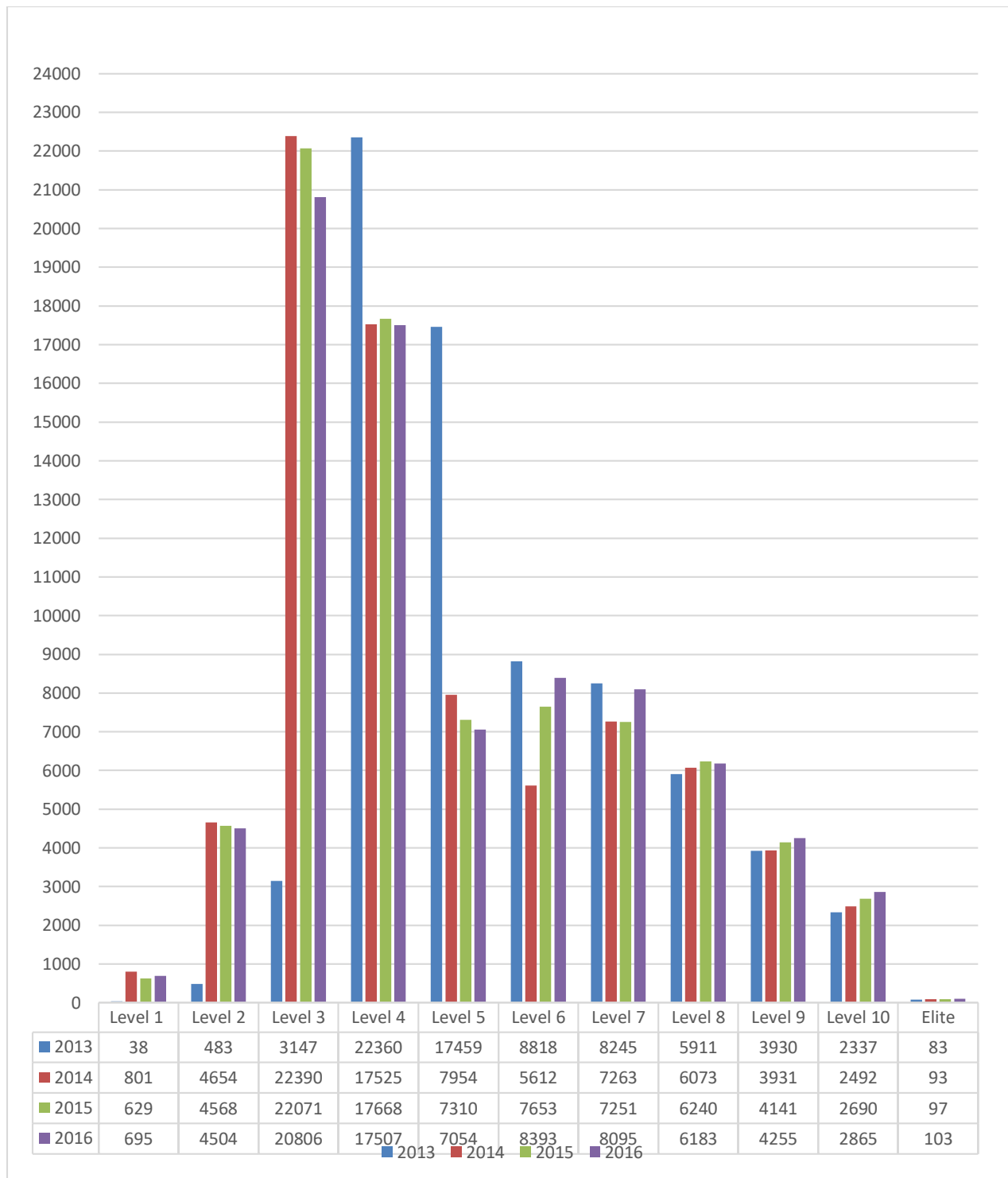


Figure 9 Women's Gymnastics Membership by Level

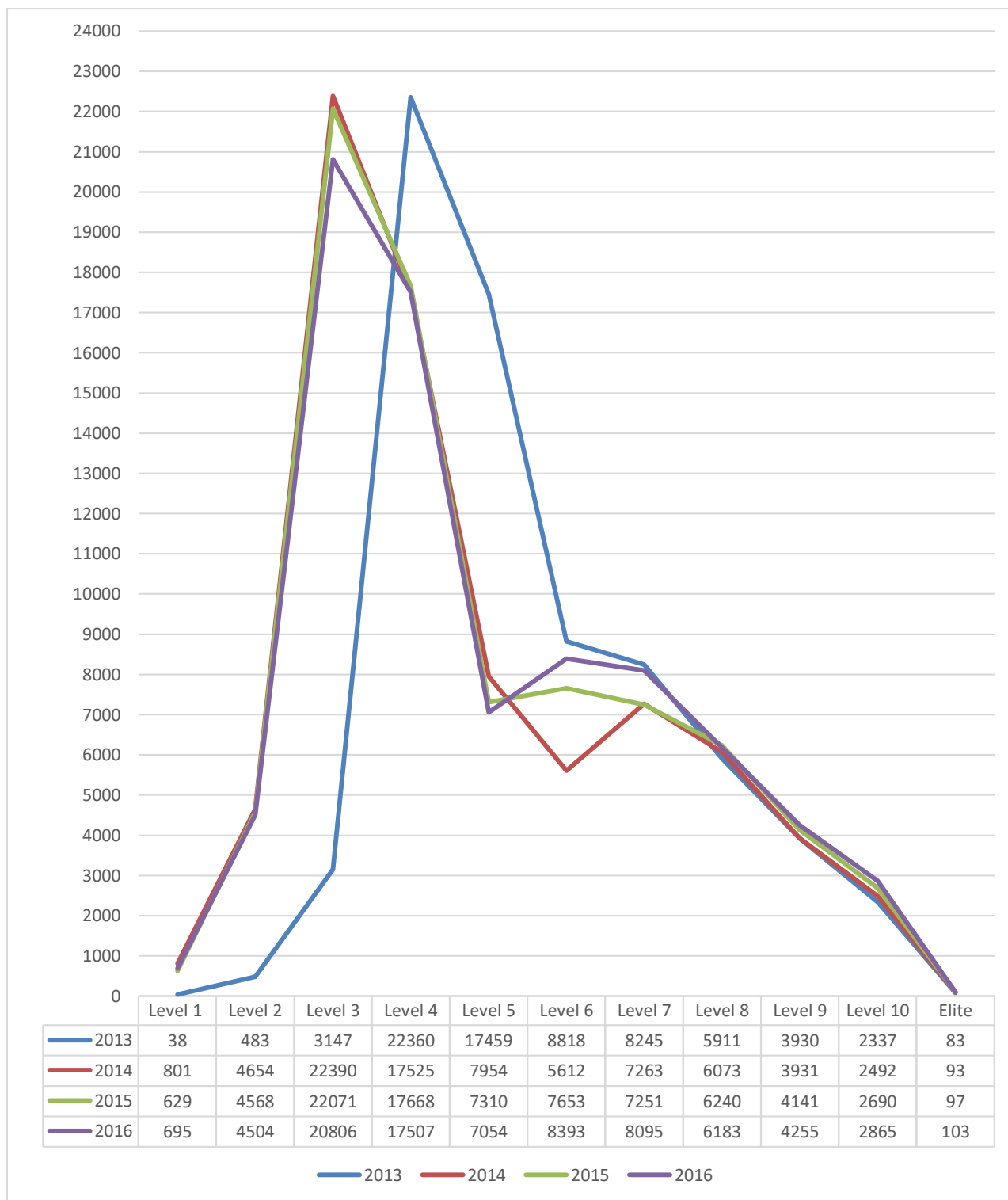


Figure 10 Women's Gymnastics Membership by Level

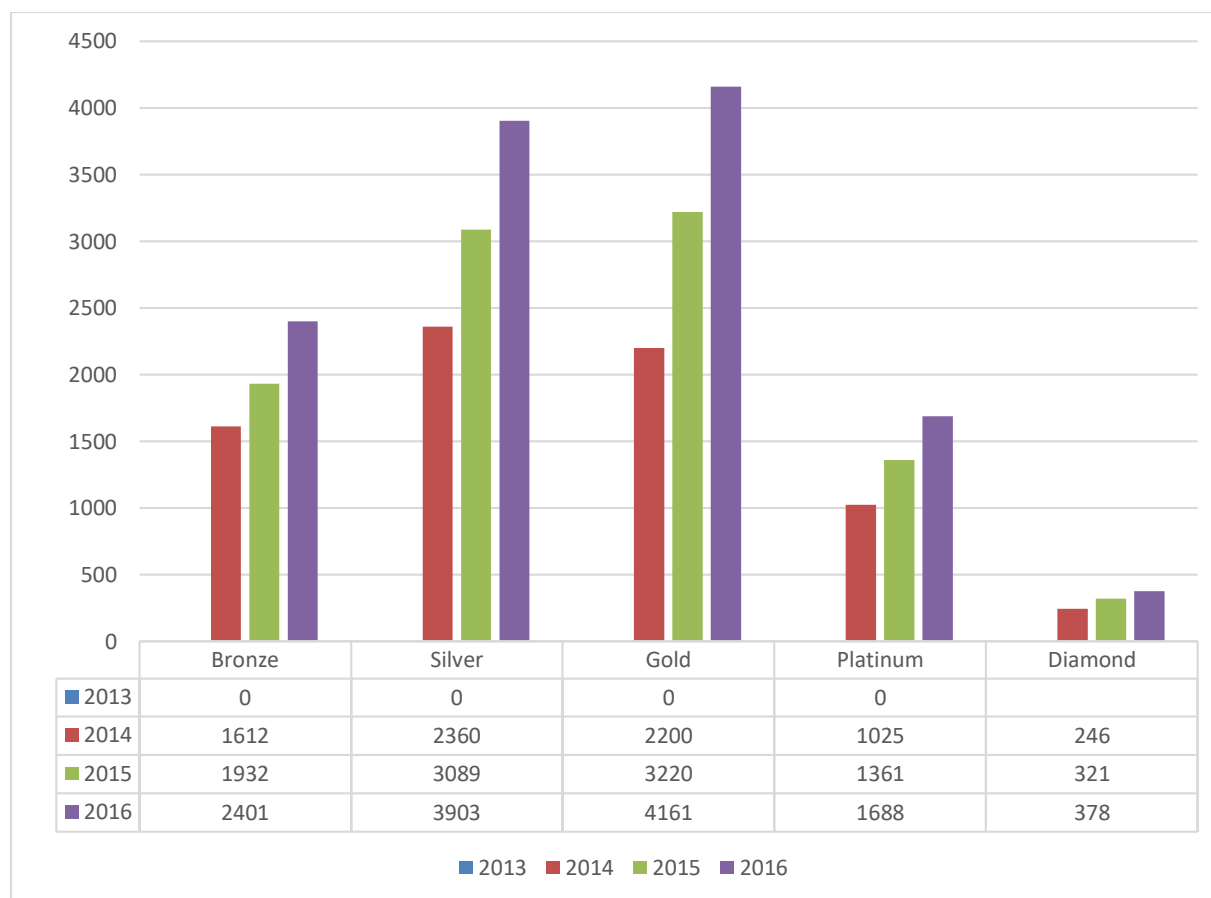


Figure 11 Women's Gymnastics Xcel Membership

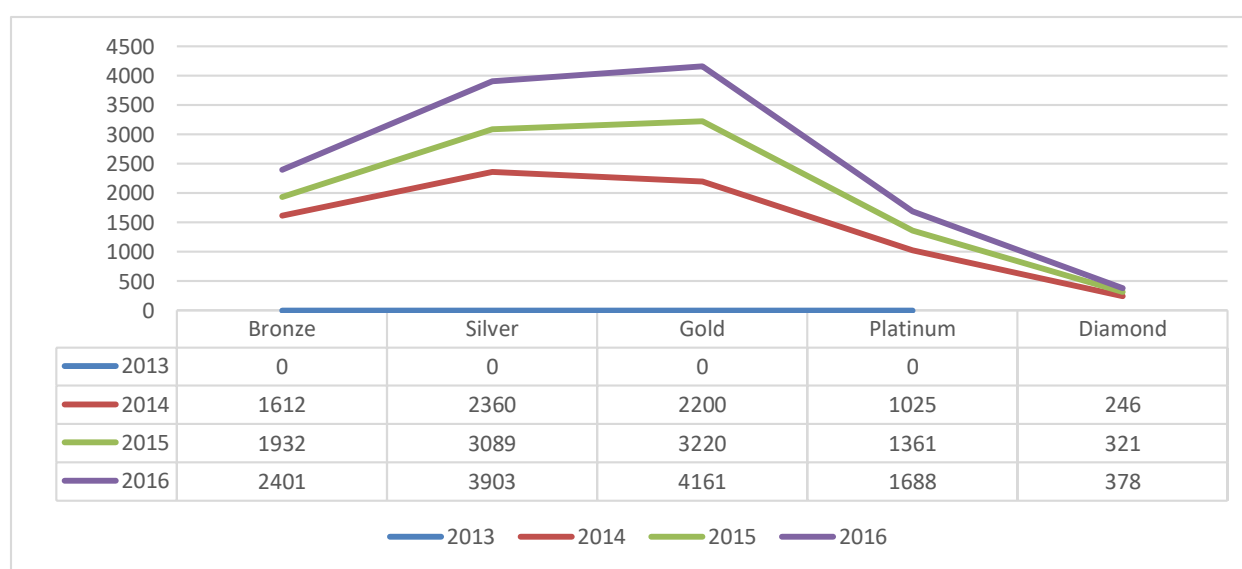


Figure 12 Women's Gymnastics Xcel Membership

	<u>2013</u>	<u>2014</u>	<u>2015</u>	<u>2016</u>	<u>Average</u>
Bronze	0	1612	1932	2401	1486.25
Silver	0	2360	3089	3903	2338
Gold	0	2200	3220	4161	2395.25
Platinum	0	1025	1361	1688	1018.5
Diamond	0	246	321	378	236.25
Level 1	38	801	629	695	540.75
Level 2	483	4654	4568	4504	3552.25
Level 3	3147	22390	22071	20806	17103.5
Level 4	22360	17525	17668	17507	18765
Level 5	17459	7954	7310	7054	9944.25
Level 6	8818	5612	7653	8393	7619
Level 7	8245	7263	7251	8095	7713.5
Level 8	5911	6073	6240	6183	6101.75
Level 9	3930	3931	4141	4255	4064.25
Level 10	2337	2492	2690	2865	2596
Elite	83	93	97	103	94
TOTAL:	72811	86231	90241	92991	85568.5

Table 5 USA Women's Gymnastics Membership by Level and Division

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